Making Algorithm Registers Work for Meaningful Transparency

State of the art and policy recommendations on how to design, implement and evaluate algorithm registers

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About this report

This report has been prepared by Soizic Pénicaud, with coordination and editing by IA Ciudadana. It is published in March 2025.

IA Ciudadana is a coalition of 17 organizations working to defend human rights in the context of digital technologies. Our goal is to expand spaces for societal participation in the regulation and governance of artificial intelligence and algorithms. More info: **iaciudadana.org**.

Executive Summary

More and more algorithms are used in critical fields of the public sector. Yet, even as some of these systems have been shown to have dire consequences on citizens, their use remains opaque.

The European Union's recent AI Act introduces an EU-wide database, managed by the European Commission, in which high risk AI systems will have to be registered publicly. This includes algorithmic systems used in critical areas of the public sector, such as education, access to public services, or justice, and in the private sector, such as banking and insurance.

The database is not devoid of limitations. However, it is an opportunity for governments to tackle the topic of algorithm registers at a national level, and use them as a tool to ensure transparency, accountability and the safeguarding of fundamental rights in the way algorithmic systems are designed, developed, implemented and assessed.

Against this backdrop, this report aims to inform governments wishing to develop an algorithm register in their national context, and organizations advocating for their development. It attempts to answer the question: how to design, implement, and evaluate a national algorithm register that serves transparency, accountability, and the safeguarding of fundamental rights?

To do so, it:

- Explores how algorithm registers can contribute to more meaningful transparency of public sector algorithms;

- Outlines the opportunities and limitations of the AI Act's database;

- Presents the state of play of algorithm registers in Europe, based on a mapping and analysis of 39 algorithm registers developed or planned on the European continent;

- Proposes 12 concrete policy recommendations to design, develop and implement an algorithm register at a national level, based on a review of literature, guidance, and interviews with governments and civil society actors;

- Proposes a sociotechnical framework for a register, building on existing frameworks, that can be used as a first iteration for a national register.

Algorithm registers are a necessary tool to guarantee algorithmic accountability. By bringing more transparency to the technical and policy aspects of algorithmic systems, they can help safeguard fundamental rights, foster democratic participation, and make governments more responsible for their decisions.

However, they are never sufficient. If done poorly, they risk participating in “transparency washing” without bringing more accountability to the way algorithmic systems are introduced, developed, or evaluated. They must be carefully implemented in order to actually achieve meaningful transparency.

The AI Act’s database’s mandatory status gives Member States the impetus to tackle the topic of algorithm registers. However, it presents major limitations: its scope is limited, and exceptions allow for critical systems to remain opaque (in particular, law enforcement and migration systems). High risk systems used in banking and insurance which are asked to conduct fundamental rights impact assessments but not to make them public. The information required is also insufficient and risks being too laconic. This calls for Member States to go further than the AI Act’s provisions.

Today, 34 algorithm registers are in use in Europe, including 27 by public institutions and governments and 7 by external actors such as civil society organizations. Only five countries, of which only two in the European Union, currently have registers at a national level (the UK, France, Norway, the Netherlands, and Scotland).

Although they have been on the rise in the last few years, registers remain a nascent governance tool. As such, they lack standardization (in terms of scope, content, numbers), and have shown limited impact so far, especially as internal and external evaluations are scarce. If they are already recognized as useful tools for internal governance, few can already be used as a resource for monitoring and research due to lacking essential technical features and documenting too few algorithms. Most initiatives remain voluntary and public agencies lack incentives to document the systems.

However, interestingly, most of the existing registers already go beyond the AI Act in terms of scope and content.

With this context in mind, the report makes the following recommendations:

Process and governance

1. Build a central, mandatory register

2. Collaborate with civil society to build, assess, and use the register

3. Approach national registers as complementary to the AI Act database

Scope

4. Include rule-based algorithms

5. Register all algorithms publicly, especially in critical sectors

6. Include in-development and discarded systems

Accessibility and usability

7. Adapt the level and presentation of information to different audiences
8. Include search, tracking & versioning functionalities
9. Document and justify the absence of information

Implementation

10. Appoint a team in charge of implementing the register
11. Embed the registration into the lifecycle of the algorithmic system
12. Supplement the register with other accountability instruments

Introduction

From determining whether inmates can be granted parole[1], to allocating organ transplants[2], predicting students' exam grades[3], targeting social welfare beneficiaries for controls[4], and estimating risk of gender-based domestic violence[5], public administrations are increasingly resorting to algorithms[6] to support or make decisions and to interact with citizens. They also seep into critical areas of the private sector, such as insurance, banking[7], or employment[8]. The use of algorithms is often seen as a way to achieve more efficiency, objectivity, or lower costs[9].

However, over the past few years, researchers, journalists, civil society organizations, and institutions have shown that algorithms are not without risks, including discrimination[10], harms to fundamental rights[11], and poor quality decisions[12]. Some systems, and the policies they implement, have had dire consequences on citizens[13] and eroded public trust.

Even as problematic systems are uncovered and contested, the use of automated-decision making algorithms by governments remains opaque. Currently, it is nearly impossible to have a clear picture of all the algorithms used

[1] Digital Future Society. (2022). Chapter 1. RisCanvi (I): el algoritmo de la cárcel. In *Algoritmos y gobiernos*. Available at: https://digitalfuturesociety.com/podcasts/capitulo-1-riscanvi-i-el-algoritmo-de-la-carcel/

[2] Robinson, D. G. (2022, August 21). The Kidney Transplant Algorithm's Surprising Lessons for Ethical A.I.. Slate. Available at: https://slate.com/technology/2022/08/kidney-allocation-algorithm-ai-ethics.html

[3] Jones, E. and Safak, C. (2020, August 18). Can Algorithms ever Make the Grade?. Ada Lovelace Institute. Available at: https://www.adalovelaceinstitute.org/blog/can-algorithms-ever-make-the-grade/

[4] Geiger, G. (2023, March 7). How Denmark's Welfare State Became a Surveillance Nightmare. Wired. Available at: https://www.wired.com/story/algorithms-welfare-state-politics/

[5] Eticas. (2022). The adversarial audit of VioGén: Three years later & new system version. Available at: https://eticas.ai/the-adversarial-audit-of-viogen-three-years-later/

[6] Algorithms are (computer) programs which, given an input, produce an output based on a set of steps.

[7] AlgorithmWatch. (2018, May 22). OpenSCHUFA – shedding light on Germany's opaque credit scoring algorithm. Available at: https://algorithmwatch.org/en/openschufa-shedding-light-on-germanys-opaque-credit-scoring-2/

[8] Institute for the Future of Work. (2022, September 23). Algorithmic hiring systems: what are they and what are the risks?. Available at: https://www.ifow.org/news-articles/algorithmic-hiring-systems

[9] See for instance OECD/UNESCO. (2024). G7 Toolkit for Artificial Intelligence in the Public Sector. OECD Publishing. Paris. Available at: https://doi.org/10.1787/421c1244-en.

[10] BBC. (2020, August 4). Home Office drops 'racist' algorithm from visa decisions. BBC News. Available at: https://www.bbc.com/news/technology-53650758

[11] Heikkilä, M. (2022, March 29). Dutch scandal serves as a warning for Europe over risks of using algorithms. Politico. Available at: https://www.politico.eu/article/dutch-scandal-serves-as-a-warning-for-europe-over-risks-of-using-algorithms/

[12] Yong, E. (2018, January 17). A Popular Algorithm Is No Better at Predicting Crimes Than Random People. The Atlantic. Available at: https://www.theatlantic.com/technology/archive/2018/01/equivant-compas-algorithm/550646/

[13] Burgess, M., Schot, E., and Geiger, G. (2023, March 6). This Algorithm Could Ruin Your Life. Wired. Available at: https://www.wired.com/story/welfare-algorithms-discrimination/

in a given sector or geographical area. As a result, citizens, watchdogs, and regulators struggle to comprehend their uses, let alone monitor and challenge them. Public agencies also lack the necessary overview to ensure proper governance. More generally, such opacity prevents democratic debate around the automation of public services.

The European Union recently established a uniform framework to regulate the development, marketing, and use of artificial intelligence (AI) systems throughout the EU. The AI Act[14] entered into force on August 1, 2024. It introduces new obligations for entities developing or using AI systems. One of them is the obligation for providers and deployers of specific AI systems to register them in a public database managed by the European Commission (see section 2 of this report)[15]. The database is meant to "facilitate the work of the Commission and the Member States in the AI field" and to "increase the transparency towards the public"[16].

Civil society voices have hailed the database as a welcome governance tool in the AI Act, while pointing to its worrying shortcomings[17]. For Member States, there's an opportunity to tackle algorithm registers at a national level in a way that addresses the limitations of the AI Act database.

Against this backdrop, this report attempts to answer the question: how to design, implement, and evaluate a national algorithm register that serves participation, accountability, and the safeguarding of fundamental rights?

This report starts with an overview of algorithm registers, and the interplay between algorithmic transparency and government accountability (Section 1). It then presents the EU AI Act's provisions on the high-risk system database, and analyzes its opportunities and limitations (Section 2). It follows with an overview of the current state of algorithm registers in Europe (Section 3). It ends on 12 concrete policy recommendations to design, develop and implement an algorithm register at a national level (Section 4).

Methodology

The findings of this report are based on:

[14] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) (Text with EEA relevance), hereafter "AI Act".
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1689&qid=1724384177230

[15] AI Act, Article 71

[16] AI Act, Recital 131

[17] Article 19 et al. (April 3, 2024). EU's AI Act fails to set gold standard for human rights. Available at: https://www.article19.org/resources/eu-ai-act-fails-to-set-gold-standard-for-human-rights/

- An analysis of 39 algorithm registers developed or planned on the European continent by governments and civil society organizations, to establish the state of play. The mapping expands on efforts to map algorithm registers worldwide[18].

- Semi-structured interviews with civil society organizations and governments developing and using algorithm registers, to identify the needs of target audiences and good practices from governments;

- A review of existing reports, academic literature, and government guidance on algorithm registers;

- A review of existing policies and regulations relevant for the EU context, in particular the AI Act.

Our analysis focuses on publicly accessible registers in the executive branch, with at least a description of each algorithmic system, who uses it, and a presentation of the algorithm.

Registers can either be built internally (by governments using algorithmic systems) or externally (by civil society organizations or academic institutions), to fill an information gap left by government inaction.

As external registers are usually designed as a monitoring and advocacy tool, they are not directly comparable to internally built registers. Consequently, while our research inventories registers built by civil society, the analysis focuses on government-led initiatives.

[18] Gutiérrez, J.D. and Muñoz-Cadena, S. (2024). Algorithmic Transparency in the Public Sector. A state-of-the-art report of algorithmic transparency instruments. Global Partnership on Artificial Intelligence. Available at: https://gpai.ai/projects/responsible-ai/algorithmic-transparency-in-the-public-sector/algorithmic-transparency-in-the-public-sector.pdf; Ada Lovelace Institute, AI Now Institute and Open Government Partnership. (2021). Algorithmic Accountability for the Public Sector. Available at: https://www.opengovpartnership.org/documents/algorithmic-accountability-public-sector/

1. Algorithm registers and meaningful transparency: an overview

Algorithm registers are "consolidated directories providing information about algorithmic systems used by public agencies in different jurisdictions"[19]. They can take the form of webpages, databases, or datasets, available publicly. They are often seen as one of the first steps for algorithmic transparency, as they enable a broad overview of the systems in use in a given sector or location.

1.2. Transparency for what? Meaningful transparency for public sector algorithms

While the concept of "algorithmic transparency" is widespread in research[20] and regulation[21] on algorithmic governance, it actually encompasses different meanings[22]. It can be seen as a standalone principle or as a means to achieve other ends.

As a principle, algorithmic transparency in the public sector is grounded in the democratic right to know and access information about governmental actions. This right is supported by the Universal Declaration of Human Rights (article 19) and the International Covenant on Civil and Political Rights (article 19.2). 13 States have also ratified Convention n°205 of the Council of Europe on Access to Official Documents (Tromsø Convention).

But algorithmic transparency can also be a first step to achieve other ends. This includes:

- Safeguarding fundamental rights, by identifying and avoiding the harms of a system thanks to public oversight, or improving a system via crowdsourcing[23];

- Fostering democratic participation, with information fueling the public debate[24];

[19] Ada Lovelace Institute, *op. cit.*, note 9, p.19.

[20] Loi, M., Mätzener, A., Müller, A., and Spielkamp, M. (2021). Automated Decision-Making Systems in the Public Sector: An Impact Assessment Tool for Public Authorities, p.19. AlgorithmWatch. Available at: https://algorithmwatch.org/en/wp-content/uploads/2021/09/2021_AW_Decision_Public_Sector_EN_v5.pdf.

[21] To only name two frameworks, algorithmic transparency is present in article 8 of the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law, and is one of the ten principles of UNESCO's Recommendation on the Ethics of Artificial Intelligence.

