

Artificial Intelligence and public services

KEY FINDINGS

Artificial Intelligence (AI) has become a key enabling technology in public services and its use has increased over the past two years.

Ensuring explainability of AI systems in public services is crucial but difficult to achieve in case of black-box algorithms.

In AI applications in public services, focus is on law enforcement, surveillance and process optimisation. AI for front-end public services seems less of a priority.

There is a growing public concern over the development and use of AI in society. With the increase of its use, the potential for errors and harms also increases.

The public sector should lead the way in creating trustworthy AI. Regulatory sandboxing and pre-procurement are key for creating trustworthy AI for public services.

Introduction

The public sector aims to capture the benefits from using AI. Contrary to a commonly held opinion, there is no indication that the uptake of AI in the EU public sector is lagging behind the uptake in other sectors¹. As co-legislator, the European Parliament plays an important role in the EU AI strategy that is characterised by its focus on *trust* and *excellence*, by promoting tools that enable growth, competitiveness and quality of life in the EU, while safeguarding fundamental rights. But while governments aim to uphold human rights, unfortunately, not all applications in public services have been developed responsibly. In the Netherlands, for example, the use of the System Risk Indication (SyRI) system identifying social benefits fraud was banned². Furthermore, in the recently proposed AI-regulation, some AI-applications that may be used in public services such as those that manipulate human behaviour are specifically considered to pose an unacceptable risk and are forbidden³.

This briefing will discuss how AI can be used to improve public services, how public investments can accelerate the societal uptake of responsible AI and thus stimulate responsible AI developments in the private sector, and what the benefits and challenges of using Open Data for AI are. First, we provide background information on the definition and uptake of AI in public services. Then, we identify benefits and drivers of AI to improve public services. Subsequently, we present a number of challenges to the uptake and its acceleration. Finally, this briefing is concluded with recommendations.






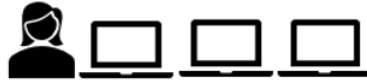

AI for public services

Different definitions of AI in public services are in use by various international organisations, authorities and expert groups. Many definitions vary by the level of detail of specifications given for the possible outcomes⁴ and embedded technologies or methods⁵. For the purpose of this briefing we use the short definition provided by the EU White Paper on AI published in 2020⁶: “a collection of technologies that combine, data, algorithms, and computing power”.

The OECD definition, already adopted by many EU Member States, explicitly specifies that AI targets human-defined goals, highlighting where the final responsibility for AI outcomes lies⁷. The role and influence of human responsibility in AI, however, becomes increasingly marginalised when complexity increases (e.g. through the use of multiple data sources and combining different AI applications). **Ensuring explainability of processes and trustworthiness is crucial but difficult to achieve in the case of “black-box” algorithms** (i.e. difficult to explain how they work or how they reach certain decisions; this is especially the case of forms of machine learning). As such this provides us with many questions on how to develop AI responsibly and human-centred, which is especially relevant in public services.

One element of human-centredness is the degree of automation of decisions or services. The Figure below shows the different levels or stages of automation.

Levels and types of decision automation in public processes

Decision Automation Type	Decision Automation Level	Description	Illustration
Automated decision-support	Manual	The human decides and acts without computer assistance.	
	Advice	The human decides and acts based on the advice of the computer.	
	Consent	The computer decides and acts after approval of the human.	
Automated decision-making	Veto	The computer decides and acts automatically but gives the human opportunity for a veto.	
	Autonomous	The computer decides and acts automatically without informing the human	

Source: Authors’ own elaboration based on Arciszewski, Greef & Delft (2009)⁸ and Parasuraman, Sheridan & Wickens (2000)⁹.

When looking into what constitute public services, we refer to the EU Treaty of Rome and the official classification of the functions of government (COFOG), in which it is defined as **services of general interest that correspond broadly to public services**. However, between Member States the interpretations differ significantly and in practice includes a combination of private organisations, public-private partnerships, and non-profit organisations. The European Parliament’s own definition of public services is: “an economic









activity of general interest defined, created and controlled by the public authorities and subject, to varying degrees, to a special legal regime, irrespective of whether it is actually carried out by a public or private body”¹⁰.

