



AI in the public sector

A European Perspective

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The views expressed are those of the author and may not in any circumstances be regarded as stating an official position of the European Commission.

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JRC research

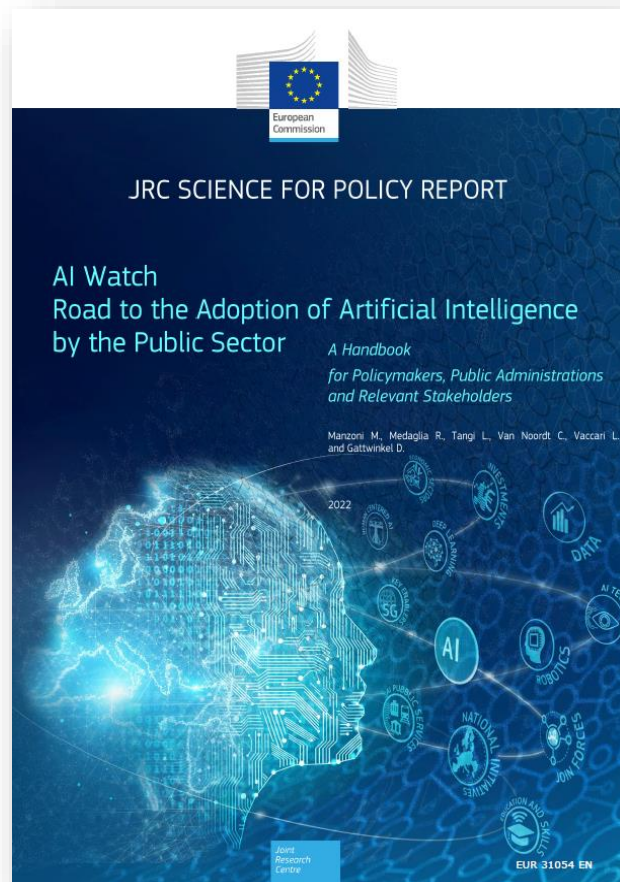
- Fully **policy-relevant** and world class **knowledge production**
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- **Addressing challenges of research**
(information deluge, multidisciplinary, integrity, reproducibility)





Road to the adoption of AI by the public sector

- An evidence based Approach



4 Areas of interventions

16 Recommendations

Over 50 Actions
at different levels of operational governance



Road to the adoption of AI by the public sector

1. Provide an **educated picture of the State of the Art of AI in Europe**
2. **Identify challenges and opportunities**, areas of intervention and potentials
3. **Outline Initiatives and activities** in support to progress of AI in the PS
4. **Provide a dedicated framework** and possible actions for **key stakeholders at all levels**
5. Identify **policy options** and **research avenues** for the future



an ***actionable plan***
based on *concrete evidence* supported by *examples*, ruled by *common needs and opportunities*, supported by *initiatives and policies* at all levels

Area 1:
Promote an EU value-oriented, inclusive, human-centric and trustworthy AI in the public sector

- 1.1**
Harmonise and complement EU regulations to promote human-centric and trustworthy AI-enabled public services for all citizens
- 1.2**
Promote the adoption of ethical principles, the development of guidelines and the identification of mitigating measures to minimize the risks of deployment of AI by the public sector
- 1.3**
Develop and promote dedicated AI-enabled solutions based on co-creation approaches to increase relevance and citizens' and businesses' trust and confidence in the use of AI by the public sector

Area 2:
Enhance coordinated governance, convergence of regulations, and capacity building

- 2.1**
Create an EU-wide network of governance bodies for a streamlined management of AI in the public sector
- 2.2**
Design national and European capacity-building programs for public sector innovators aiming to develop and/or adopt AI in support to the digital transformation of public services
- 2.3**
Build upon and promote the use of regulatory sandboxes for public administrations, allowing experimentation of AI-enabled solutions in controlled environments
- 2.4**
Optimise funding in support to AI in the public sector to promote the spreading and scaling of reusable solutions
- 2.5**
Promote the development of multilingual guidelines, criteria, and tools for public procurement of AI solutions in the public sector throughout Europe

Area 3:
Build a shared and interactive AI digital ecosystem

- 3.1**
Support multidisciplinary research and knowledge creation amongst European universities and Research and Development (R&D) institutions around AI for the public sector
- 3.2**
Build a common European Data Space for public sector bodies and their operators, drawing from the compilation of relevant AI datasets and related Registries throughout Europe
- 3.3**
Reinforce and advance existing initiatives on open data and interoperability
- 3.4**
Share reusable and interoperable AI components at all operational levels of European public administrations
- 3.5**
Create a European marketplace for GovTech solutions in support of public sector digital transformation

Area 4:
Apply and monitor sustainability through value-oriented AI impact assessment co-created frameworks