[22] For a review of definitions, see Valderrama, M., Hermosilla, María Paz, & Garrido, Romina. (2023). State of the Evidence: Algorithmic Transparency. Open Government Partnership; GobLab (Universidad Adolfo Ibáñez). Available at: https://www.opengovpartnership.org/wp-content/uploads/2023/05/State-of-the-Evidence-Algorithmic-Transparency.pdf

[23] Loi, M. op. cit., p.19.

[24] Ibid.

- Ensuring government accountability, by allowing interested parties to ask for the justification of the use of an algorithmic system, and holding responsible entities responsible in case of negative effects[25].

As a means to an end, transparency is a necessary first step, but isn't sufficient because it doesn't automatically lead to the desired objectives[26].

In particular, researchers Mike Ananny and Kate Crawford have warned against "seeing without knowing", i.e. in which transparency is not helpful and even counterproductive. For instance, information can be made available in technical documents without being understandable by its intended (non technical) audience. They also highlight that, when disconnected from issues of power, algorithmic transparency doesn't lead to accountability. Even when algorithmic harm or risk is uncovered through transparency, government agencies can be reluctant to take it into account, or refuse to repair the harm[27].

Researchers at the Ada Lovelace Institute conceptualize "meaningful transparency" as "amplifying existing mechanisms that keep public services in check and making information available to the public with the authentic intention of engaging them in decision-making processes"[28]. The notions of intent and authenticity are helpful to approach and assess algorithmic transparency in a way that recognizes both its potential and its shortcomings.

1.2. Transparency how? Individual and systemic transparency of public sector algorithms

Algorithmic transparency can occur on two levels:

- At an individual level, for instance when a person is notified that an algorithm was involved in a decision that concerns them, and/or told how the decision was reached.

- At a systemic level, where information is given about a system as a whole to the general public.

The information can be disclosed in different ways. When it is disclosed by public agencies themselves, it can be either demand-driven, when the information is asked by a third party, or supply-driven, when the agency

[25] Ada Lovelace Institute, op. Cit., p.18.

[26] See for instance Valderrama et al., op. cit., pp.5-8., and Ada Lovelace Institute et al., op. cit.

[27] Ananny, M., and Crawford, K. (2018). Seeing without knowing: Limitations of the transparency ideal and its application to algorithmic accountability. New Media & Society, 20(3), 973-989. Available at: https://doi.org/10.1177/1461444816676645

[28] Safak, C., Parker, I. (2020). Meaningful transparency and (in)visible algorithms: Can transparency bring accountability to public-sector algorithmic decision-making (ADM) systems?. Ada Lovelace Institute. Available at: https://www.adalovelaceinstitute.org/blog/meaningful-transparency-and-invisible-algorithms/

discloses information without being prompted to[29]. It can also be forced, when information is disclosed via an external audit[30].

Table 1 offers an overview of government-led modalities for transparency, with examples. It identifies algorithm registers as a form of systemic, supply-driven transparency.

	Individual level transparency	Systemic level transparency
Demand-driven disclosure	Response to a data access request. Response to a Freedom of Information request on a specific decision. Judge ordered disclosures of information on a specific decision.	Response to Freedom of Information request on an algorithmic system. Judge ordered disclosures of information on an algorithmic system.
Supply-driven disclosure	Individual notice that an algorithm was involved in a decision. Individual notice that an individual is interacting with an algorithm (for example, a chatbot). Explanation of an individual decision.	Algorithm registers. Publication of datasheets[31] or model cards[32]. Publication of source code.

Table 1. Examples of government-led modalities for transparency

Algorithmic transparency can also be supported by traditional transparency mechanisms in the public sector, such as the publication of local government deliberations, or transparency in public procurement[33].

[29] Gutiérrez and Muñoz-Cadena, op. cit.

[30] Diakopoulos, N. (2020). Chapter 10: Transparency. In The Oxford Handbook of Ethics of AI. Available at: https://doi.org/10.1093/oxfordhb/9780190067397.013.11

[31] Gebru, Timnit, et al. (2018). 'Datasheets for datasets'. Cornell University. Available at: https://arxiv.org/abs/1803.09010

[32] Mitchell, M., et al. (2019). 'Model cards for model reporting.' Proceedings of the conference on fairness, accountability, and transparency. Available at: https://arxiv.org/abs/1810.03993

[33] See for instance Kaye, K. (2024, November 1). AI Governance on the Ground: Chile's Social Security and Medical Insurance Agency Grapples with Balancing New Responsible AI Criteria and Vendor Cost. World Privacy Forum. Available at: https://www.worldprivacyforum.org/2024/11/ai-governance-on-the-ground-chiles-social-security-and-medical-insurance-agency-grapples-with-balancing-new-responsible-ai-criteria-and-vendor-cost/

1.3. What to make transparent? Content of algorithm registers

Most existing registers, academic literature, and expert recommendations take a broad approach to what information should be recorded in a register. This "sociotechnical" approach[34] goes beyond the technical aspects of algorithms and encompasses the processes and human decisions underpinning their design, and how they are used within the broader public policy they support. In other words, they make transparent not only the "what" of algorithms, but also the "why", the "who", and the "how".

Existing registers generally cover similar categories, spanning:

- The policy context, actors, and decisions around the design and development of algorithms: which agency/official is responsible for it? How much does it cost and what are its sources of funding? Have third-party suppliers been involved through procurement? What's the legal basis of the system? Have other solutions been considered?

- The processes in which the algorithmic system is integrated: what are the goals and intended effects of the process? What role does the algorithm play in the decision-making process? What are the human oversight measures?

- The technical aspects of the system: what's its overall architecture? How was it developed (in the case of machine learning systems: data processed, models trained and used; for rule-based systems: how the rules were decided before being turned into code)? What data is inputted into the system to get to the desired result? What are the safeguards put in place when dealing with personal data? This can also include directly disclosing the source code of the system, the training data, and the models themselves.

- Evaluations and impact assessments: what assessments have been conducted (both technical and pertaining to data protection and fundamental rights)? If they haven't been done, why? What monitoring and evaluation measures are set up throughout the lifecycle of the system (including after deployment)?

- Accountability measures: what are the appeals mechanisms? Can the system be rolled back? How and at which stage impacted communities and other stakeholders have been involved in the design, development and deployment of the algorithmic system? This also includes sharing the contact information for the people and institutions accountable for the system.

To date, there isn't a single standard on what information algorithm registers should record.

Annex 2 of this report proposes a draft for a framework that takes all of these dimensions into account, building from existing registers.

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[34] Singh, R. (2024). How to think like a sociotechnical researcher. Data & Society. Available at: https://datasociety.net/points/how-to-think-like-a-sociotechnical-researcher/

1.4. Opportunities and limitations of algorithm registers

Registers can be used by a wide range of external audiences, including:

- Citizens, to learn more about the systems that are in use in their city or country, debate them, and exert their rights;

- Civil society organizations, to monitor the use of algorithms (in general or in a particular domain such as housing, urban planning or health);

- Journalists, to identify specific systems to investigate;

- Researchers, to analyze and compare the use of algorithms over time, or across different geographies and contexts;

- Regulators (data protection authorities, agencies in charge of overseeing AI in the public sector, fundamental rights agencies, consumer protection agencies), to target algorithmic systems to oversee;

- Elected officials, in their role of monitoring the executive branch.

Registers can also benefit internal audiences (e.g. government teams buying, developing and using algorithmic systems), by:

- Improving internal governance: registers can help government teams developing and using algorithmic systems to know and understand what systems are being used, explain their role in the decision-making process, and identify potential problems within a tool early on and thus avoid harms and compliance issues. Some have argued that the mere act of feeling scrutinized can help governments make better decisions[35].

- Fostering knowledge-sharing and innovation between agencies, leading to mutualization and dissemination of successful practices.

- Increasing trust from citizens[36].

[35] Floridi, L. (2020). Artificial intelligence as a public service: Learning from Amsterdam and Helsinki. Philosophy & Technology, 33(4), 541–546. Available at: https://doi.org/10.1007/s13347-020-00434-3

[36] BritainThinks. (2021). Complete transparency, complete simplicity: How can the public sector be meaningfully transparent about algorithmic decision making?. Available at: https://assets.publishing.service.gov.uk/media/60ccae1c8fa8f57cef61fcc7/Complete_transparency__complete_simplicity_-_Accessible.pdf

Because they push governments to proactively disclose information, registers help avoid the "transparency fallacy" of demand-driven disclosure, where people don't use the methods of disclosure and the information end up not actually being communicated[37].

Despite these promises, some have called to take registers with a pinch of salt, especially for their role in improving participation and accountability.

In their 2021 commentary on the Amsterdam register, researchers Corinne Cath and Fieke Jansen underline that registers may bring a false sense of security[38]. When registers only present a "small subsection of algorithms deployed by or available to public authorities", they bring the focus on the algorithms that are documented and divert the attention away from those that aren't, and which are often the most critical. Cath and Jansen warn that a register is likely to actually increase the information asymmetry if "corporate or contentious government systems" are excluded from its scope.

In addition, the effectiveness of the register depends on the quantity and quality of information communicated. As algorithm registers are produced by the administration, the information might be "strategically shaped, distorted, or unreliable and therefore less conducive to accountability"[39]. Legal scholars have pointed out the risk to approach algorithmic transparency only through a logic of communication, i.e. when government agencies mediate the information presented through summaries of documents instead of disclosing the originals. They have called to preserve the logic of disclosure or public access, in which agencies release documents directly, such as reports, meeting transcripts, source codes, or datasets[40], to limit mediation.

All in all, algorithm registers, if done right, can be an essential (albeit not sufficient) tool for participation, accountability, and safeguarding of human rights. On the other hand, they run the risk of "normalizing the use of AI"[41] without bringing more accountability to the way algorithmic systems are introduced, developed, or evaluated.

With this in mind, the next section examines the EU-wide database introduced by the AI Act.

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[37] Edwards, L., & Veale, M. (2018). Enslaving the algorithm: From a 'right to an explanation' to a 'right to better decisions'? IEEE Security & Privacy, 16(3), 46–54. Available at: https://doi.org/10.2139/ssrn.3052831

[38] Cath, C., & Jansen, F. (2021). Dutch comfort: The limits of AI governance through municipal registers. arXiv. Available: https://arxiv.org/abs/2109.02944

[39] Diakopoulos, op. cit.

[40] Busuioc, M., Curtin, D., & Almada, M. (2023). Reclaiming transparency: contesting the logics of secrecy within the AI Act. European Law Open, 2(1), 79–105. doi:10.1017/elo.2022.47

[41] Cath & Jansen, op. cit.

2. Overview of the EU AI Act's database

2.1. The AI Act and high-risk systems

The EU AI Act is the European Union's legal framework on artificial intelligence. It entered into force on 1 August, 2024 and will become fully applicable in August 2026.

The Act adopts a risk-based approach. It prohibits AI systems considered presenting "unacceptable risks" and lays down requirements pertaining to documentation, transparency, and risk management and monitoring for systems considered "high-risk". These requirements concern different entities, in particular:

- Providers of AI systems, i.e. the entities that place an AI system on the market or into service. In the public sector, this could mean third-parties developing AI systems for public sector use or public agencies developing them in-house.

- Deployers of AI systems, i.e. entities that use an AI system under their authority, including public agencies or third parties mandated to deliver a public service.

High risk systems in Annex III

Systems can be considered high risk for different reasons. One of them is that they pertain to an area listed in Annex III of the AI Act[42]. Currently, several areas designated as high risk under Annex III concern the public sector, such as biometrics, critical infrastructure, education and vocational training, essential public services and benefits, law enforcement, migration, asylum and border control management, and administration of justice and democratic processes.

However, even if it pertains to an area listed in Annex III, an AI system will not be considered high risk if it does not pose a significant risk of harm to the health, safety or fundamental rights of people, except when it performs profiling of natural persons[43].

It's up to the provider of an AI system to decide whether it is high risk or not. If the provider considers that the system is not high risk, it's only required to document the assessment. It may provide the documentation to the national competent authorities, but only upon request[44].

[42] AI Act, Article 6(2)
[43] AI Act, Article 6(3)
[44] AI Act, Article 6(4)

For a more in-depth overview of the EU AI Act, see: Lazaro Cabrera, L., and McGowan, I. (March 2024). A Series on the EU AI Act - Pt 1. An Overview. CDT Europe.

2.2. The database of high-risk systems: an EU-wide algorithm register

The EU AI Act tasks the Commission, in collaboration with the Member States, with setting up and maintaining a public database containing information on systems in areas listed in Annex III[45].

Two types of entities have an obligation to provide information.

Entity	Summary of the information to register
Providers of the AI system pertaining to areas listed in Annex III, before placing it on the market or putting it into service[46].	Name, address and contact details of the provider; Purpose of the system and its components; Basic and concise technical information; Status of the system (e.g. if the system is in use or has been discontinued); The electronic instructions for use communicated by the provider to the deployers as per Article 13(2) (including the "characteristics, capabilities, and limitations of the system, such as its level of accuracy", and human oversight measures[47]). Nota: systems that pertain to areas listed in Annex III that are not considered high risk under article 6(3) still have to be registered in the database, with reduced requirements[48].
Deployers of the AI system, before putting it into service or using it, if they are public authorities, Union institutions, bodies, offices or agencies or persons acting on their behalf[49].	Name, address and contact details of the deployer; The URL of the entry of the AI system in the EU database by the provider; A summary of the findings of the Fundamental Rights Impact Assessment that has to be conducted as per Article 27 (see below);

[45] AI Act, Article 71
[46] AI Act, Article 49(1)
[47] AI Act, Article 13(2)
[48] See Annex 1 of this report for more detail
[49] AI Act, Article 49(3)

	A summary of the Data Protection Impact Assessment carried out pursuant to relevant data protection regulation.