Public services thus include three categories¹¹:

- **Services of general economic interest**, which are basic services that are carried out in return for payment, such as postal services. These services are subject to European internal market and competition rules. However, there may be derogations to these rules if necessary, to protect citizens' access to basic services.
- **Non-economic services**, such as the police, justice and statutory social security schemes, are not subject to specific European legislation or to internal market and competition rules.
- **Social services of general interest** are those that respond to the needs of vulnerable citizens and are based on the principles of solidarity and equal access. They can be both of an economic or non-economic nature. Examples include social security schemes, employment services and social housing.

A recent study of the use of AI in public services in the Netherlands shows that **AI has become a key enabling technology in public services**¹². Furthermore, this study shows that the use of AI in public services has increased in the past two years and proliferates in the areas of inspection, enforcement and detection by enforcement agencies and for process optimisation of various services internally. In the mid-range of AI use are personalised services, maintenance and forecasting & policy making. The least frequent use of AI in public services is for knowledge gathering and support of democratic processes. These different types of services mainly use image recognition, speech/text recognition, and robotics. Also, the use of 'stand-alone' machine learning algorithms is often observed. Other studies of AI for public services also indicate a significant dependence on the private sector for developing and delivering AI solutions for public services. While some government organisations develop in-house AI solutions, arguably a majority do not. This dependence refers to the entire infrastructure of AI in public services and not just the front-end services. The figure below depicts typical AI applications in public services.

Categorisation of AI applications in public services

Democratic process	Tailored solutions	Process optimization	Maintenance	Inspection and enforcement	(Crime) investigation	Knowledge and archive	Forecasting and policy development
							
Stimulating open government and the general democratic process	Tailoring and personalizing service delivery	Optimization of resources, e.g. for smart city applications	Identifying potential risks to schedule repairs, e.g. in public space	Predicting risk based on (behavioral) patterns	Investigation of crime	Information gathering and archiving, e.g. to deepen knowledge on history	Identifying trends and patterns that can be used for policy and predicting trends.

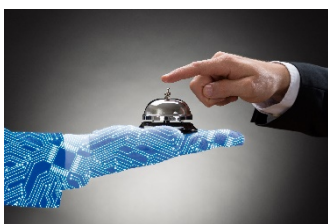
Source: Hoekstra, M., Chideock, C. & Veenstra, A.F. van (2021) Quicksan AI use in public services II.

Benefits of AI for public services and drivers for its uptake

Generic benefits of AI (including but not limited to its use in the public sector) include organisational benefits such as process optimisation and improvement of business intelligence. Dealing with large datasets and knowledge graphs, for example to find correlations and patterns over time or across domains, and the possibility to make fine-grained predictions based on these patterns **makes AI perfectly suitable for optimising operations in the public sector**. Other recent studies have pointed to economic benefits of using AI in the public sector, projecting economic growth¹³ and an increase in jobs¹⁴, although the latter

may also mean a change in type of labour, whereby low-skilled labour decreases as a result of automation. AI may help in the factory workplace or other assembly-line work, by aiding and co-working with humans become more efficient or to reach higher quality. Other benefits connected to the workplace are better time management, increased self-learning or co-learning and a better diffusion of innovation. Other benefits mentioned and observed can be found in healthcare, where AI and more precisely forms of machine learning have sped up scientific progress and helped tackle 'grand challenges'¹⁵. AI solutions may also have positive impacts in the area of occupational health and safety, in sustainability, and in social welfare, with dedicated roadmaps on how AI can help in achieving the Sustainable Development Goals¹⁶.