- 4.1**
Set up an EU observatory on AI, built on a pan-European network of AI national observatories, to gather, share, and collectively manage best practices and experiences learned from different stakeholders in the public sector throughout Europe
- 4.2**
Develop and apply umbrella impact assessment frameworks based on key influencing factors to measure the use and impact of AI in the public sector
- 4.3**
Promote AI in the public sector in support to sustainability while developing sustainable AI, in compliance with environmental principles, and leveraging on civic engagement and participation

A Roadmap for the Adoption of Artificial Intelligence in the Public Sector in Europe

NEEDS					
Area 1: Mapping of recommendations in relation to stakeholders					
RECOMMENDATIONS and ACTIONS	STAKEHOLDERS groups: LEADING (dark grey) or CONTRIBUTING (light grey) to the Recommendations and Actions				
	EU Institutions & international authorities	Central public authorities in European countries	Decentralised public administrations in European Countries	Civil society intermediaries and users representatives	R&D institutions and academia
1. Promote an EU value-oriented, inclusive, human-centric and trustworthy AI in the public sector					
1.1 Harmonise and complement EU regulations to promote human-centric and trustworthy AI-enabled public services for all citizens					
Focus should be put primarily on the use of AI, rather than on the specific technology and its components					
Enabling regulations at the EU level should act as a springboard for alignment at national level and, at the same time, these would need to be contextualised and enriched by the experience of their concrete implementation in specific contexts					
Efforts should be concentrated on streamlining and making sense out of the vast portfolio of existing relevant regulations					
1.2 Promote the adoption of ethical principles, the development of guidelines and the identification of mitigating measures to minimise the risks of deployment of AI by the public sector					
Factors to be taken into account:					
- The identification of criteria for EU-compliant applications and use of AI, beyond those applied to the related assessment of existing underlying technologies;					
- The need to identify and focus on potential areas where high risks of AI applications are likely to occur the most, or cause the most damage;					
- The need to collect and scrutinise both good and bad practices to acquire experience and identify the necessary validation tools, methodologies, and relevant processes;					
- The need to carefully look into existing guidelines, complement them only when necessary and, above all, identify and apply mitigation measures relevant to their contexts and specific use;					
- The need for constant monitoring over time					
1.3 Develop and promote dedicated AI-enabled solutions based on co-creation approaches to increase relevance of services and citizens' and business' trust and confidence in the use of AI by the public sector					

Co-creation and iteration-based development approaches should be promoted to stimulate and reinforce active citizen involvement at early stage of development process of AI solutions, from design, to development through testing, to use and evaluation					
2. Reinforce cross-sectoral governance, convergence or regulations, or in capacity building					
2.1 Create an EU-wide framework of governance models for a sustainable management of AI in the public sector					
Setting up a European registry of AI Algorithms by indicating and promoting the creation of national registries to monitor the market around AI and help in meeting the relevant criteria set down by EU regulations					
Set up an Artificial Intelligence Working Group specifically dedicated to the public sector at the European level					
Member States to identify organisations at the national level to represent AI in the public sector within the EU Working Group					
Identify AI champions who would raise awareness, provide advice and assistance to local administrations					
2.2 Design national and European capacity building programmes for public sector innovation aiming to develop and/or adopt AI in support to the digital transformation of public services					
The development of dedicated capacity-building programmes would grant an adequate level of independence, and higher capability to create relevant solutions for public administrations' specific needs					
"Train the trainers" schemes within national training plans for civil servants engaged in both the commissioning and/or direct development of AI solutions					
Develop dedicated training modules which are content related to support the application of EU regulations, versus national/regional regulations, legal frameworks/Laws					
2.3 Build upon and promote the use of regulatory sandboxes for public administrations, allowing experimentation of AI-enabled solutions in controlled environments					
Create regulatory sandboxes across the EU to help create a new generation of AI-supported public services					
Establish common criteria at the EU level for the testing of AI, following agreed standardisation activities and guidelines on how to assess and test AI					
Interface experimenting facilities at national and local level with international/cross-border facilities and networks, which would require the development of common criteria for cross-operationalisation					

2.4 Optimise funding in support to AI in the public sector to promote the spreading and scaling of reusable solutions					
Use international funding together national/regional funds in a complementary manner					
Apply scalability as a formal precondition to benefit from EU dedicated funding to foster AI-related activities					
Encourage the use of instruments that would enhance innovation, replicability and scalability (i.e., innovation procurement schemes and reusable solutions), and that apply spreading and scaling approaches at the early stages of solution development					
2.5 Promote the development of multilingual guidelines, criteria, and tools for public procurement of AI solutions in the public sector throughout Europe					
Develop procurement guidelines at the EU level, providing directions and criteria for developing national guidelines in compliance with EU principles and regulations					
Develop a multilingual set of AI procurement guidelines, in partnership with the national procurement authorities of the Member States					
3. Make systems and ecosystems more inclusive and innovative in digital ecosystems					
3.1 Support cross-sectoral research and knowledge creation amongst European universities and user institutions around AI for the public sector					
Create an "AI research and knowledge alliance" of European universities and other research and development institutions working with the public sector to promote the development of a common agenda and dedicated centres for research on applications, crucial challenges, solutions, methodologies and practices regarding the use, design, business, risks and benefits of AI in the public sector					
Generate funding and grants to support dedicated research and guidance on how to produce anonymised data sets and create related registries					
Establish a European Federation of business schools and institutes for public administration that could be deployed by the different European countries to develop specific curricula, and provide training on AI technologies dedicated to the public sector					
3.2 Build a common European Data Space for public sector bodies and their operators, drawing from the compilation of relevant AI datasets and related registries throughout Europe					
Promote the implementation of a Common European Data Space for public administrations not only with data collected by the public sector, but also with other relevant data acquired from both established and emerging actors within the value chain					