Table 2. Succinct overview of entities and information concerned by the database. For more information on the exact content categories of the database, see the detailed comparison table in Annex 1.

However, there are two notable exceptions to registration in the public database:

Exception 1: AI systems used in law enforcement, migration, asylum and border control management are registered in a private part of the database

For those systems, providers and deployers:

- Provide less information (for instance, they do not have to provide electronic instructions for use[50]);
- Register the systems in a private section of the database, accessible to the Commission, specific market surveillance authorities[51], and national public authorities and bodies in charge of supervising fundamental rights[52].

Exception 2: AI systems used in critical infrastructure are registered at a national level

Providers and deployers of AI systems used in critical infrastructure have to register them at a national level[53].

In a nutshell, the EU AI Act introduces:

- A public-facing register ("database");
- A private section of the register for high-risk AI systems in law enforcement, migration, asylum and border control management;
- An obligation to register AI systems in critical infrastructure at a national level.

At the time of writing this report, the database has not yet been set up by the European Commission. Work is scheduled to start in the upcoming months[54].

[50] AI Act, Article 49(4)
[51] AI Act, Article 49(4) and Article 60(4)(c)
[52] AI Act, Article 77
[53] AI Act, Article 49(5)
[54] DIGITAL Europe Programme - Annex to the Amended Work Programme 2023-2024, p.95.

2.3. Limitations and opportunities of the EU AI Act database

The EU AI Act's database is a welcome and important step forward for algorithmic transparency and safeguarding of fundamental rights in automated decision-making. However, it presents a series of limitations[55].

2.3.1. Limited scope that leaves out important algorithmic systems

The database is limited to systems considered AI systems under the AI Act. It is still unclear whether the definition of "artificial intelligence system" in the AI Act[56] encompasses all rule-based systems (see box below). Too narrow a definition would leave out many critical systems which are still rule-based.

In addition, the database only concerns high-risk systems. This has two consequences: the first is that, by default, it leaves out applications such as chatbots directly interacting with citizens. The second is that, as providers can self-exclude from the high-risk regime without much scrutiny, systems may end up being wrongfully under-registered.

Finally, registration will only be made mandatory from August 2026[57], and will only apply to systems put in service or used from then on, barring a "significant change in their design or intended purpose"[58]. This leaves out all the impactful systems already in use.

[55] See Article 19 et al., *op. cit.*
[56] "A machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and 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." (AI Act, Article 3(1))
[57] AI Act, Recital 179
[58] AI Act, Recital 177. What constitutes a "significant change" will be determined by market surveillance authorities.

Rule-based systems versus machine learning systems

Algorithmic systems always work the same way: they take a specific input, process it according to rules, and give an output. However, the way these rules are determined differs.

Roughly speaking, there are two main approaches.

- In rule-based systems, the rules are determined by humans, and then turned into code.
- In machine-learning systems, the algorithm uses existing data to identify patterns thanks to statistical methods, which it turns into rules. For instance, the risk-scoring algorithm used by the municipality of Rotterdam to identify benefit fraud used historical data to determine how the score of beneficiaries would be calculated[59]. Humans still make choices, including on what the goal of the system is and the data that will be used to train the systems. However, they have less control over the rules that will lead to a specific result. Some machine-learning techniques such as deep learning make it technically difficult to understand the rules that underpin the algorithms.

Although rule-based systems are technically simpler than machine learning systems, they underpin critical applications in the public sector, especially when it comes to social and fiscal policies. BOSCO, the algorithmic system used by the Spanish Ministry for Green Energy Transition to determine which families receive a bonus to help them pay their electricity bill, is a rule-based system[60].

2.3.2. Persistent opacity of critical systems due to exceptions

The blanket exception for systems used in law enforcement, immigration, asylum and border control management hides from public view some of the most impactful systems. While these systems will be registered in the database, it will only be in its private section. Their effective scrutiny will therefore depend on the will and resources of regulators and enforcement agencies, which undermines public accountability.

[59] Burgess et al., op. cit.

[60] Digital Future Society. (2023). Case No 1: BOSCO. In Algorithms in the public sector: four case studies of ADMS in Spain. Available at: https://digitalfuturesociety.com/report/algorithms-in-the-public-sector-four-case-studies-of-adms-in-spain/

Systems in banking and insurance also suffer from a paradox: while their providers have an obligation to register them in the public section of the database, their deployers don't, even though they have to conduct a fundamental rights impact assessment (see box below). The information relative to their fundamental rights impact assessments will thus be shielded from public view and it is unclear how it will be accessible to watchdog organizations.

Fundamental Rights Impact Assessments in the AI Act

The AI Act introduces Fundamental Rights Impact Assessments[61] (FRIA), to be performed by:

- Deployers of high-risk AI systems that are bodies governed by public law or private entities providing public services.
- Deployers of systems used in banking and insurance[62].

The FRIA contains a description of the uses and purposes of the system, the categories of people likely to be affected, the specific risks of harm, human oversight measures and appeals and redress mechanisms.

A summary of the FRIA has to be published by deployers of high risk systems in the database, but only if they are "public authorities, Union institutions, bodies, offices or agencies or persons acting on their behalf". This excludes deployers in banking and insurance, and weakens their role as accountability instruments.

2.3.3. Insufficient information, even for publicly recorded systems

Even for systems which have to comply with the highest level of transparency, the information may not be sufficient for monitoring.

Certain categories of information, such as source code or training data, do not need to be registered.

[61] AI Act, Article 27

[62] AI Act, Annex III 5(b) and 5(c)

Deployers are only required to publish summaries, rather than the full versions, of Fundamental Rights Impact Assessments and Data Protection Impact Assessments. Such summaries may not be enough to gather the information required to analyze and monitor algorithmic systems.

The categories listed in Annex VIII remain broad, and it remains to be seen whether providers and deployers will fill them in adequately.

2.3.4. Opportunity: a starting point for algorithmic transparency at a national level

Despite these limitations, the introduction of a mandatory database remains an opportunity.

However, the database should be seen as a starting point for Member States to approach the topic of algorithm registers, and go further in their national contexts.

The AI Act itself offers opportunities to expand the scope of the database. Deployers of AI systems not concerned by obligations "should be entitled" to register their system in the database voluntarily, which includes deployers which are private entities[63]. Registration before 2 August 2026 is encouraged, on a voluntary basis[64].

[63] AI Act, Recital 131

[64] AI Act, Recital 179

3. State of algorithm registers in Europe

3.1. A brief history of algorithm registers

Civil society and multistakeholder organizations have long called for governments to set up algorithm registers[65]. Some governments were forerunners in pushing for algorithm registers.

In 2016, France passed its Digital Republic Act[66], which came into effect in 2018. It introduced into administrative law new transparency obligations for public agencies using decision-making algorithms, including a "general information" obligation equating to a requirement for algorithm registers (see section "Focus on 3 algorithm registers" below).

The government of Canada's Policy on Service and Digital, supported by the 2019 Directive on Automated Decision-Making[67] (updated in April 2023), was the first in the world to introduce mandatory impact assessments for all decision-making algorithms used by government agencies. Even though it was not framed as a register, it effectively creates one by requiring mandatory online publication of the impact assessments[68]. At a local level, Helsinki and Amsterdam were the first cities in the world to publish theirs in September 2020[69]. That same year, the US introduced an Executive Order titled "Promoting the Use of Trustworthy Artificial Intelligence in the Federal Government" requiring federal agencies to provide case inventories of AI use[70].

Since then, more and more governments, civil society organizations and academic institutions around the world have launched their own register initiatives and policies. A mapping of registers worldwide by the Global Partnership on AI inventories 69 active registers throughout the world[71].

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[65] To name only a few: AlgorithmWatch, the Ada Lovelace Institute. The multistakeholder organization Open Government Partnership helped connect countries working on the topic through its Open Algorithms Network.

[66] LOI n° 2016-1321 du 7 octobre 2016 pour une République numérique.

[67] Available at: https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32592

[68] Currently, the database contains 23 records. https://search.open.canada.ca/opendata/?collection=aia

[69] Wray, S. (2020, September 29). 'Helsinki and Amsterdam launch AI registers to detail city systems'. Cities Today. Available at: https://cities-today.com/helsinki-launches-ai-register-to-detail-city-systems/

[70] Executive Order 13960 of December 3, 2020. Another Executive Order was introduced in October 2023. For more detail, see Leslie, M., and Selman, C. (2024). Securing meaningful transparency of public sector use of AI. Comparative approaches across five jurisdictions. Public Law Project. Available at: https://publiclawproject.org.uk/content/uploads/2024/10/Securing-meaningful-transparency-of-public-sector-AI.pdf

[71] Gutiérrez and Muñoz-Cadena, op. cit.

3.2. A growing, but still limited, number of algorithm registers in Europe

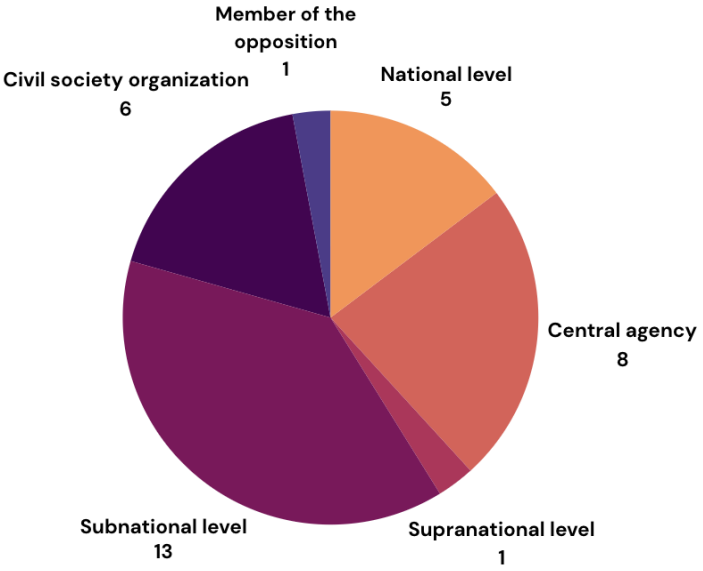

Fig 1. Types of entities building algorithm registers in Europe

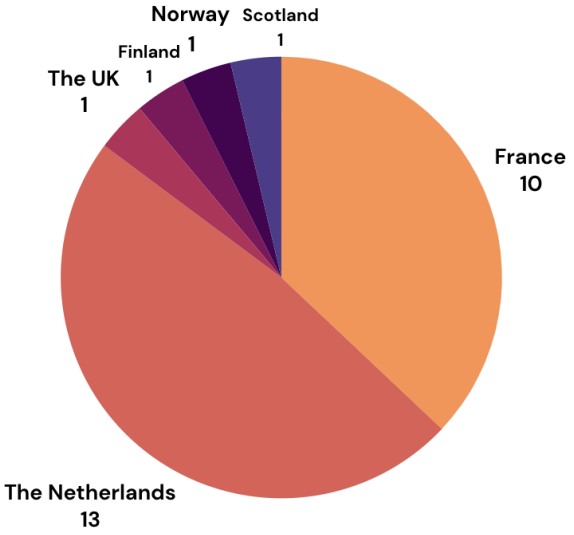

Fig 2. Number of government-led registers currently in use, by country

Our research has identified 34 algorithm registers currently in use in Europe, and 5 in construction[72]. Out of the 34 active registers, 79% (27) are developed and maintained by official institutions, and 21% (7) by watchdogs (6 by civil society organizations in the UK, Italy, Spain, France, Slovenia and Switzerland, and 1 by an elected member of the opposition in Germany). Although at an international level, academic institutions have played an important role in building externally-led algorithm registers[73], it is not the case in Europe. Overall, existing government-led registers are concentrated in six countries: France, the Netherlands, Finland, the UK, Scotland, and Norway.

The subnational level is the most populated, with 13 local and regional registers. These registers are mainly located in France and the Netherlands. Scotland also has its own register.

In 2023, Eurocities published an algorithmic transparency standard ("data schema") developed by nine European cities (Barcelona, Bologna, Brussels Capital Region, Eindhoven, Mannheim, Rotterdam and Sofia, based on the example set by Amsterdam and Helsinki)[74]. Five of them (Barcelona, Brussels, Eindhoven, Mannheim, and Sofia) have announced that they are currently developing registers based on the standard.

At a European level, the Joint Research Center of the European Commission maintains the Public Sector Tech Watch[75], which includes (but is not limited to) AI uses across the European Union. It is primarily aimed as a knowledge-sharing tool, but also brings more transparency about how algorithmic systems are used.