When focusing on AI in public services, **besides the generic goals and potential benefits** we know from **digital government strategies** and programs (such as efficiency, time and costs savings, service improvement, improved accessibility and inclusion of services), AI may contribute to such goals in its own particular way. In different studies performed by research institutes, NGO's, and the European Commission's own Joint Research Centre, empirical evidence was gathered on the use of AI in public services. **This empirical evidence shows a strong tendency towards applications in the areas of security and surveillance, and in internal process optimisation.**



Recent case studies have shown the potential of AI to improve social service delivery and accessibility of public services through, for example, communicative AI in government-to-citizens web portals or digital applications¹⁷. Another angle to improving the front-end interaction with public services is through service robots to deliver social care, help in referring citizens to the right counter, or help with getting their automated prescriptions, to name a few applications¹⁸. In that sense, **AI can contribute to personalisation of services**, although it remains to be seen if and how chatbots or service robots can truly reach a level of intelligent interaction needed.

Another form of aiding both citizens and internal work processes is to use AI to help in case selection and prioritising cases for public administrators or case workers, thereby **optimising internal workflows through more accurate predictions**. Examples of this are a random forest-based AI system that helps to predict when citizens get into problematic debt, in order to guide case workers to more targeted pre-emptive interventions¹⁹, or AI-based systems that, based on pattern recognition of combined datasets, help to predict fraudulent behaviour.

The global pandemic has accelerated public sector AI. For example, many countries have developed Covid-19 apps²⁰ **directed at both informing and controlling citizens**, using app data and AI-based models to predict next steps in spreading and human behaviour, as well as applications that allocate patients to beds and improve the diagnostic process²¹. Such applications have often been developed in transparency through the use of publicly available nation-based dashboards²² and through collaborations with research institutes and oversight bodies²³. Although uptake varied per Member State and the harmonisation of cross-border digital infrastructures and protocols remains challenging²⁴, the wide uptake of AI-based tools and applications during the pandemic highlights public sector readiness and willingness to operationalise existing technologies, develop alternatives and/or acquire the expertise to move rapidly from prototype to implementation. It, thereby, provided experience in the much-needed process of developing through experimentation and testing, and **learning-by-doing**, not only in the level of the technology but also from a legal, ethical and organisational point of view.

The benefits of such applications seem obvious, as often they are connected to a specific need or problem. However, in the case of AI systems geared towards process optimisation and internal business processes, benefits might show on the long(er) term. Some of the benefits are time savings through more and

improved digital services and an increase of predictive services which may lead to a **better allocation of public resources**. The use of AI may also aid in improving generic inclusiveness and accessibility of services. Within public services, we have seen an increase of the use of AI, be it for decision support or to further gain efficiency by completely automating processes. The use of AI in direct service delivery between citizen and government seems like an area in which there is much to gain, yet for now, not much evidence is found underpinning such developments.

Summarising, we identify the main benefits of AI use in the public sector as follows:

- Efficiency gains and internal process optimisation.
- Less human error and fraud, both internally and in services to businesses and citizens.
- Possibility to deliver more accessible and inclusive services: personalisation.
- Increase of anticipatory governance and policy: more accurate predictions.



Potential benefits as described above relate to particular drivers for uptake of AI in the public sector. An exploration of drivers for AI in the public sector amongst different Member States' representatives²⁵, has shown that in general Member States are looking both for better monitoring and understanding of citizen behaviour, and also to make better predictions and to offer more tailored services. A common driver or requirement to make this happen is the **simplification of regulatory frameworks** enabling and facilitating data sharing (for AI) which leads to improved data accessibility. Also having better

capacity to process different languages should get high priority since **AI-based services will increasingly be either trained and/or used cross-border**. Many AI applications are driven by efficiency goals, often by streamlining processes or enhancing detection capabilities through for instance patterns and comparisons. This efficiency gain of AI aligns with generic drivers of digitisation of government and as such provides a mandate to explore how AI can be used to deal with large amounts of tasks with limited funds. Although this varies widely per policy domain and/or department, the **availability of useful data is both a driver and a barrier** (in case of lacking data). Attracting experts with the required digital skills by public authorities as well as the **level of connectedness to ICT industry** will positively influence the uptake of AI for public services.