Create AI algorithm registries, by using catalogues of AI-enabled applications and by supporting public administrations to promote trustworthy AI					
Establish and activate reference organisations for data trust and data cooperatives to accommodate emerging forms of social innovation initiatives stemming from the civil society and relevant communities of practices					
Set up networks of Local Digital Yields as an impactful exercise in support of resource efficiency					
Promote EU Coop4Start-ups bringing innovative solutions to public services					
5.5 Refine and advance existing initiatives on open data and interoperability					
Provide dedicated technical and financial resources that would support the necessary efforts required for ensuring data quality, updating, accessibility and usability of public sector datasets					
Raise awareness to support a better understanding from public service officials of how sharing open data can assist society					
Raise awareness amongst politicians and governments of the value and potential return of investment in data infrastructures in terms of socio-economic benefits for society as a whole					
Consider the support of a dedicated API Frameworks and web standards					
5.4 Share reusable and interoperable AI components at all operational levels of European public administrations					
Share components used in the development of AI solutions for reuse by other public administrations on open repositories, following the existing building blocks and guidelines developed within EU relevant initiatives					
Exchange guidelines to build reusable components based on common standards and best practices					
Exchange dedicated national repositories of standards, guidelines, and performance metrics					
Align components specifications to the areas and issues they intend to address (e.g. transport, housing, etc.) so that dedicated directorates would help operation reuse existing components in other parts of Europe					
Set up an EU AI registry based on local AI registries, adding when available information and link to reusable parts like algorithms, models, and datasets					

Member States join forces and operationalise actions to support innovative Coop4Start-ups companies that can provide innovative AI applications to the European public sector					
Adopt much call to innovative companies and identify available AI-based solutions they could benefit from					
Exchange specific procurement frameworks and relevant conditions dedicated to support start-up development					
Apply and monitor sustainability through value-oriented AI impact assessment co-creation frameworks					
6.1 Set up an EU Observatory on AI, based on a pan-European network of AI observatories, to gather, share, and effectively manage best practices and represent various user-defined stakeholders in the public sector throughout Europe					
Establish an AI EU observatory as a one-stop shop/central repository where public bodies and agencies from all over Europe can benefit from shared knowledge and experience					
EU Member States should identify relevant bodies that would act as AI national observatories to represent the country and actively participate in the activities of an EU observatory established at the European level and acting as a central hub of expertise on AI dedicated to public administrations					
Create a pan-European network of AI observatories dedicated to the public sector and promote its use					
Set up an European Registry of AI Algorithms by indicating and promoting the creation of interoperable national registries to monitor the market around AI, to share relevant information, and help in meeting the relevant criteria set down by EU regulations					
Coordinate with international organisations already operating in this area (e.g., OECD, UNESCO) on critical topics such as ethics and trustworthiness, and any other openAI issues					
6.2 Develop and apply criteria impact assessment frameworks based on key influencing factors to measure the use and impact of AI in the public sector					
Develop umbrella impact assessment frameworks that would be adapted and contextualised across different countries and sectors, based on key influencing factors underlying quantitative as well as qualitative indicators, characterising impact in the specific public sector ecosystems					
Utilise AI frameworks (such as AI) impact assessment indicators to internationally recognised principles, especially regarding ethics and a trustworthy use of AI					

Promote a catalytic role of AI for environmental sustainability to show examples of beneficial uses of AI in different application areas					
Promote sustainable AI as a mandatory prerequisite in AI strategies of public administrations and governments, both at the international and national levels, including public procurement frameworks, in compliance with EU values and environmental sustainability principles					
Develop and apply certification and labelling approaches based on common sustainability principles, aligned to EU environmental policies, like the Green Deal and the United Nations' Sustainable Development Goals					
Promote active civic engagement, expressed under different forms of citizens involvement in the management of public good, especially when addressing common challenges and civil fundamental rights					
Develop impact assessment frameworks in support of sustainable AI, built on participatory practices and co-creation approaches, drawing from the knowledge and pro-active involvement of citizens and their Communities of Practices operating at the targeted level of intervention					