8 agencies at a central or federal level have published their own registers, such as the French unemployment agency (France Travail) or the Dutch Ministry of Justice and Security.

So far, only five countries in Europe (and two in the European Union) have national algorithm registers: the UK, the Netherlands, Norway, Scotland, and France.

Other institutions have set out to develop registers which, even though it is not their primary purpose, can serve as transparency instruments. Germany has announced its intention to develop a "marketplace of AI opportunities", which could also be used as a central AI transparency register[76]. Similarly, the aforementioned Public Sector Tech Watch, developed by the Joint Research Center of the EU Commission, documents "technological developments to improve public sector operations and service delivery". Denmark has an innovation-oriented repository of "signature projects"[77].

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[72] See Annex 3 for a list of all registers mapped. To note: information obtained after the completion of the research, which we were not able to include in our analysis, shows that Belgium has a tool which can stand as a public algorithm register, and that Estonia is also building an algorithm transparency standard.

[73] Gutiérrez and Muñoz-Cadena, op. cit.

[74] https://www.algorithmregister.org/standard

[75] https://joinup.ec.europa.eu/collection/public-sector-tech-watch

[76] https://www.cio.bund.de/Webs/CIO/DE/digitale-loesungen/datenpolitik/daten-und-ki/daten-und-ki-node.html

[77] https://digst.dk/kunstig-intelligens/signaturprojekter/

3.3. Focus on three national registers

The five national registers mentioned above vary in terms of content and maturity. In this report, we will focus on the UK, the Netherlands, and France.

The UK's Algorithmic Transparency Recording Standard

The UK's Algorithmic Transparency Recording Standard (ATRS) was first launched in late 2021 by the Central Digital and Data Office (CDDO) and the then-Centre for Data Ethics and Innovation (CDEI). The first version of the standard was piloted with 15 government agencies at national and local levels, and was informed by public engagement[78]. It then underwent several iterations, and is now on version 3.0.

The team which is in charge of maintaining the Standard, implementing the register, and supporting public sector teams to complete transparency records is now part of the Department for Science, Innovation, and Technology. They have created extensive guidance for agencies[79] and also proactively work with central, local, and police agencies to encourage and support them to record algorithmic systems. Each record is reviewed multiple times before publication, with suggestions on how to refine language if need be (but without assessing the algorithmic system itself).

At the time of writing, the register records 9 algorithms[80]. In early 2024, the UK government announced that the ARTS would become mandatory for all central government agencies[81], but without it being supported by statutory requirements. Single points of contact have been designated in each agency to supervise the internal processes of complying with the mandate. They have regular exchanges with the team in charge of ATRS, to monitor progress against key milestones.

The Algorithm Register of the Dutch government

The Algorithm Register of the Dutch government[82] was launched in 2022, following two resolutions in Parliament prompted by the scandal around the use of a faulty algorithm by the Dutch Tax Office. It is the most populated, with 609 algorithms as of November 2024. Close to 200 organizations have registered algorithms, including almost 100 municipalities.

The register is maintained by the Ministry of the Interior and Kingdom Relations, with support from the government's internal management company (ICTU). Each agency is responsible for their own records, but the team maintaining the register provides extensive guidance and support to agencies looking to register their

[78] BritainThinks, op. cit.

[79] https://www.gov.uk/government/collections/algorithmic-transparency-recording-standard-hub

[80] This report was completed in November 2024. Since then, the repository has grown to 55 algorithms recorded.

[81] Responsible Technology Adoption Unit. (2024). Algorithmic Transparency Recording Standard: Getting ready for adoption at scale. Available at: https://rtau.blog.gov.uk/2024/03/07/algorithmic-transparency-recording-standard-getting-ready-for-adoption-at-scale/

[82] https://algoritmes.overheid.nl/en

systems, and creates incentives to register by organizing presentations about the register and the EU AI Act, publishing guidance[83], and setting up contests. They also led public engagement activities, leading to a report in 2023[84]. Currently, two people from ICTU work full-time on the register, and two people from the Ministry of the Interior and of Kingdom Relations work part-time. Here again, the team supervises which algorithms are recorded, but doesn't assess the systems themselves.

Registration is not legally mandatory, but all central agencies have agreed to a "gentleman's agreement" under which all systems considered high risk under the AI Act have to be registered in the database by the end of 2025.

France's Digital Republic Act

France is the only country with a law mandating the creation of algorithm registers[85]. The law introduces transparency obligations for agencies using decision-making algorithms:

- Individual notice: individuals have to be notified an algorithm was used to assist or make an administrative decision[86].
- Individual transparency: individuals have the right to ask the steps that led to a decision assisted or made via an algorithm[87].
- General transparency: agencies have to inventory and publish the operational principles underpinning their main algorithmic treatments[88].

In 2021, Etalab, a team within the Interministerial Department for Digital Affairs (DINUM), published online guidance to help agencies implement the legal framework, including a detailed standard for registers co-created with local and central agencies[89].

A recent analysis of the efficacy of the law has underlied the limitations both of the framework itself and its implementation[90]. Namely, the law is too narrow in scope and contains many exceptions, which excludes critical algorithms from public view. In addition, it does not provide for the creation of a central register, leading to an uncoordinated approach. Very few agencies have actually implemented the law: only 8 central and local

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[83] https://algoritmes.overheid.nl/en/footer/meedoen

[84] Ministry of the Interior and Kingdom Relations. (2023). Target group analysis algorithm register. Available at: https://algoritmes.pleio.nl/attachment/entity/e59fb733-51ca-4811-9b6e-1d89d348a5b3

[85] LOI n° 2016-1321 du 7 octobre 2016 pour une République numérique.

[86] Article L.311-3-1 du Code des relations entre le public et l'administration.

[87] Article R.311-3-1-2 du Code des relations entre le public et l'administration.

[88] Article L312-1-3 du Code des relations entre le public et l'administration.

[89] https://guides.etalab.gouv.fr/algorithmes/

[90] Leslie and Selman, op. cit.

agencies have published registers. Currently, no one at the DINUM is in charge of supporting agencies to build their registers.

It is also interesting to notice that the national register identified (a GitHub page[91]) does not match the standard proposed by Etalab. The register only records algorithms for which the source codes have been open (14), with limited information besides the code.

That being said, the mere existence of the law has been the incentive for most agencies who have complied to look into registers, underlining the importance of provisions being mandatory.

3.4. Registers vary in terms of number of algorithmic systems recorded, location online, content, and scope

Overall, the 27 active government-led registers present several disparities.

Number of algorithmic systems recorded

The number of algorithms recorded in registers ranges from 1 (register of the Central Judicial Collection Agency of the Netherlands) to 609 (national register of the Netherlands). The level of government does not determine the number of algorithms registered, with some subnational registers registering many: the register of the Ille et Vilaine département in France contains 103 algorithms, and Amsterdam's register 42.

Location online

The location of the registers online also varies: 11 registers can be found as a specific page on the organization's website, 8 as a page on the agency's open data portal, 5 as standalone websites, and 3 elsewhere (for instance, as part of the "data protection" page of the agency's website).

This reveals the different ways algorithmic transparency can be framed, ranging from a continuation of open data policies, to part of data protection policies.

Content

Besides upcoming registers based on the Eurocities standard, and a select number of Dutch registers developed by central agencies, none of the registers follow the same standard. Although categories are similar across registers, their exact content and framing can change, and their focus may differ.

[91] https://github.com/etalab/algorithmes-publics/blob/master/liste.org

For instance, registers in the Netherlands tend to have a heavy component on identifying and mitigating discrimination, as opposed to registers in France which don't include any element on discrimination and fundamental rights but focus more on opening source codes.

The Eurocities Algorithm Transparency standard focuses on accountability elements less covered by other registers, namely "rollback procedures" and objection procedures[92].

The UK's standard is the most detailed in terms of technical categories, in part to harmonize the section on technical information with other technical documentation that may be required for governance and compliance (e.g. datasheets for datasets or model cards).

Notably, none of the government-led registers include a category to document the cost of systems[93]. None include categories directly addressing public participation in the design of the systems.

Scope

Each register has its own definition and scope for the systems to be registered.

The French Digital Republic Act requires the registration of algorithms which lead to an administrative decision. The Dutch guidance suggest to prioritize "impactful algorithms", which include systems considered high risk under the AI Act and, more broadly, any algorithmic system that has direct legal consequences for data subjects, or influences a selection for inspection or control[94], or algorithms that influence how the government classifies a data subject or a group[95]. The UK government considers registration "most relevant" for algorithms that "have a significant influence on a decision-making process with direct or indirect public effect" or "directly interact with the general public"[96].

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[92] The UK Algorithmic Transparency Recording Standard also has a category for "appeals and review".

[93] Worldwide, registers in Colombia and Chile do. See Gutiérrez and Muñoz-Cadena, op. cit., p.34.

[94] Ministry of the Interior and Kingdom Relations. (2023). Guidance for algorithm registers. p.11. Available at: https://algoritmes.pleio.nl/attachment/entity/f1a35292-7ea6-4e47-93fa-b3358e9ab2e0

[95] The Dutch government also advises to register algorithms that are (technically) complex and/or use data intensively and where publication can contribute to demystification of algorithms and AI, those that are the subject of social debate (e.g. subject to media attention), those that have been (or are) the subject of research by a supervisor or inspection; those that concern themes that citizens or the media frequently inquire about (ex: benefits, visa applications), those with a (in)direct impact on the environment, those where transparency is requested by a FOI request (ex: detecting welfare fraud in municipalities).

[96] Central Digital and Data Office and Responsible Technology Adoption Unit. (2023). Algorithmic Transparency Recording Standard - Guidance for Public Sector Bodies. Available at: https://www.gov.uk/government/publications/guidance-for-organisations-using-the-algorithmic-transparency-recording-standard/algorithmic-transparency-recording-standard-guidance-for-public-sector-bodies

3.5. Most registers already go beyond the scope of the AI Act database

Despite variations in scope, a common trend for these registers is that most of them go beyond the scope and content categories of the AI Act database.

Most include rule-based systems. Even though definitions of what an algorithm is vary from register to register, 85% of the registers (23 out of 27) include rules-based algorithms either in the definition of "algorithm" or in the systems recorded. None of them actually explicitly excludes rule-based systems.

Most also record algorithms which are not considered high risk under the AI Act, such as citizen-facing chatbots.

3.6. Most registers lack technical features that are essential for research and monitoring

To date, few of the registers can be used as tools for research and monitoring. Only 3 registers (the Netherlands' and the UK's national registers, and the EU's Public Sector Tech Watch) are databases offering a search feature with different filters. The majority (16/27) is available as relatively user-friendly web pages, but with no search filters. 2 of them are only accessible as PDF files.

Only 25% (7/27) of the registers offer the option to download the data in a reusable format. On the contrary, 4 of them are only available as downloadable datasets, which can be a hindrance for less tech-savvy audiences.

Only 7 include algorithms that are in development or discarded, while the remaining 20 focus on algorithms in use, offering limited opportunities for archiving and monitoring. Furthermore, similarly to what has been shown for registers in the US[97], only around half (14/27) contain information on when the register was last updated, making it difficult to know whether the information is still relevant and current.

3.7. Registers are still a relatively new mechanism and lack evaluation and results

Algorithm registers are still a nascent instrument, leading to several shortcomings.

[97] Cooper, B. (2023). Like Looking for a Needle in an AI-Stack: The challenges of navigating federal agencies' AI inventories. Center for Democracy and Technology. Available at: https://cdt.org/insights/like-looking-for-a-needle-in-an-ai-stack/

Firstly, existing registers are not comprehensive yet. Most of the registers are sparsely populated, and it is often impossible to tell whether it's because the agency doesn't use algorithms or because they haven't inventoried them. Findings suggest it may be the latter: registers developed by academia and civil society have highlighted that many algorithmic systems in use are yet to be recorded in their government-led equivalents. In the UK, the Public Law Project's Tracking Automated Government Register[98] has records of 55 automated tools, while the Algorithmic Transparency Standard Recording Hub only has 9 at the time of writing this report.

Although not explicitly discontinued, some registers seem to have remained at the pilot stage: for instance, the registers of Nantes and Lille (France) have not been updated since their publication in 2022 and 2023.

Secondly, it is still difficult to evaluate the impact of algorithm registers on participation, accountability, and safeguarding fundamental rights, for two reasons. The first is that government agencies themselves fail to publish evaluations and success metrics of the registers related to accountability. A government team building an algorithm register has also explained currently focusing on transparency, as it is their opinion that the register needs to be more comprehensive before being truly useful for accountability.

The second is that academic research on the effectiveness of algorithm registers is scarce. This lack of hindsight makes it difficult to draw definitive conclusions.

The status quo, however, seems to be that algorithm registers haven't lived up to all the promises yet. Existing research on the Dutch context has found that, as of now, registers are mostly helpful as an internal governance mechanism, but have done little to help scrutiny and participation in public algorithms[99].