Moreover, the way in which AI is being developed in the public sector, and by whom, may have a major influence in realising its benefits. Developing AI in-house may increase transparency and auditability of AI systems in the public sector. However, they may also run the risk of lower performance, higher start-up costs, less training data and other challenges in uptake compared to for instance an established private party who is able to co-develop and offer AI-based public services. In case of the latter, however, data and model transparency as well as **auditability of the system** become more challenging and as such would pose risks to upholding public values or protecting fundamental rights. Again, it is important to understand the extent of potential risks and benefits in the context of a particular AI application in the public sector. When looking at benefits for the public sector when it comes to applying AI, it is necessary to understand what public sector goals are being aimed for or supported with the AI system.

Summarising, we identify the main drivers of AI use in the public sector as follows:

- Simplification of regulatory landscape.
- Sharing of best practices.
- Alignment of strength of AI (optimisation) and digital government goals.

- Earlier experience and investments in digitisation in the public sector.
- Level of digitisation in society: demand and uptake by citizens and governments of AI-based services.

Challenges and risks of AI for public services

While there are benefits of the use of AI, increased attention for AI in society and in the public sector has also raised concerns about the risks and harms AI-based system may cause. While forms of AI, such as rule-based systems based on expert knowledge, have been long deployed in manners usually not considered harmful, there is increasing **concern regarding the application of AI, and more specifically machine learning, to societal challenges**. Not all AI systems are considered harmful for individuals. However, the use of predictive systems in the public sector has already had undesired consequences, especially when deployed in forms of (semi) algorithmic decision making (ADM). The SyRI, for example, was an AI-based system using data from many different databases including personal and sensitive data to attribute a risk-prediction score to citizens (risk of committing a crime or offence). As mentioned earlier, this system has been ruled illegitimate and harmful to human rights by a court of law.

This raises the question *what harm is or can be in relation to AI* and what that means for AI-based applications and services in the public sector. Harm in a legal sense refers to damages or loss to a person or group of persons (be they natural or legal persons)²⁶. **The question of harm in relation to AI can be approached from different perspectives**. There is a technological perspective on risks and harms mainly in the AI-subdomain of machine learning, in which the unexplainability of AI (black-box algorithms) are a main concern.



Risks and harms can be approached from an ethical point of view by asking what the moral underpinnings of use or non-use of forms of AI are, e.g. to tackle challenges or solve a problem, and at what social, societal, economic or moral costs? Moreover, there is a legal viewpoint to harms, related to the question of whom to appoint liability and accountability claims in relation to established harms. The question is whether our current legal frameworks and democratic systems of checks and balances are equipped to regulate AI risks and harms, when

taking the recently proposed regulation for AI in mind. Lastly, the viewpoint of citizens and their view on AI risks and harms is of importance. How do people interpret this wave of AI developments and **what are their main hopes, concerns and perceived risks** when it comes to AI? On all these fronts, fundamental and applied research is ongoing, and even more is needed to understand and assess **AI as a socio-technical system** and its accompanying risks and harms.

Recent cases of governmental use of AI gone wrong (e.g. the aforementioned SyRI system in the Netherlands, or the automation of grading in the UK²⁷) have led to a **growing public concern over the development and use of AI in society**²⁸. Specifically, the use of AI poses a risk for the public sector because it leads to opaque procedures. Recent court cases have made explicit that harms indeed occur as a result of this opacity. These harms evolve around (amongst others) information asymmetry, not knowing about ADM processes in government services, not being aware and not being informed about of being part of a dataset used in an digital application, or being part of the outcome of a 'fact-finding' algorithm that predicts a certain likelihood of a citizen fallen into a particular category. Especially in policy areas such as law enforcement and fraud detection, once citizens end up on such a list, it can be life-destroying (a 'red flag' will continue to pop up in requests for benefits, childcare services, job-seeking etc.).