EU Landscape

AI use in the Public Sector



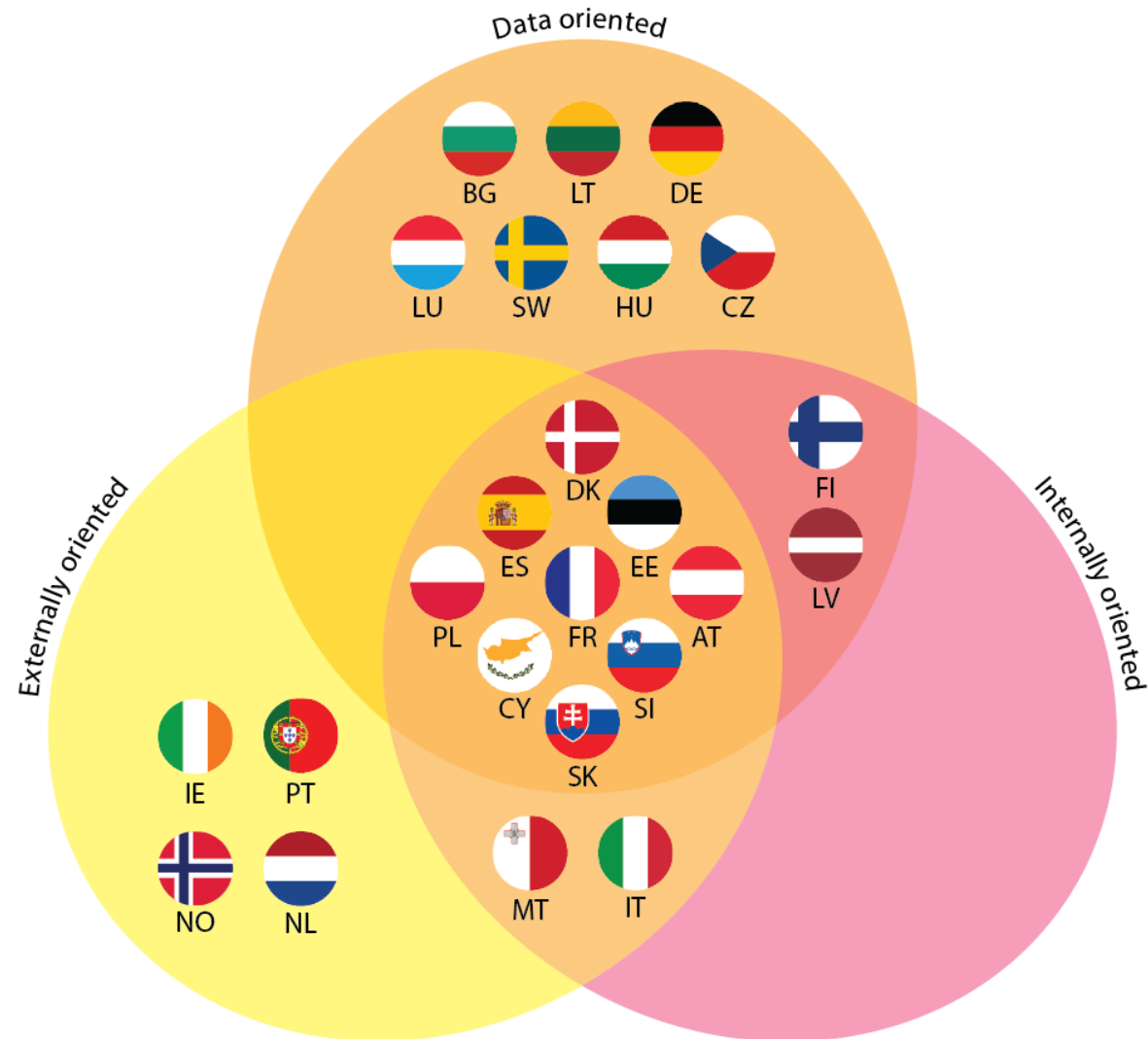
European landscape on AI

1. Analysis of the AI national strategies with a focus on the public sector
2. Inventory of use cases of AI in the public sector
3. In-depth case studies

- European landscape on the use of Artificial Intelligence by the Public Sector



1. National Strategies





AI Case Inventory

686 AI Cases collected and validated

How we collect cases?