Several interviewees have shared that, as of now, they consider that most registers are not useful for monitoring yet. This is corroborated by findings from the Global Partnership on AI on public registers worldwide[100], the Center for Democracy and Technology on registers in the United States[101], and research by the Public Law Project on the effectiveness of transparency requirements in different countries[102]. However, recent signals point to a shift in this trend, notably regarding the Dutch register, which journalists have indicated as more and more useful to monitor (or, at least, learn about the existence of) critical systems. The Dutch register is the most populated, alluding and this dynamic confirms the hypothesis that comprehensive registers may be used for effective external scrutiny.

Taking into account the current state of play and the lessons learned in this nascent implementation stage, the next session presents recommendations for designing, implementing and evaluating an algorithm register at a national level.

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[98] https://publiclawproject.org.uk/resources/the-tracking-automated-government-register/

[99] Nieuwenhuizen, E. (2024). Algorithm registers: A box-ticking exercise or a meaningful tool for transparency?. National Conference on Governing AI. https://www.uu.nl/sites/default/files/Governing%20AI%20-%20Nieuwenhuizen.pdf

[100] Gutiérrez and Muñoz-Cadena, op. cit.

[101] Cooper, op. cit.

[102] Leslie and Selman, op. cit.

4. Implementing an algorithm register: lessons learned from existing initiatives

As previously seen, algorithm registers, if done wrongly, can end up doing little more than "transparency washing", and even lead to more harm than good. The following section draws from feedback from existing algorithm registers and makes 12 recommendations to ensure that registers lead to more participation, accountability, and safeguard of fundamental rights, across 4 categories:

- Process and governance
- Scope
- Accessibility and usability
- Implementation

Process and governance

4.1. Build a central, mandatory register

For civil society organizations, the added value of algorithm registers comes from having a standardized, overall view of all systems. Uncoordinated initiatives can lead to "patchwork" approaches and make it difficult to compare systems[103]. This implies building a centralized, easy to find register, around a unified standard.

Technical solutions can help this centralization without overly constraining local governments who may already have put solutions in place. For instance, the Dutch government provides local governments access to an API, to facilitate the registration of their algorithms into the central register.

In addition, there is a consensus about the fact that making registration mandatory (even through soft law) is one of the most powerful incentive mechanisms for agencies to engage in registering algorithmic systems. It enables a systematic, top-down approach, and increases the number of agencies registering systems, creating positive examples for the most reluctant departments.

[103] This was also a key finding of the Bertelsmann Stiftung on their research on a national register for Germany. See Bertelsmann Stiftung. (2023). Transparente digitale Verwaltung: Umsetzbarkeit eines KI-Registers in Deutschland. p.18. Available at: https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/transparente-digitale-verwaltung

4.2. Collaborate with civil society to build, assess, and use the register

To be actually useful to intended target audiences, the register should be designed, developed and assessed in close collaboration with them, following a user-centric design approach.

In particular, civil society organizations who are one of the main target audience of the register can be involved at several stages:

- Building the register categories (drawing inspiration from existing frameworks);

- Prioritizing the algorithms to register. For instance, during a public engagement exercise conducted by the Netherlands in 2023[104], a proposal was to make it possible for citizens or experts to ask for the registration of an algorithm. This can also be done by prioritizing systems on which an agency would have received a lot of freedom of information requests, as suggested by Gutiérrez and Muñoz-Cadena[105];

- Reviewing the information presented. Several registers allow visitors to send feedback about algorithms. However, it is unclear how such information will be used by agencies. A more ambitious way could be to formally integrate target audiences in reviewing documentation, ideally including before it is published, through an iterative process.

Working towards meaningful transparency also entails giving civil society organizations adequate resources to actually be able to use the register, and monitor and challenge systems.

Finally, disseminating registers is essential. Registers remaining vastly unknown by their target audiences, if only because they take a technical entrypoint. Thus, they may miss the mark on allowing for more public participation and scrutiny, for instance from organizations and/or journalists focusing on one particular issue, such as housing or health, who don't feel immediately concerned with topics identified as technological. Presently, most registers are difficult to find, be it via a search engine or on an agency's website.

To improve discoverability, a recommendation from the public engagement exercise conducted by the Dutch administration is to promote the algorithm register via social media. This is actually already done in Chile[106]. The United States' guidance mandates that registers be published on a standardized URL on each federal agency's website[107].

Other avenues include conducting workshops with sectoral organizations or journalists on the existence of the register and how to use it. However, interviewees were divided between those reluctant to disseminate registers

[104] Ministry of the Interior and Kingdom Relations, op. cit.

[105] However, to this last point, Diakopoulos (2020, op. cit.) underlines that "the provision of transparency information is not about popular demand as it only takes a few interested stakeholders to be able to use transpar- ency information for the purposes of accountability".

[106] Gutiérrez et al., op. cit.

[107] White House, op. cit.

too soon, for fear of creating disappointment regarding missing algorithms or information, and others promoting a "the sooner the better" approach of releasing information as frequently as possible, even if incomplete.

4.3. Approach national registers as complementary to the AI Act database

To remedy the shortcomings of the AI Act's database, national registers should be approached as complementary, in several aspects.

The first is to explicitly record high-risk systems while encouraging the registration of other algorithms. For instance, the Dutch register prioritizes the registration of systems considered high risk under the AI Act, and labels the systems as such, making it easy for agencies to identify which systems have to be registered at an EU level. Meanwhile, it also encourages the registration of other systems, especially those classified as "impactful systems".

The second is to make concrete the optional possibilities offered by the AI Act, thus solving some of its shortcomings. As seen in section 2, the AI Act introduces obligations for deployers of high risk systems in finance and insurance to conduct fundamental rights impact assessments, but does not require their registration in the database. However, it explicitly encourages any deployer to voluntarily register their use of an AI system into the database. National governments could leverage this invitation and include the possibility for deployers of high risk systems from the private sector to register their algorithmic systems and their FRIAs.

The third is to leverage the AI Act's new transparency requirements to ask third parties for information. For instance, the AI Act requires providers to provide "electronic instructions for use" to deployers, including "characteristics, capabilities, and limitations of the system, such as its level of accuracy"[108]. This means that it should be easy for governments procuring AI systems to obtain this information and make it public. The AI Act would prove useful here, as governments tend to struggle to obtain the relevant information from third-party suppliers.

Scope

4.4. Include rule-based algorithms

As previously discussed (see section "Limitations and opportunities of the EU AI Act database"), the most impactful algorithmic systems can be relatively simple, and not subjecting them to recording obligations would shield critical systems from public view. Most existing registers already include rule-based systems. Although it is still unclear whether rule-based systems will be included in the AI Act, upcoming national registers should

[108] AI Act, Article 13(2)

follow the lead of active registers and adopt a broad definition of the term, focusing on how impactful the algorithmic system is rather than on its technical complexity.

4.5. Register all algorithms publicly, especially in critical sectors

Transparency can come into conflict with other rights or perceived obstacles. Common concerns, which are similar to those raised in discussions around freedom of information access, include "gaming the system", cybersecurity, intellectual property, and privacy. The AI Act itself only requires the registration of systems pertaining to areas considered as high-risk.

On the other hand, the lack of public registration of specific algorithmic systems (as is the case for systems used in law enforcement, migration, asylum, and border control in the AI Act) may make registers ineffective, as they will prevent accountability of the most critical tools.

In reality, transparency isn't binary. It can be understood as a continuum that can adapt to specific challenges raised in certain systems. Public registers can, and should, be designed to include all algorithmic systems.

In the UK, the Department for Sciences, Innovation, and Technology has made its Algorithmic Transparency Recording Standard compatible with the challenges cited above. It explains that adapting the level of detail provided is enough to manage risks of gaming the system and intellectual property rights, underlining that "wider information, for example on how the algorithmic tool is used in the overall decision-making process, may be still safe to release and relevant"[109]. The standard doesn't have a blanket exception for a sector (including law enforcement or migration), and the register has two records of local police forces published[110].

A bare minimum level of public transparency can be to list the existence of an algorithm. The Netherlands' guidance specifies that, even for algorithms that are excluded from transparency obligations on legal grounds, "the Algorithm Register can indicate that algorithms are used and how they are checked", to contribute to more trust[111]. The Netherlands also has a "publish unless" principle: if there is a debate about whether to publish or not, by default, publish.

Registers should also strive to strike a balance between collecting enough information on a system, and making sure their existence is communicated to the public as soon as possible, even if information is missing.

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[109] Central Digital and Data Office and Responsible Technology Adoption Unit, op. cit.

[110] West Midlands Police's exploratory analysis of sexual convictions, available at: https://www.gov.uk/algorithmic-transparency-records/west-midlands-police-exploratory-analysis-of-sexual-convictions and Hampshire and Thames Valley Police's Domestic Abuse Risk Assessment Tool, available at: https://www.gov.uk/algorithmic-transparency-records/hampshire-and-thames-valley-police-darat.

[111] Ministry of the Interior and Kingdom Relations. (2023). Guidance for algorithm registers. Available at: https://algoritmes.pleio.nl/attachment/entity/f1a35292-7ea6-4e47-93fa-b3358e9ab2e0

Most active registers record algorithms that are not considered high-risk under the AI Act. The Dutch government even noticed that recording less contentious systems could be a way for agencies to "ease into" the process of registering their algorithms.

4.6. Include in-development and discarded systems

Registration after deployment is a good start, but it is not enough to ensure full accountability and participation. Civil society will have little leverage to challenge algorithmic systems if algorithms are only published after they are developed. Archiving and keeping a trace of discarded systems for historical research and oversight is another often overlooked issue[112].

The recording standards proposed by the UK, the Netherlands, and Eurocities, as well as several local registers (such as Amsterdam's), already account for such needs by including a category for the date of publication of the record, and a category for the status of the algorithmic system, which includes systems in development and systems that have been abandoned.

Accessibility and usability

4.7. Adapt the level and presentation of information to different audiences

It is not enough for the information to be published. It also needs to be adapted to its intended audience(s) for it to be understandable and usable. Algorithm registers may cater to a wide range of publics, and the difficulty is to strike a balance between information that is detailed enough to be useful to informed crowds and information that is accessible to those less familiar with algorithms.

A user-centric approach requires first defining one's target audience(s). For instance, the Dutch government chose to primarily serve the citizen, as opposed to governments or companies[113]. Interestingly, certain interviewees from civil society expressed doubts about the use of algorithm registers by citizens, and saw it more as a tool for expert audiences (journalists, digital rights organizations, and, tentatively, organizations focused on sectoral issues such as housing, welfare, the environment) and who would then disseminate the findings.

Particular consideration should be paid to using simple, accessible language in the way the algorithmic systems are described. To do so, five repositories so far have taken a two-tiered approach, with a basic level and a more detailed version of the information. A study by BritainThinks about the UK Standard has validated such an

[112] See Ada Lovelace Institute et al., op. cit.

[113] Ministry of the Interior and Kingdom Relations. (2023). Guidance for algorithm registers. https://algoritmes.pleio.nl/attachment/entity/f1a35292-7ea6-4e47-93fa-b3358e9ab2e0

approach: "The two-tiered approach balances participants' expectation that all transparency information is available to access on demand, whilst also ensuring that transparency information shared at the point of interacting with the algorithm is simple, clear, concise and unlikely to overwhelm individuals"[114].

Making information as accessible as possible should not preclude the direct disclosure of original documents. This can mean releasing the full fundamental rights or data protection impact assessments (rather than their summaries), and technical documents such as source codes, training datasets, and models[115]. The French Digital Republic Law explicitly recognizes a source code as an administrative document that can be communicated.

4.8. Include search, tracking & versioning functionalities

To be tools for exploration, monitoring, and analysis, algorithm registers must include specific technical features. Search filters (including by location) are particularly important, as well as the ability to download the data in different formats, including machine readable ones such as JSON, .csv or .xlsx.

Gutiérrez and Muñoz-Cadena highlight the use of personalized alerts by academia-led register AlgorithmTips, which allows users to receive email notifications when an algorithm is added to the database[116]. Such a feature could be integrated into government-led registers to contribute to easier monitoring.

Algorithmic systems are not fixed objects, and can be updated. The descriptions of algorithms in the registers themselves is also subject to change. As such, it is also important for registers to have a technical versioning feature.

Finally, interviewees noted that links to external resources were susceptible to be taken down without such changes being recorded in the register. The registers should also be technically designed to keep a copy of external documents that the documentation may lead to, such as source codes, impact assessments or datasheets.

4.9. Document and justify the absence of information

Even for algorithms that are documented, the information released is often not sufficient to understand and challenge the systems. In particular, it is difficult to know why optional categories have been left blank. If a

[114] BritainThinks, op. cit., p.19

[115] Busuioc et al., op. cit.

[116] http://algorithmtips.org/ cited in Gutiérrez et al., op. cit.

category about "impact assessment" is not filled in, is it because the assessment was not conducted (and, in this case, why wasn't it?) or conducted but not made public?[117]

In addition to lack of accountability, incomplete information could actually lead to adverse effects such as loss of trust.

These concerns were raised during the public engagement exercise conducted around the Dutch algorithm register. Recommendations included making more fields mandatory, and communicating about the reasons why a field was empty (such as "not necessary", "not done", "in progress"). The current version of the Dutch register now encourages agencies to elaborate on why certain impact assessments were not performed[118].