While usually developed and implemented with the best of intentions, the citizen-data double that has been created through datapoints and used by governments to create **predictions about future behaviour has often lead to dehumanisation** and increased bureaucratization of government. The role of AI cannot be

underestimated in the ongoing development of digitising government, while being far more scrutinised than private companies when it comes to forms of AI and ADM. NGO's²⁹ and privacy and ethics advocates follow closely if and how ethical guidelines for AI are upheld and what kinds of policy domains benefit from AI the most and at what risk. Scholars have mentioned computational violations of privacy, behaviour influencing through hyper-personalisation, algorithmic opacity³⁰ (not knowing when and how you are dealing with an AI or not, and what predictions it has made about you), lack of diversity of norms that get built in and automatically enforced³¹, dehumanisation through hard-coding assumption and values, irreproducibility of AI outcomes, monopolies of complexity, and more fundamentally the negation of novel and public futures³², and power asymmetries enhanced by algorithms without clear possibilities for redress³³.



Some of these harms may be amplified by the use of particular forms of AI, and some already existed but come to the surface through the application of AI. Specific forms of AI, most notably black-box AI (machine learning) and the application thereof in decision-making processes in that regard **pose novel risks** that go beyond the known risks and harms that have resulted from an increasingly data driven society³⁴.

Summarising, we identify the main risks of AI use in the public sector as follows:

- Discrimination due to data bias and hard coding of presumptions.
- Transparency and explicability. Good governance principles and right to explanation of a decision becomes more difficult when the use of AI and 'black-box' algorithms for decision support or algorithmic decision making is increasing.
- Dehumanisation of public services. Due to hardcoding of governmental processes and decision making, there is less and less leeway for exceptions or case-by-case circumstances (automation in general and AI specifically does not deal well with exceptions or boundary cases).

Barriers for uptake of AI for public services

The risks that AI poses to human rights and public values contributed to the development of a European proposal for AI regulation. By this regulation certain AI application domains are considered to pose an unacceptable risk will be prohibited, applications classified as high risk will be regulated, and lower-risk AI will be left to voluntary self-regulation, certification, or labelling. The consequence for public sector AI depending on the policy area. For instance, the safety and security domain has different needs and potential uses for AI-based systems and services than the social care domain.

There are, however, some generic barriers to be addressed for uptake of AI in the public sector. A first issue is a **generic lack of openness and transparency of AI applications** and the dataset and features measured or generated in such applications. Moreover, there is a barrier of **expertise and capacity** within national and local governments to develop AI-based applications in-house: as a result, governments either procure of AI or set up public-private partner programs in which governments are responsible for an AI system, but they are not the owner of the software. While there are proven advantages of public-private partnerships, in the case of AI this balance needs careful consideration when it comes to ADM. The latter consideration would be helped by clear (risk) frameworks to guide such decisions. So far, there are many ethics frameworks for AI³⁵, but they are difficult to translate into data science practice. Whereas the EC proposed a novel data

governance act³⁶, the connection to AI and AI regulation still needs to be made and put into practice within an **already complicated data regulation landscape**.

Another barrier for uptake is uncertainty of the role and place of government in data ecosystems or the **lack of data ecosystem tailored to governmental use**. Leaving exceptions aside³⁷, many local governmental bodies or smaller communities do not have the means to either organise or be part of a vivid data ecosystem, which is a minimal requirement to develop AI. In terms of open data challenges, a first would be how to develop a *data4AI* infrastructure³⁸ as a necessary building block for **training AI that is safe, secure, robust and (con)testable**; a second would be to find ways to independently scrutinise and test the AI models used on robustness and performance on the long run. Although the new AI regulation hints at this, **we have seen very little regulatory sandboxes** or auditing frameworks in place. Although it is too early for this, model robustness, auditability and explicability of outcomes is key in building reliable AI-based public services. Other challenges for many AI-based services in the public sector will be the non-transferability and testability due to the dependency on a specific language in which the algorithm has been trained and tested (if quality procedures are correctly followed). **Multilingual AI and accompanied training data** are one of the grand challenges for communicative AI in Europe.