- Country repositories or research studies
- News articles
- Responses to our AI Survey

n.b. the cases are not statistically representative. No comparison can be done among the different countries

Published cases: [Joint Research Centre Data Catalogue - Selected AI cases in the public sector - European Commission \(europa.eu\)](#)

Organisation Features

Responsible Organisation

- Central Government
- Regional Government
- Local Government
- Private sector
- Academic-Research
- Non-governmental
- Community led
- Consortium

Geographical Extent

- Local
- Regional
- National
- Across Countries

Functions of Government I

- Defense
- Economic affairs
- Education
- Environmental protection
- General public services
- Health
- Housing and community amenities
- Public order and safety
- Recreation, culture and religion
- Social protection

Service Description Features

Process type

- Enforcement
- Analysis, monitoring and regulatory research
- Adjudication
- Public services and engagement
- Internal management

Recipients

- G2C Government to Citizen
- G2B Government to Business
- G2G Government to Government

Data input

- Dynamic Data
- Historical Data
- Location Data

Status

- In development
- Implemented
- Not in use anymore
- Pilot
- Planned

Application type

- Smart Recognition processes
- Engagement management
- Financial management and support
- Information analysis processes
- Management of auditing and logging
- Data sharing Management
- Monitoring policy implementation
- Prediction and planning
- Predictive enforcement processes
- Service integration
- Service personalisation
- Supporting inspection processes
- Taking decisions on benefits
- Internal primary processes
- Internal support processes
- Internal management processes

II level

Value of Service Features

Improved Public Service

- Personalised Services
- Public (citizen)-centered services
- Increase quality of public information and services
- More responsive, efficient, public services
- New services or channels

Improved Administrative Efficiency

- Cost-reduction
- Responsiveness of government operation
- Improved management of public resources
- Increased quality of processes and systems
- Better collaboration and better communication
- Reduced or eliminate the risk of corruption and abuse of the law by public servants
- Enabled greater fairness, honesty, equality

Improved OpenGov Capabilities

- Increased transparency of PS operations
- Increased participation in government actions
- Improved public control and influence on government actions

Artificial Intelligence Features

AI Domain

- Reasoning
- Planning
- Learning
- Communication
- Perception
- Integration and Interaction
- Services
- Ethics & Philosophy



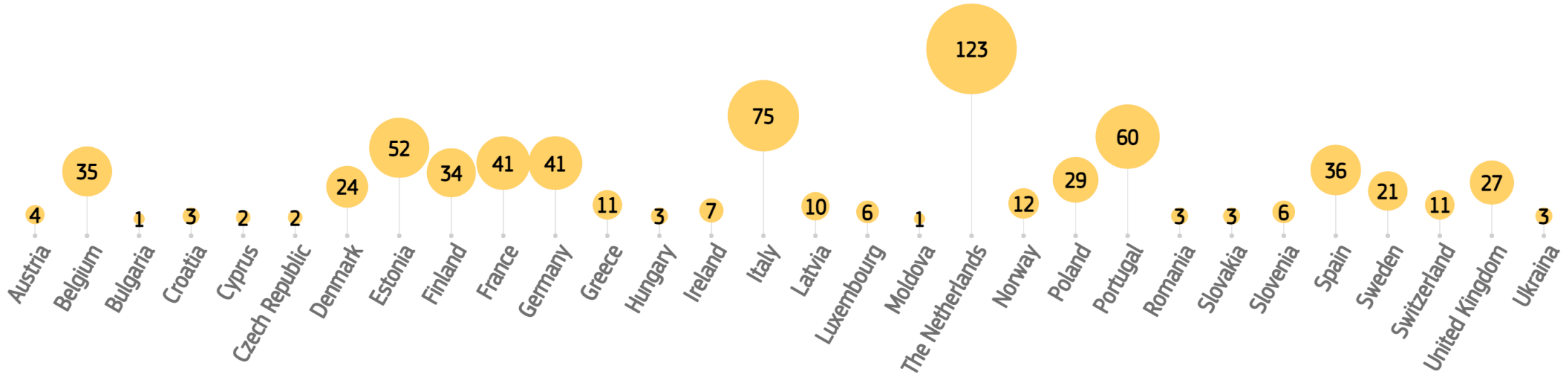
II level

AI Subdomain

- Knowledge representation
- Automated reasoning
- Common sense reasoning
- Planning and Scheduling
- Searching
- Optimisation
- Machine Learning
- Natural Language Processing
- Computer Vision
- Audio Processing
- Multi-Agent systems
- Robotics and Automation
- Connected and Automated vehicles
- AI Services
- AI Ethics
- AI Philosophy