The most recent US guidance also recommends that agencies who don't use AI post a notice on their government website with a statement indicating no current use of AI technology[119].

The existence of close-ended, specific categories (as opposed to open-ended fields) can ensure thorough documentation of what doesn't exist.

Implementation

4.10. Appoint a team in charge of implementing the register

The presence of a team leading the implementation at a national level is an opportunity to make the register a priority, support agencies, and ensure a harmonized implementation of the register.

Documenting algorithmic systems can be resource intensive, and require collaboration between different actors ranging from IT teams (including third-party suppliers), to public procurement teams, to data protection officers and chief information security officers, to civil servants using an algorithmic system. Such actors may not be

[117] On this issue more broadly, see Wright et al. (2024). Null compliance: NYC Local Law 144 and the challenges of algorithm accountability. FAccT '24: Proceedings of the 2024 ACM Conference on Fairness, Accountability, and Transparency. https://doi.org/10.1145/3630106.365899

[118] Ministry of the Interior and Kingdom Relations. (2023). Target group analysis algorithm register. Available at: https://algoritmes.pleio.nl/attachment/entity/e59fb733-51ca-4811-9b6e-1d89d348a5b3

[119] White House. (2024). Guidance for 2024 Agency Artificial Reporting per EO 14110. https://www.whitehouse.gov/wp-content/uploads/2024/08/Instructions-for-2024-Agency-AI-Reporting-per-EO-14110.pdf

used to working together and share information internally[120], and may lack the know-how and the information needed to document the systems.

Lack of resources and support is one of the main reasons raised by French agencies for their slow implementation of algorithmic transparency[121]. Lack of expertise and resources can also lead to variations in the quality of the documentation, making the register less impactful.

In Europe, both the UK and the Netherlands have teams in charge of centralizing contributions and offering support to agencies, in the form of guidance, training and knowledge-sharing events. In the UK, a single point of contact is now systematically designated in all agencies, to follow the implementation of the register on the ground. Both the UK and the Netherlands also emphasize the importance of inter-agency cooperation, either informal or, in the case of the UK, via cohorts[122]. Civil society interviewees have stressed that such teams should be tech- and data-literate, to be able to assess the technical information documented by agencies.

4.11. Embed the registration into the lifecycle of the algorithmic system

One way to make the registration process both a mandatory step and more accessible to under-resourced agencies, and thus ensure the register is as comprehensive as possible, is to embed registration in the normal design, development, and deployment processes algorithmic systems are part of. This includes:

- Standardize contractual clauses, in order to make sure that the information is already part of the information exchange between suppliers and users of the tools within government;

- Harmonize the information to be recorded in the register with other documentation standards (for instance, the information contained in datasheets for datasets and model cards), and make documentation and registration systems interoperable;

- Set up a robust governance process about how to record information internally;

[120] Murad, M. (2021). Beyond the "Black Box": Enabling Meaningful Transparency of Algorithmic DecisionMaking Systems through Public Registers, p.22. https://dspace.mit.edu/bitstream/handle/1721.1/139092/murad-mmurad-sm-idm-2021-thesis.pdf?sequence=1&isAllowed=y

[121] Promotion 2018-2019 « MOLIÈRE ». (2019). Rapport collectif sur commande d'une administration centrale: Éthique et responsabilité des algorithmes publics. https://www.etalab.gouv.fr/wp-content/uploads/2020/01/Rapport-ENA-Ethique-et-responsabilit%C3%A9-des-algorithmes-publics.pdf

[122] Responsible Technology Adoption Unit, op. cit.

- Take into account the maintenance of systems and registrations. Van Vliet et al. advise that higher-impact systems be subjected to more frequent maintenance[123].

4.12. Supplement the register with other accountability instruments

As seen throughout this report, algorithm registers are necessary, but not sufficient, to achieve accountability, participation, and safeguarding of fundamental rights. As such, they should be complemented by other governance instruments.

Governments have put in place other system-level algorithmic transparency instruments. For instance, the Netherlands has proposed transparency clauses in public procurement[124]. The Region of Catalunya has developed model cards for three algorithms of the region[125].

To achieve greater impact, system-level algorithmic transparency can be supplemented by individual-level transparency mechanisms[126], and by other types of algorithm accountability instruments, such as prohibitions, impact assessments, audits and regulatory inspection, oversight bodies, rights to hearing and appeal, and public procurement clauses[127].

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[123] Van Vliet, M., Schuitemaker, N., España, S., van de Weerd, I., & Brinkkemper, S. (2024). Defining and implementing algorithm registers: an organizational perspective. Thirty-Second European Conference on Information Systems (ECIS 2024), Paphos, Cyprus.
https://www.ingevandeweerd.nl/wp-content/uploads/2024/04/van-Vliet-et-al.-2024-ECIS-Defining-and-implementing-algorithm-registers-An-organizational-perspective.pdf

[124] Ministry of the Interior and Kingdom Relations. (2023). Guidance for algorithm registers. p.14. Available at:
https://algoritmes.pleio.nl/attachment/entity/f1a35292-7ea6-4e47-93fa-b3358e9ab2e0

[125]
https://www.aoc.cat/es/projecte-innovacio/transparencia-en-lus-dalgorismes-dintelligencia-artificial-a-laoc/

[126] For a review of select existing individual-level transparency mechanisms, see Leslie and Selman, op. Cit.

[127] Ada Lovelace Institute et al., op. cit.

5. Algorithmic transparency: the case of Spain

As described in the recommendations of the present report, besides complying with the requirements imposed by the AI Act, Member States (MS) have the capacity to foster greater algorithmic transparency and accountability in the public and private sector through the creation of national registers (see section 3.4 of the report). The scope of these registers can be defined by each state, but should ideally comprise an explicit record of high-risk systems, as well as enable deployers to register their use of AI systems of any kind.

In fact, the EU AI Act establishes a database for registering some information of AI systems, as outlined in Article 71. However, its scope is limited to certain mandatory categories, focusing on providers and certain deployers of high-risk AI systems, and providers of systems self-assessed as not high-risk, and explicitly excluding others (see point 2 of the report).

Despite these limitations, the AI Act presents significant opportunities. Notably, it encourages deployers (Recital 131) to voluntarily register their systems even before the mandatory application date of 2 August 2026 (Recital 179) and allows both deployers and providers of AI systems to voluntarily comply with certain obligations through codes of conduct (Recital 165). This creates, on one hand, room for civil society organizations to advocate for the inclusion of rules-based systems under the AI Act's scope (despite ongoing discussions about the limited definition of AI systems adopted in art. 3.1 of the law) and, on the other hand, opportunities for MS to develop more ambitious forms of the database, as they have the competence to establish their own national databases, particularly given the obligation to register AI systems used in critical infrastructure at the national level.

Crucially, the AI Act differentiates between "providers" and "deployers." While the Commission appears to hold the authority to impose rules and interpretations on providers, MS retain the flexibility to exceed the AI Act's provisions concerning deployers. In this sense, they can develop national databases and encourage or foster "voluntary" registration. By leveraging these opportunities, MS can establish public registers that align with the EU database while also addressing local needs and exceeding its scope.

Thus, the focus is set on promoting channels and tools that allow citizens, civil society or governmental actors to consult the impact of algorithms and automated decision-making at the social, economic and political sphere.

5.1. Strategies to strengthen algorithmic transparency in Spain

At the Spanish level, a number of plans and strategies are being currently implemented to strengthen transparency at the institutional level, including the use of algorithms by the public sector and, in some cases, the private sector.

This is the case of Spain's National Artificial Intelligence Strategy, whose last version was launched in 2024. The Strategy is structured along three pillars, the third one being the "development of a transparent, responsible and humanist Artificial Intelligence". For this aim, the role of the Spanish AI Supervisory Agency (AESIA) is reinforced as the coordinator of a governance system of AI. In this sense, the Strategy emphasizes the need to "define high levels of transparency and reliability of AI models and systems through evaluation and review processes that go beyond the application of the AI Act". However, no progress has been made in this area and specific actions within the AESIA have yet to be announced and implemented.

Also in 2024, the Ministry for the Digital Transformation and of the Civil Service started the definition process of Spain's Fifth Open Government Plan 2024-2028, which includes "Digital Governance" as an area of reform. The first draft of the Plan has not been published, but in the workshops conducted with civil society organizations, "the creation of a register of AI and automated decision making systems" was highlighted as a priority. The publication of the Plan is expected for the first quartersemester of 2025, which could shed light on the feasibility of a national register becoming a reality in the following years.

Lastly, the government of Spain adopted in 2021 the Charter of Digital Rights, becoming the first European state to recognize this set of protections for citizens in the online sphere. Although the provisions contained in the Charter are non-binding and no further steps have been taken in the upholding of these rights through the passage of legislation, it does establish that automated decision making systems used by public administrations should be accessible to citizens in a comprehensive manner. The document states as well that "the law may regulate conditions regarding transparency and access to source code, especially in order to verify that the results produced are not discriminatory".

5.2. Latest developments: AI's regulatory sandbox

In December 2024, the Spanish Secretariat of State for Digitalization and Artificial Intelligence (SEDIA), launched a call for access to a controlled testing environment (sandbox) for a so-called "reliable" AI. This initiative aims to test compliance with the AI Act, particularly for high-risk systems. Among other objectives, the sandbox is expected to foster compliance within small and medium-sized enterprises with AI regulations.

It is important to highlight that the evaluation criteria include the level of innovation, social impact, algorithm transparency, alignment with Spain's Digital Rights Charter, system maturity, technical quality, and the type of participating entities.

5.3. Key institutions

As mentioned above, at the national level, the AESIA is expected to be the key institution in the development of advancements for algorithmic transparency. The AESIA reports directly to the above-mentioned SEDIA (embedded in the Ministry for the Digital Transformation and of the Civil Service) and is currently undergoing a process of organizational reforms that will determine the new scope of its activities and competences. ¿Algo más sobre la AESIA?

Also embedded in the Ministry for the Digital Transformation is the newly created State Agency for Digital Administration (AEAD), which will deploy under the coordination of its Department of New Innovative Services "the redefinition and intelligent automation of internal processes through the use of robotisation and artificial intelligence capabilities" within public administrations. Therefore, the Agency could play a crucial role in the definition of a national register of algorithms, as a sort of "black box" of all AI systems operated in the public sector.

5.4. Advancements at the regional level: the case of Comunidad Valenciana and Catalonia

Different regions in Spain, most notably the Valencian Community and Catalonia, have approached in recent years the issue of algorithmic transparency and proposed measures to increase accessibility to AI systems affecting the daily lives of citizens. At the same time, autonomous communities such as Galicia, Asturias or Extremadura, have passed or are in the process of passing specific regulations on AI, although not including measures for the creation of a register.

In the case of the Valencian Community, the mandatory publication of high-risk AI and automated systems, as well as those that significantly impact administrative procedures or the provision of public services, was included in the Law on Transparency and Good Governance of the region passed in 2022. Since then, the autonomous administration has been working with universities and companies in the definition of the register, which is expected to be launched soon.

Catalonia has also strengthened access to information on algorithms used by the public sector, publishing a set of informative sheets on its AI systems. These dossiers provide data on how the system was trained, its benefits, risks in terms of privacy or discrimination and the technical provisions of the algorithm. However, only four sheets have been published so far. In addition to this, the Catalonian government created at the beginning of 2024 the Artificial Intelligence Commission to foster the deployment of AI systems within public administrations, as well as to oversee its implementation.

5.5. Final remarks

The AI Act leaves room for improvement at the national level in relation to the EU database, as Member States must develop their own databases, at least for critical infrastructure, and have the competence to impose stricter requirements on deployers. Combined with Spain's efforts to improve algorithmic transparency -as shown by the initiatives previously mentioned and the examples of Valencia and Catalonia- this provides a unique and timely opportunity to take concrete steps in this area. Moreover, considering the opportunities provided by the AI Act -such as the mandate for Member States to establish governance structures by 2 August 2025 (recital 179 of the AI Act)- and the upcoming regulatory sandboxes in Spain, which aim to support compliance with the law, the moment is perfect for action.

In other words, Spain mustcould create a national public register of algorithms, including those used in public administration and the private sector, and adopt the necessary policies and regulatory measures to promote and enforce both mandatory and voluntary registrations. By doing so, Spain has the potential to become a leader in algorithmic transparency in Europe.

6. Conclusion and perspectives

Even though not sufficient, algorithm registers are a necessary step for algorithmic transparency and accountability. However, particular attention has to be paid to their content, dissemination, and the context in which they are embedded, lest they become instruments of "transparency washing" and end up doing more harm than good.

This report makes different contributions to the issue of public registers:

- It proposes a comprehensive mapping and analysis of algorithm registers in Europe, building on and complementing other mapping endeavors at a global level;

- It makes concrete policy recommendations on how to design, develop, and evaluate a national algorithm register, based on good practices and needs of target audiences, in a way that uses the AI Act's database as a springboard.

- It proposes a sociotechnical framework for a register, building on existing frameworks, that can be used as a first iteration for a national register.