Summarising the main barriers for uptake are:

- Access to data for training and testing.
- Complex data regulation landscape.
- In-house AI expertise and proprietary systems and software.
- Transparency and accountability of AI systems.
- Multilinguistic datasets to train local AI models.

Recommendations for uptake of AI for public services

The public sector has a very important role to play in the responsible development, deployment and use of AI systems to address societal challenges. Whether as developer of in-house AI systems, or as deployer of commercial AI systems, or as regulator of AI, the public sector disposes over various tools which could be used more actively and effectively than is currently the case.

Whereas most Member States have national AI strategies and many public and private organisations have published or are working on ethical frameworks and guidelines for responsible or human-centric AI, little attention is paid to the practical reality of current AI-based public services. Many of such services are developed with external private entities. As such, little attention is paid to procurement processes around AI in the public sector and the (lack of) reflection of AI ethics terminology and principles in those processes. **Public procurement** in particular holds significant potential in the responsible development and deployment of commercial AI systems for use in the public sector. The EU counts over 250,000 public authorities. With a budget of about 2 trillion EUR per year (the equivalent of over 14% of the EU GDP³⁹), they are the main investors in areas such as social protection, health, transport, education, energy, public order and safety, and defence. However, preliminary data indicate that in public procurement of AI, price remains the main selection and evaluation criterium, and strict criteria for the development of socially responsible AI are rarely set. This could be actively encouraged and supported by harmonised EU guidance (such as the recently published EU guidance for socially responsible public procurement; or specific guidance for AI public procurement⁴⁰).

Next to public procurement, **other tools** could be used to address specific challenges posed by AI in public services. Amongst those currently explored are extended pre-procurement tasks, pre-commercial procurement projects, technical and regulatory sandboxes, and testbeds.

Pre-procurement can be used in the public sector to assess in advance the feasibility of a potential AI project in all its complexity: social, economic, technical, organisational. In addition, it can be used to define the social and economic requirements with which the potential AI system have to comply (such as transparency, explainability, usability, etc.). There is no information about the current use of this due diligence tool by the EU public sector.

Pre-commercial procurement projects are initiated by one or several public sector organisations working closely with several suppliers of technical solutions. They aim for the development and prototyping of AI systems that satisfy specific needs as defined by the public sector buyer. This tool is currently used experimentally by the public sector⁴¹. **Technical and regulatory sandboxes** are controlled environments in which AI systems are developed and tested live. In these environments also the functioning of AI systems and their potential risks can be explored in a safe environment and used for regulatory purposes⁴². This tool is also relatively recent and experimental. There is an opportunity for the public sector **to lead the way in creating trustworthy AI**.

Based on recent insights gathered from applied research regarding the use of AI in the public sector, we recommend considering the following:

1. Promote Human Rights Impact assessment for AI (HRIAAI). Whereas Human Rights Impact Assessment in itself is not new, in the context of AI in the public sector, there have been recent developments to apply this form of impact assessment.
2. Experimentation & regulatory sandboxing. As proposed in the novel regulation, experimentation and regulatory sandboxing are key in developing trustworthy AI in and for the public sector. We stress the need to apply a multidisciplinary approach, with a strong emphasis on social science and humanities as being currently underrepresented in such endeavours.
3. Education and explanation. If the aim is to take the wider public on board and develop true human-centric AI, the public sector should be leading in demystifying AI and offering free and open education about AI. Over the recent year, many such initiatives have been developed and deployed in both formal and vocational/voluntary education: professional education within government about AI would truly help in increasing public sector readiness for AI.
4. Recontextualisation and rehabilitation of the citizens behind the datasets. In many cases in which public sector AI went wrong, the issue seemed to originate from a loss of context and impact on real lives of real people: if public sectors AI developers and administrators are only confronted with numbers, graphs and thresholds, the human side of AI gets lost.
5. Oversight and monitoring should be organised in a dynamic way. Many specifically self-learning 'black-box AI' applications may change over time due to optimisation and/or novel or added datasets or features. As a result, oversight and evaluation of such systems also needs to be dynamic and equipped for the long term. The conformity assessment as described in the proposed AI regulation does not seem to capture the long-term changes to the algorithms and accompanied impact of AI, or 'feature creep' that might occur over time. Moreover, many AI applications will operate within a 'system of systems'; changing the algorithm might have secondary effects on other technical or organisational processes. This makes the exercise of oversight and evaluation potentially more complex than in previous IT systems.