AI Cases by Country



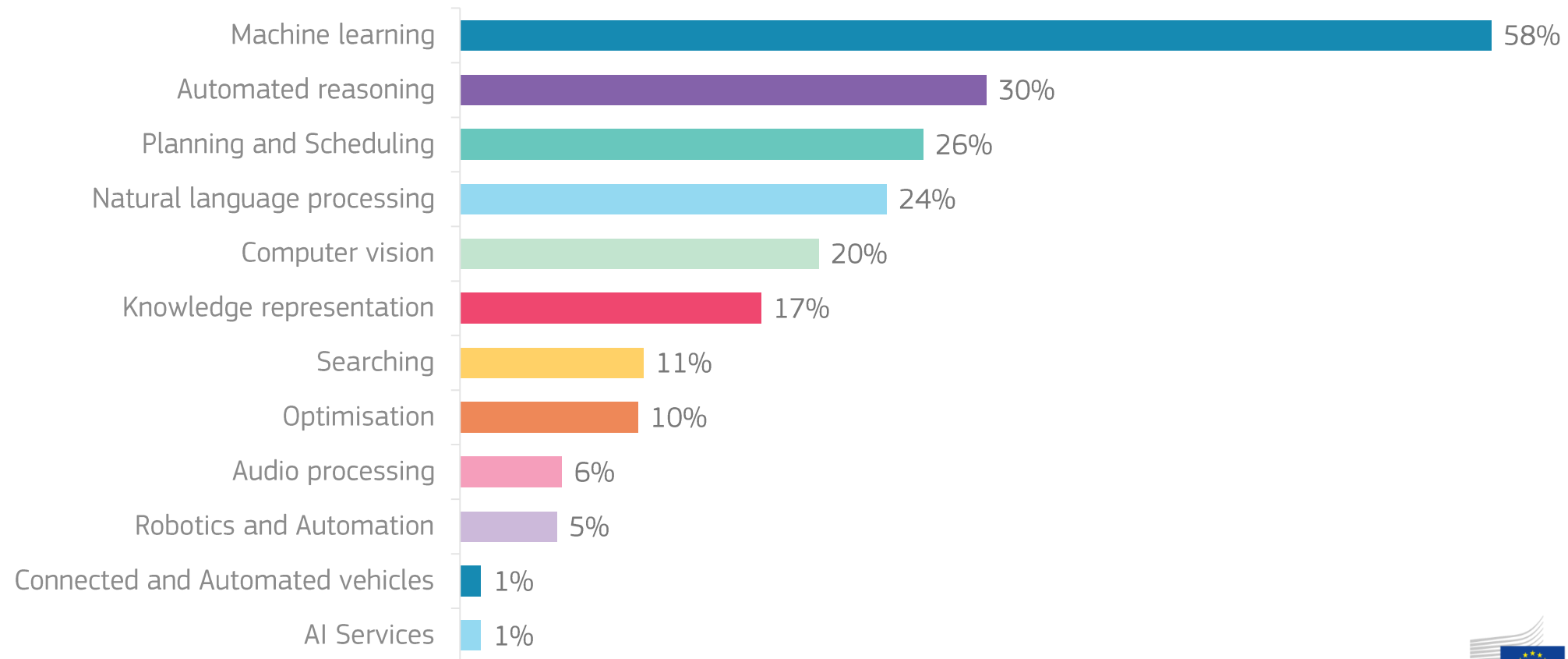
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AI Cases by Technology

ML is the main AI technology, even though the spectrum of opportunities is varied