Our research was limited due to resources and time constraints. In addition, language may have been a barrier in identifying registers unavailable in English. For instance, information obtained after the completion of this research, which we were not able to include in our analysis, showed that Belgium has a tool which can stand as a public algorithm register[128], and that Estonia is also building an algorithm transparency standard, drawing from the United Kingdom's experience[129].

Our results highlight the need to conduct more thorough internal and external evaluations of existing algorithm registers in order to assess their impact in practice. At the European level, they call for continued collaboration between different geographical areas, especially in the context of the implementation of the AI Act.

[128] https://bosa.belgium.be/fr/AI4Belgium/observatoire#anchor-3

[129] https://www.gov.uk/government/publications/estonia-uk-science-and-innovation-network-summary/uk-science-and-innovation-network-summary-estonia

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Annex I. Information to be registered in the EU AI Act database

1. Information to be registered by providers

Green: information required is identical for systems considered high-risk and systems not considered high-risk

Yellow: information requirements for systems not considered high-risk are less than those for systems considered high-risk

Pink: information is not required for systems not considered high-risk

White: different information

If the system is considered high-risk (Article 49(1)) Annex VIII, Section A.	If the system is not considered high-risk (Article 49(2)) Annex VIII, Section B.
1.The name, address and contact details of the provider;	1.The name, address and contact details of the provider;
2.Where submission of information is carried out by another person on behalf of the provider, the name, address and contact details of that person;	2.Where submission of information is carried out by another person on behalf of the provider, the name, address and contact details of that person;
3.The name, address and contact details of the authorised representative, where applicable;	3.The name, address and contact details of the authorised representative, where applicable;
4.The AI system trade name and any additional unambiguous reference allowing the identification and traceability of the AI system;	4.The AI system trade name and any additional unambiguous reference allowing the identification and traceability of the AI system;
5.A description of the intended purpose of the AI system and of the components and functions supported through this AI system;	5.A description of the intended purpose of the AI system;

6.A basic and concise description of the information used by the system (data, inputs) and its operating logic; EXCEPTION: information not required for systems pertaining to law enforcement, migration, asylum and border control management	Not required
Not applicable	6.The condition or conditions under Article 6(3)based on which the AI system is considered to be not-high-risk;
Not applicable	7.A short summary of the grounds on which the AI system is considered to be not-high-risk in application of the procedure under Article 6(3); EXCEPTION: information not required for systems pertaining to law enforcement, migration, asylum and border control management
7.The status of the AI system (on the market, or in service; no longer placed on the market/in service, recalled);	8.The status of the AI system (on the market, or in service; no longer placed on the market/in service, recalled);
8.The type, number and expiry date of the certificate issued by the notified body and the name or identification number of that notified body, where applicable; EXCEPTION: information not required for systems pertaining to law enforcement, migration, asylum and border control management	Not required
9.A scanned copy of the certificate referred to in point 8, where applicable; EXCEPTION: information not required for systems pertaining to law enforcement, migration, asylum and border control management	Not required

10.Any Member States in which the AI system has been placed on the market, put into service or made available in the Union.	9.Any Member States in which the AI system has been placed on the market, put into service or made available in the Union.
11.A copy of the EU declaration of conformity referred to in Article 47;	Not required
12.Electronic instructions for use*: Per Article 13(2), electronic instructions for use must include at least: - The contact information of the provider; - The characteristics, capabilities, and limitations of the system, such as its level of accuracy; - Any changes to the system and its performance which have been pre-determined by the controller at the moment of the initial conformity assessment; - The human oversight measures adopted in the system; and the expected life cycle of the system, including necessary updates and maintenance practices. EXCEPTION: law enforcement, migration, asylum and border control management	Not required
13.A URL for additional information (optional).	Not required

2. Information to be registered by deployers

General rule (Article 49(3)) Annex VIII, Section C	Exception: law enforcement, migration, asylum and border control management (Article 49(4))
1.The name, address and contact details of the deployer;	1.The name, address and contact details of the deployer;
2.The name, address and contact details of the person submitting information on behalf of the deployer;	2.The name, address and contact details of the person submitting information on behalf of the deployer;
3.The URL of the entry of the AI system in the EU database by its provider;	3.The URL of the entry of the AI system in the EU database by its provider;
4.A summary of the findings of the fundamental rights impact assessment conducted in accordance with Article 27; EXCEPTION: information not required for AI systems used in critical infrastructure	NOT REQUIRED
5.A summary of the data protection impact assessment carried out in accordance with Article 35 of Regulation (EU) 2016/679 or Article 27 of Directive (EU) 2016/680 as specified in Article 26(8) of this Regulation, where applicable.	NOT REQUIRED

Annex II. Proposal for a framework for a national public algorithm register

This framework operationalizes the general categories outlined in section 1, drawing from different existing frameworks.

It strives to take into account the recommendations made in the report, based on the good practices outlined by the literature and interviewees, including a two-tiered information system, an emphasis on accountability, versioning, and the possibility to link to unmediated documentation.

It also succinctly identifies correspondence between certain categories and categories required in the EU AI Act's database, to illustrate how national registers can be thought of coherently with the EU AI Act requirements.

It illustrates the categories with a fictional algorithm[130]. This example is not meant to be a "gold standard" for an algorithm (in terms of the goals pursued or the development and deployment process), but to show how such a tool could be recorded in a register.

This framework should be seen as a starting point for a national government interested in implementing a register. Ideally, the next iteration would be co-designed with its intended audiences.

[130] The example was freely adapted from a case documented by the municipality of Amsterdam. See: https://algoritmeregister.amsterdam.nl/ai-system/illegal-holiday-rental-housing-risk/109/. Some of the categories directly draw from the case, and are indicated as such.

Category	Description/additional information on the category	Example with a fictional algorithm	Correspondence with information required in the AI Act's database
System overview (First Tier Information)			
Name of the system		Illegal tourism rental housing risk detection	For providers: "The AI system trade name and any additional unambiguous reference allowing the identification and traceability of the AI system;"
Description	Basic overview of the purpose of the tool. It should include: - How the tool is used - Why the tool is used	The municipality of X has limited living space. In order to ensure its inhabitants have enough affordable housing and to preserve the livability of the city, the municipality has set constraints on tourism rentals. Homeowners can only rent their house or apartment for 90 nights per year. They also have to declare their income to the municipality.	

		However, not everyone respects these rules. The department of housing receives reports from neighbors or rental platforms that the conditions may not have been respected. These reports trigger investigations. An algorithm has been put in place to help the department of housing prioritize the investigations, to support the work of the department of housing's employees and help them make their work more efficient.	
Contact email	Email address for the organization or team responsible for this record. The UK Algorithmic Transparency Recording Standard advises using or creating a team email address instead of using an individual email address, for continuity and security purposes.	housing@municipalityx.es	For providers/deployers: "The name, address and contact details of the provider;" "The name, address and contact details of the deployer;"

Phase	The Eurocities standard suggests the following categories: planned, design, development, pilot, evaluation, operational, retired	Experimentation	For providers: “The status of the AI system (on the market, or in service; no longer placed on the market/in service, recalled);”
Beginning date of the phase		01/11/2024	
Theme	Note: a finite list of themes should be provided.	Housing	
Link to outside resources	Including the website’s URL	https://www.municipalityx.es/housingdepartment/risk-algorithm	For providers: “an optional URL for additional information”
Second Tier Information			
1.Ownership and involved parties			
Ownership			

Responsible organization	Ex: ministry, city...	Municipality X	For providers/deployers “The name, address and contact details of the provider;” “The name, address and contact details of the deployer;”
Department	Specific department	Department of Housing	
External supplier involvement (if relevant)			
External supplier name		AI Insights Spain	Providers can be external suppliers when they sell off-the-shelf tools to agencies.
External supplier role	External suppliers can have been involved in different ways, for instance: - By selling an off-the-shelf tool to the municipality - By developing an ad-hoc algorithmic system - By writing a scoping report - ...	AI Insights Spain was in charge of developing the algorithmic system for the municipality. They worked with housing experts from the municipality to configure the tool according to the requirements of the municipality.	

	Different suppliers can also be involved at different stages		
Procurement procedure type	Specify the terms of the procurement (for instance, open procedure, closed procedure).		
Data access terms		AI Insights Spain was given access to three datasets (identity and housing rights data, buildings data, and prior illegal housing cases) in order to develop the system. This was done in compliance with GDPR. The staff only had access to the data during the development of the algorithmic system. The maintenance of the tool is carried out by the municipality.	
Funding			

Sources that financed the development or acquisition of the system		The tool was financed by the municipality's budget (5 000 euros) and a government grant from the AI Innovation Call for Projects (25 000 euros). It is maintained with the municipality's budget.	
Cost of building/acquiring and maintaining the system		System development: 30 000 euros. System maintenance and hosting: 2000 euros/year.	
Process and effects			
System purpose			
Detailed description	You can go more into detail	n/a	
Goals	What are the goals of the policy for which the algorithm is being/was put in place and how will the application expectedly contribute to reaching these goals?	The algorithm was put in place to optimize the employees' workload, as the department of housing is short-staffed.	For providers: A description of the intended purpose of the AI system and of the components and functions supported through this AI system;

Justification/Proportionality	Why was an algorithm necessary? How do the expected benefits outweigh any potential expected risk?	The municipality identified an algorithmic system as the most efficient and cheapest way to optimize the workload. One of the risks would be to overcontrol certain categories of homeowners. Another one is to worsen the employees's working conditions. The system is being experimented and can be rolled back if it's found not to be useful or accurate.	
Previous process		Previously, the employees of the department of housing prioritized the controls by chronological order.	
Alternatives considered	Including non-algorithmic alternatives and other types of algorithms.	The municipality deliberated on hiring an extra employee at the department of housing, but this was impossible due to budgetary constraints.	
Legal basis		Municipal deliberation n°XXX. Link to the municipal deliberation: [URL]	

Acquisition/development decision-making process	Include elements about how the system was chosen, and if civil society/affected communities were involved in this decision.	The decision to develop the algorithmic system was suggested by the employees and discussed with unions. It was also deliberated with citizens during an open meeting in which homeowners and housing rights organizations were heard and could share their opinion. The decision was then made by the municipality. The notes from the open meeting can be found here: [URL].	
Decision-making process			
Process integration	Explain how the algorithmic tool is integrated into the decision-making process.	Each report is analyzed by the algorithmic system and assigned a risk score. The employees have access to a dashboard interface where reports are by default ordered by risk score.	

		The employee can decide to investigate any report present on the dashboard. Once an investigation is triggered, the employees conducts preliminary research and field investigations. The dashboard is also used to manage the processing of the reports once an employee has decided to investigate the case.	
Frequency and scale of usage	Provide information on how regularly the algorithmic tool is being used and the scale of use. For example, the number of decisions made per month, the number of citizens interacting with the tool, etc.	The housing department processes 300 reports a month.	

Human decisions and review	How much and what information the algorithmic tool provides to the decision maker? In what format? What are the decisions that people make? Are there human review options?	For each report, the employee can view which data features play an important role in the "risk assessment" of the algorithm. To avoid automation bias, employees have undergone training. Specific design choices have also been made, such as being able to order the list by data features and not by risk score, and indicating the margin of error of the risk score. The algorithm doesn't play a role in determining whether the rental was illegal. Employees are required to indicate whether they decided to trigger an investigation because of the risk score, but only for statistical purposes, as part of the evaluation plan.	For providers: Electronic instructions for use (which include human oversight measures)

Required training	Required training undertaken by those deploying or using the algorithmic tool, if applicable.	Employees are required to follow a half-day training outlining the general risks of using decision-making algorithms before using the tool.	For providers: Electronic instructions for use (which include human oversight measures)
Technical specifications			
System architecture	Summary of the key technical features of the tool. This can be in the form of a diagram.	A random forest regression is used on the identified datasets to calculate the probability of housing fraud. SHAP is used to calculate which features have played a role in the (high or low) risk score.	For providers A basic and concise description of the information used by the system (data, inputs) and its operating logic /!\ Not required for systems used in law enforcement, migration, asylum, border control
Models	A list of models that feature within the tool (rule-based, machine learning, other statistical or mathematical models)	Random forest regression	
Model card		Link to a standardized model card: (see for instance https://huggingface.co/docs/hub/model-cards)	For providers: Electronic instructions for use (which include the capabilities of the system)