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- ²³ See for example in France the organisation of expertise around privacy-preservation in the TousAnticovid app: [Info Coronavirus COVID-19 - Application Tousanticovid | Gouvernement.fr](https://www.tousanticovid.fr/).
- ²⁴ See for example: [Covid-19 - why didn't Europe's tracing apps work? \(euobserver.com\)](https://euobserver.com/2020/04/covid-19-why-didnt-europes-tracing-apps-work).
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- ³¹ See for example: <https://themarkup.org/2020-in-review/2020/12/15/algorithms-bias-racism-surveillance>.
- ³² See for example: <https://www.theguardian.com/commentisfree/2021/feb/05/jeff-b...>
- ³³ See for example: [Human-centred AI in the EU - YouTube](#) for more elaboration on risks and potential harms.
- ³⁴ Some of those known risks are described here: [7 Types of AI Risk and How to Mitigate their Impact | by Babar Bhatti | Towards Data Science](#).
- ³⁵ Cath, C., Wachter, S., Mittelstadt, B., Taddeo, M., & Floridi, L. (2018). Artificial intelligence and the 'good society': the US, EU, and UK approach. *Science and engineering ethics*, 24(2), 505-528.
- ³⁶ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on European data governance (Data Governance Act). COM/2020/767 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020PC0767&from=EN>.
- ³⁷ One of those exceptions is the municipality of Barcelona, who have developed open source software and tools to manage their public services. See: [Barcelona: showcase of smart city dynamics - Smart City Hub](#).
- ³⁸ Janssen, M., Charalabidis, Y., & Zuiderwijk, A. (2012). Benefits, adoption barriers and myths of open data and open government. *Information systems management*, 29(4), 258-268.
- ³⁹ The European policy on public procurement can be found here: https://ec.europa.eu/info/policies/public-procurement_en.
- ⁴⁰ One example are the AI government procurement guidelines defined by the Office for Artificial Intelligence in the UK. See: [Guidelines for AI procurement - GOV.UK \(www.gov.uk\)](#).
- ⁴¹ One example is the AI4Cities pre-commercial procurement project. The aim of the project is to procure "R&D of solutions that support cities' transition to carbon neutrality via artificial intelligence (AI) and related enabling digital technologies. (...) Two key domains linked to the cities' strategies and carbon-positive goals have been pre-selected: mobility and energy." Initiators of the project are a group of EU cities (Helsinki, Amsterdam, Paris, Copenhagen, Tallinn and Stavanger) with a shared interest in smart city applications and the reduction of greenhouse gas emissions. See: [Achieving smart city climate commitments with AI - Intelligent Transport](#).
- ⁴² One example is the regulatory sandbox for responsible AI set up by the Norwegian Data Protection Authority. The sandbox serves a double purpose: for the Norwegian Data Protection Authority to increase their own knowledge about AI and develop guidance for organizations using AI; and to help "individual organizations ensure compliance with relevant regulations and the development of solutions that take privacy into account." See: <https://www.datatilsynet.no/en/regulations-and-tools/sandbox-for-artificial-intelligence/>.

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Administrators responsible: Frédéric GOUARDÈRES, Matteo CIUCCI; Editorial assistants: Catherine NAAS, Janetta CUJKOVA

Contact: Poldep-Economy-Science@ep.europa.eu

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