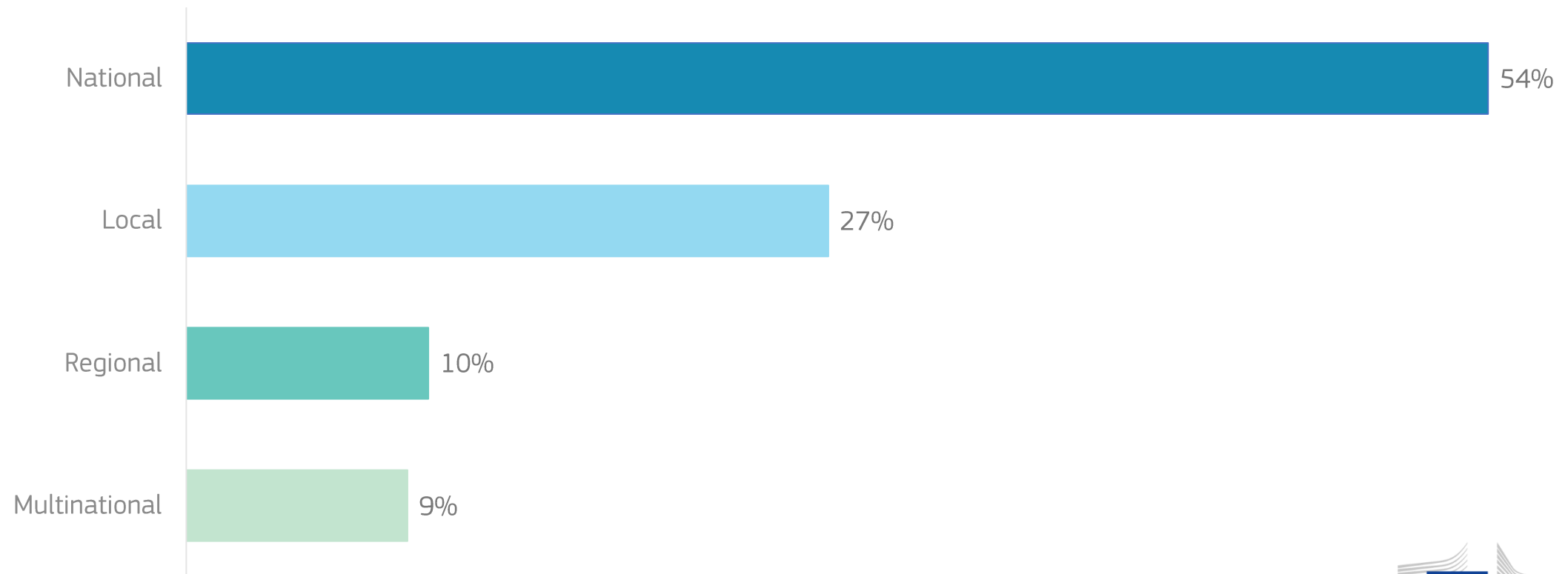
AI Cases by Status

Several cases are already implemented and in use in daily operations



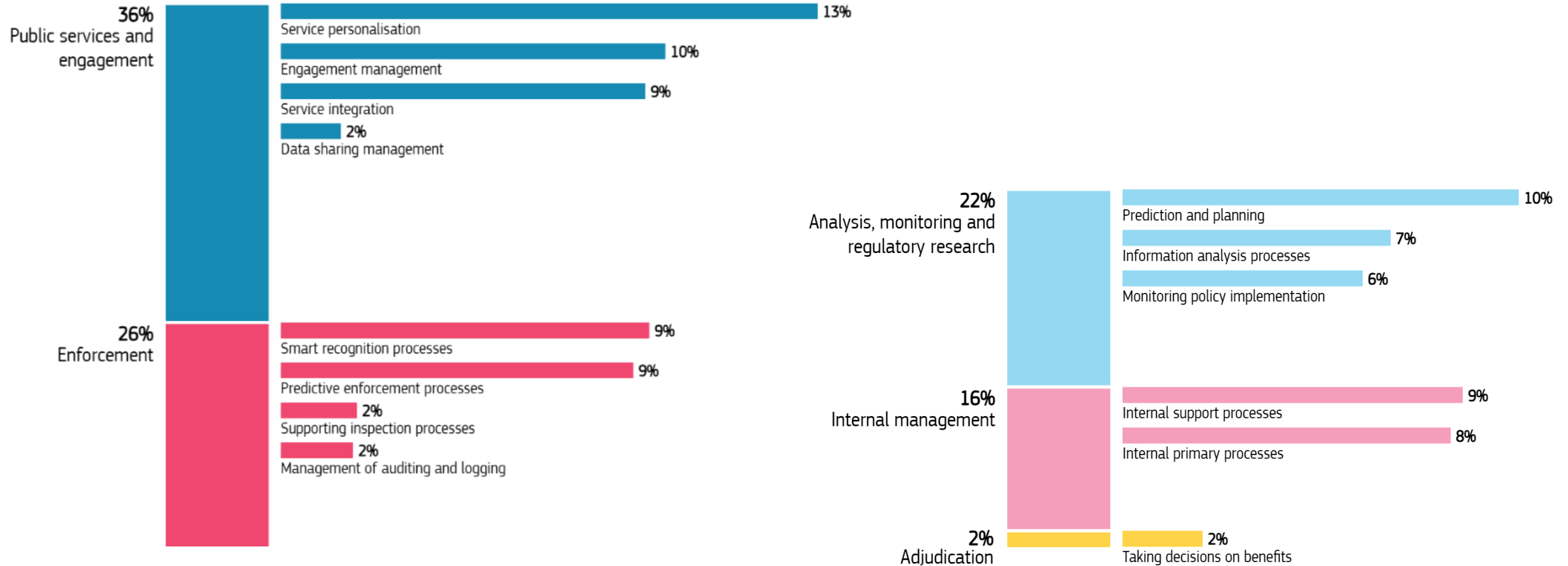
AI Cases by Geographical Extent

Most of the cases are at national level, even though the local one plays an important role