Training datasets	A list of the names, descriptions, sources, and dataset cards for the datasets used to train the models. If the dataset contains personal data, specify it.	The model uses three datasets. 1.Identity and housing rights data Dataset description: Minimized dataset from the Personal Records Database (BRP), showing information about the identity and housing rights of the residents; specifically: name; date of birth; gender; date of residence in Municipality of X; date of residence at the address; family composition; date of death. The dataset contains personal data. Source: Personal Records Database (BRP) 2.Buildings data Dataset description: Minimized dataset from the Registry of Addresses and Buildings, showing information about the building; specifically: address, street code, postal code; description of the	

		property; the type of home (rent, social rent / free sector, owner-occupied); number of rooms; floor surface area; floor number; number of building floors; description of the floor of the residential property. The dataset doesn't contain any personal data. Source: minimized dataset from the Registry of Addresses and Buildings. 3.Prior illegal housing cases Dataset description: Data from any related illegal housing cases; specifically: starting date of investigation; report stage of investigation; report code number; violation code number; investigator code number; anonymous reporter yes/no; user that created the report (including date), or edited the report (including date); handling code number (type of	

		case, allocation to team); date when case closed; reason why case closed. The dataset contains personal data. Source: ad-hoc dataset.	
Data sharing agreements		N/A	
In the case of human-made rules, how were the rules made?	If the system is based on rules made by humans, who decided on these rules? What was the input of system experts?	N/A	
Data access and storage	Who has access to the data? How is it secured? How is it stored?	The training datasets are stored securely on the municipality's cloud.	
Input data	Data used as an input in the system	The data contained in the housing fraud suspicion reports submitted by citizens or platforms is used to attribute a risk score, namely: - Data about the homeowner: name; date of birth; gender; date of residence in Municipality of X; date of	

		residence at the address; family composition; date of death. - Data about the building: address, street code, postal code; description of the property; the type of home (rent, social rent / free sector, owner-occupied); number of rooms; floor surface area; floor number; number of building floors; description of the floor of the residential property.	
Link to source codes, training datasets, and/or models		[add relevant URL]	
Performance	Technical performance of the systems, including its technical limitations	Examples of performance metrics here can include a confusion matrix.	For providers: Electronic instructions for use (which include limitations and accuracy)
Evaluations/impact assessments			

Is the system a high-risk system under Annex III of the AI Act?	Yes/No	No	
If the system pertains to a category in Annex III but you don't consider the system high risk, explain why			For providers: "The condition or conditions under Article 6(3)based on which the AI system is considered to be not-high-risk;" "A short summary of the grounds on which the AI system is considered to be not-high-risk in application of the procedure under Article 6(3);" /!\ not applicable for law enforcement, migration, asylum, border management
Data protection impact assessment (DPIA)	Performed/Not performed	Performed	

Link to the results of the DPIA		[Add URL]	For deployers: A summary of the data protection impact assessment carried out in accordance with Article 35 of Regulation (EU) 2016/679 or Article 27 of Directive (EU) 2016/680 as specified in Article 26(8) of this Regulation, where applicable.
If not performed, explain why		N/A	
Fundamental rights impact assessment (FRIA)	Performed/Not performed	Performed	
Link to the results of the FRIA		[Add URL]	For deployers: A summary of the findings of the fundamental rights impact assessment conducted in accordance with Article 27;
If not performed, explain why		N/A	

How was discrimination addressed in the project?		During the development of the algorithm, the available datasets were critically examined, using a privacy impact assessment. It was decided that only a minimal selection should be used for data processing. Only information that is critical to determine if the Housing Act is violated is included in the dataset on which the algorithm was developed. Information such as place of birth, nationality, marital status, and country of birth is not included in the algorithm. This ensures that there is no prejudice towards groups of people. The data used for the algorithm comes from previous illegal holiday rental cases. Good-quality data must be used to substantiate an enforcement decision and to make it legally sustainable. It is therefore assumed that the underlying data does not contain such material biases that it is necessary to doubt the	

		reliability of the data and the probability calculation. However, an algorithm can be so good at finding patterns that excluding sensitive data is not enough. We therefore also investigated whether the non-sensitive data processed by the algorithm indirectly leads to undesirable differences in treatment between cases. For example, it could be that in certain neighborhoods many of the people living there are of a certain nationality; or that certain groups on average have larger families. If the algorithm then uses data such as the postal code or family size, it can still indirectly distinguish between certain groups, simply by distinguishing between neighborhoods or family size. In this case, a group can still be disadvantaged by the algorithm, even if the group is not explicitly known to the algorithm. We have therefore chosen to conduct further research into this form	

		of algorithmic bias during the pilot. For this we use the “AI Fairness 360 toolkit”(https://aif360.mybluemix.net).[131]	
Other types of impact assessments	Name, description and link	N/A	
Risks and mitigations		The system naturally has an impact on the alleged offender, as the report on their offence might get more (or less) priority than it would have without the system. There have been several mitigations to make sure that all probability calculations are based on causality, not on correlations. The primary risk mitigation for this algorithm is that its use is in a pilot phase, and its trustworthiness will be evaluated extensively and continuously during that pilot phase.[132]	
Accountability			

[131] This description is directly taken from the Amsterdam registration: https://algoritmeregister.amsterdam.nl/ai-system/illegal-holiday-rental-housing-risk/109/

[132] This description is directly taken from the Amsterdam registration: https://algoritmeregister.amsterdam.nl/ai-system/illegal-holiday-rental-housing-risk/109/

Performance monitoring	Explain the measures in place to monitor the systems, including the formal ways in which civil society is engaged with. How frequently is performance monitored? How is feedback reviewed and addressed?	The system will be experimented for a period of six months. During those six months, an evaluation committee made of technical and legal experts, union representatives from the department of housing, and housing rights organizations, will evaluate the experimentation and produce a short report that will be made public. Link to the composition of the committee and their timeline: [URL].	
Appeals and review	What mechanisms are in place for review or appeal of the decision?	Homeowners cannot appeal the decision to be controlled. However, the control can result in a fine. The homeowners can appeal the decision online or by mail, through documents sent to them alongside the fine decision.	
Rollback	Is it possible to completely roll back the effects of the algorithm if needed? What does that take?	The system is still being experimented. Its accuracy will be evaluated after 6 months of use, qualitatively (perception of the employees and of the housing	

		rights associations) and quantitatively (accuracy of the predictions). If results are not satisfactory (mostly bad perception and/or inaccurate predictions), the system will be abandoned.	
Information to beneficiaries	Are the beneficiaries or recipients of the system informed about the use of the system? Do they receive information explaining how the system influenced the process or decision?	Homeowners subjected to a control are informed that they have been scored by an algorithm.	
Versioning			
Last change date	Date of the last change to the registration.	01/11/2024	
Revision date	Date before which this registration has to be revisited.	01/04/2025	
Revision date note	Why is the revision planned?	The registration will be updated at the end of the 6-month experimentation.	
Version of the standard used		V1.0	

Annex III. Mapping of registers in Europe

The detailed data for all registers analyzed is available here.

1. Registers developed by governments and public institutions

At a supranational level

Name	Responsible organization(s)	Geographical area	Link
Algorithmic Transparency Standard	Eurocities	European Union (9 cities)	https://www.algorithmregister.org/standard
Public Sector Tech Watch	Joint Research Center, EU Commission	European Union	https://joinup.ec.europa.eu/collection/public-sector-tech-watch/cases-viewer-statistics

At a national level

Name	Responsible organization(s)	Geographical area	Link
Artificial intelligence - overview of projects in the public sector	National Data Catalog of Norway	Norway	https://data.norge.no/kunstig-intelligens

Publication of algorithms and source codes	Interministerial agency for digital affairs	France	https://github.com/etalab/algorithmes-publics/blob/master/liste.org
The Algorithm Register of the Dutch government	Dutch Ministry of the Interior and Kingdom Relations	The Netherlands	https://algoritmes.overheid.nl/en
Scotland AI Register	Scottish Government	Scotland (United Kingdom)	https://scottishairegister.com/
Algorithmic Transparency Records	Cabinet Office, Central Digital and Data Office, and Department for Science, Innovation and Technology	United Kingdom	https://www.gov.uk/algorithmic-transparency-records

At a central/federal level

Name	Responsible organization(s)	Geographical area	Link
Algorithmes	French Unemployment Agency	France	https://www.francetravail.fr/candidat/algorithmes.html
Algorithm Register	Tax and Customs Administration of the Netherlands	The Netherlands	https://over-ons.belastingdienst.nl/onderwerpen/omgaan-met-gegevens/algoritmeregister/
Algorithm Register Cadastre	The Netherlands' Cadastre, Land Registry and Mapping Agency	The Netherlands	https://www.rdw.nl/over-rdw/dienstverlening/algoritmeregister

Algorithm register of the Central Judicial Collection Agency	Central Judicial Collection Agency	The Netherlands	https://www.cjib.nl/algoritmeregister
Algorithm Register of the Dutch Social Insurance Bank	Dutch Social Insurance Bank	The Netherlands	https://www.svb.nl/nl/over-de-svb/hoe-werken-we/hoe-gaan-we-om-met-algoritmes
Algorithm register of the Employee Insurance Agency	The Employee Insurance Agency	The Netherlands	https://www.uwv.nl/nl/over-uwv/organisatie/algoritmeregister-uwv
The algorithm registers of the Ministry of Justice and Security	Dutch Ministry of Justice and Security	The Netherlands	https://www.justid.nl/algoritmeregister
Algorithm Register of the Nederlands Forensisch Institute	Dutch Forensics Institute	The Netherlands	https://www.forensischinstituut.nl/over-het-nfi/algoritmeregister

At a subnational level

Name	Responsible organization(s)	Geographical area	Link
Algorithm Register Barcelona		Barcelona (Spain)	N/A (in construction, as part of Eurocities initiative)
Algorithm Register Brussels		Brussels (Belgium)	N/A (in construction, as part of Eurocities initiative)

Algorithm Register Eindhoven		Eindhoven (The Netherlands)	N/A (in construction, as part of Eurocities initiative)
Algorithm Register Mannheim		Mannheim (Germany)	N/A (in construction, as part of Eurocities initiative)
Algorithm Register Sofia		Sofia (Bulgaria)	N/A (in construction, as part of Eurocities initiative)
Algorithm Register of the Municipality of Rotterdam	Municipality of Rotterdam	Rotterdam (The Netherlands)	https://algoritmeregister.rotterdam.nl/p/Onzealgoritmes
Algorithm Register of the Municipality of Groningen	Municipality of Groningen	Groningen (The Netherlands)	https://data.groningen.nl/dataset/algoritmeregister-gemeente-groningen
Algorithm Register of Utrecht	Municipality of Utrecht	Utrecht (The Netherlands)	https://data.utrecht.nl/dataset/algoritmeregister-utrecht
Algorithm Register (Zuid-Holland)	Province of Zuid-Holland	Zuid-Holland (The Netherlands)	https://www.zuid-holland.nl/politiek-bestuur/feiten-cijfers/algoritmeregister/
City of Amsterdam Algorithm Register	Municipality of Amsterdam	Amsterdam (The Netherlands)	https://algoritmeregister.amsterdam.nl/en/ai-register/
City of Helsinki AI Register	City of Helsinki	Helsinki (Finland)	https://ai.hel.fi/en/ai-register/
Consultation of the Public Algorithms of Metropolitan Nantes	Metropolitan Nantes and City of Nantes	Metropolitan Nantes and City of Nantes (France)	https://data.nantesmetropole.fr/pages/algorithmes_nantes_metropole/

Consultation of the Public Algorithms of the City of Paris	City of Paris	City of Paris (France)	https://opendata.paris.fr/pages/algorithmes-publics-ville-de-paris/
Experimentation: Opening public algorithms	European Metropolitan Lille	European Metropolitan Lille (France)	https://data.lillemetropole.fr/catalogue/dataset/algorithmes-mel
Inventory of Algorithms Used by the City of Antibes	City of Antibes	Antibes (France)	https://www.antibes-juanlespins.com/ma-ville/donnees-municipales-et-open-data
Inventory of Algorithmic Treatments	Ille and Vilaine department	Ille et Vilaine (France)	https://data.ille-et-vilaine.fr/dataset/recensement-des-traitements-algorithmiques
Inventory of the Main Algorithmic Treatments of the Île de France Region	Region of Île de France	Île de France (France)	https://data.iledefrance.fr/explore/dataset/inventaire-des-algorithmes-region-ile-de-france/information/
Val d'Oise département's inventory of their main algorithmic treatments leading to individual administrative decision	Val d'Oise département	Val d'Oise (France)	https://www.valdoise.fr/295-protection-des-donnees-rgpd.htm

2. Registers developed externally

Name	Responsible organization(s)	Geographical area	Link
Atlas of Automation Switzerland	AlgorithmWatch Switzerland	Switzerland	https://algorithmwatch.ch/en/atlas/
Detailed analysis of the “kleine Anfrage” on deployment of artificial intelligence	Anke Domscheit-Berg (member of the German Parliament)	Germany	https://mdb.anke.domscheit-berg.de/2024/07/pm-kleineanfrage-kuenstliche-intelligenz-bund/
Observatory of the Automated Administration	Privacy Network (civil society organization)	Italy	https://privacy-network.it/osservatorio/
Tracking Automated Government (TAG) Register	Public Law Project (civil society organization)	United Kingdom	https://publiclawproject.org.uk/resources/the-tracking-automated-government-register/

Annex IV. List of interviewees

By alphabetical order:

- Department for Science, Innovation and Technology (UK)
- General directorate of digitalization in government agencies, Ministry of the Interior and Kingdom Relations (Netherlands)
- Hans de Zwart, Amsterdam University of Applied Sciences
- Interministerial Department for Digital Affairs (France)
- La Quadrature du Net
- Mia Leslie, Researcher, Currently at the Institute for the Future of Work, formerly at the Public Law Project.
- Lodewijk Noordzij, formerly at Eurocities.

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