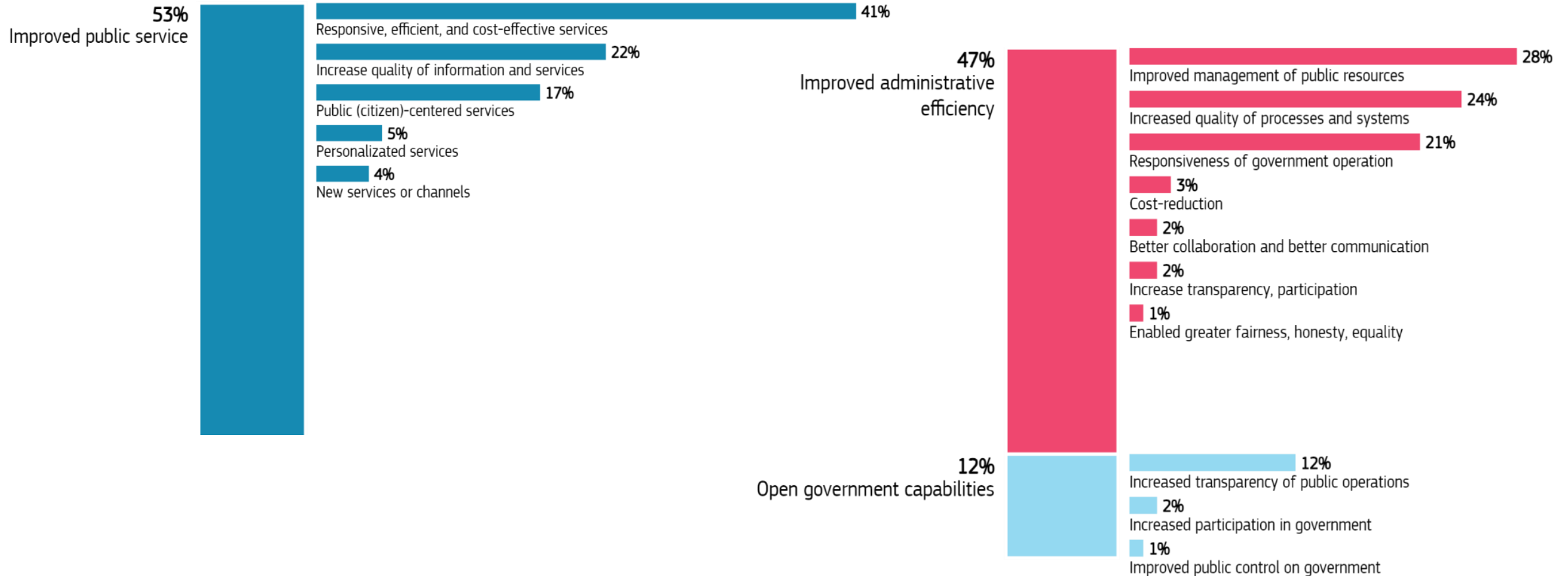
Process & application type

AI is used for variegate purposes, from service personalisation to predictions



Benefits

Benefits are almost equally split between improving public service and administrative efficiency



Lesson learned

_ AI is widespread

Public organisations should start considering AI not only as a research and innovation area but also as a set of solid and available technologies for improving the administrative machine. Moreover, they should start preparing themselves for a distributed and common use of AI in all public sector areas

_ Need of in-house expertise

Public administrations should consider in-house knowledge on AI for the – partial or complete - internal development of AI, for adapting of the system developed by external suppliers and/or for ensuring proper management of procurement activities.

_ Balance of in-house vs external development

Given that most likely public organisations would need support for developing an AI system, they should carefully select the proper partner(s) and/or suppliers and balance internal and external development.

Lesson learned

_ **Need of trustworthy AI**

Risks should be systematically assessed with a structured and well-defined procedure, avoiding any form of discriminatory and unfair use of the AI system. Proper mitigation measures should be identified for ensuring a human-centric use of AI. This needs to become a routine for public organisations.

_ **General awareness**

Public administrations should start considering AI as a technology that will affect the daily routines of most employees, hence start thinking about the wide dissemination of basic knowledge on how algorithms work and how to deal with AI enabled solutions

_ **Technology is only half of the story**

Public administrations should be aware that the technical effort for coding an AI system is only a small portion of the effort needed for the implementation thereof. Introducing an AI solution requires a general awareness of AI but also new task allocation and, when needed, new roles and positions within a given organisation.

Useful Links

AI Watch. Road to the adoption of Artificial Intelligence by the Public Sector.

<https://europa.eu/!jNQg8p>

AI WATCH. European landscape on the use of Artificial Intelligence by the Public Sector.

<https://europa.eu/!dK7jk6>

Unique features of the public sector

and pre-requisites for good governance of public administrations

Unique Features of the Public Sector

- **It is driven** by the *rule of law* (e.g. understanding scrutiny and accountabilities, apply equity, transparency, consistency in decisions and redress whenever needed)
- **Its primary objective is Public Value Creation**
- **Its mandate** being achieving the **public good** for its diverse communities (protection of citizens and promotion of well-being at large)
- **Public sector administrations** operate within highly diversified and **complex political, cultural and socio-economic ecosystems**
- Public administrations **differ** from private sector organizations in a number of fundamental characteristics underpinning their **values**, determining their **objectives, instruments, roles** and **relationships** with other actors
- Besides providing services, governments also regulate most of socio-economic activities of citizens, and businesses. Consequently, the exercise of such powers requires that the public sector **conform to administrative law, and to ethical and human rights principles**

Prerequisites for AI application in the PS

Fundamental questions:

- **Where** AI is most relevant?
- **What** are the most important sectors that would benefit from it?
- And, **Who/which** users will ultimately benefit from such digital transformation?

Fundamental prerequisites:

Be **relevant** (to the actual needs), **useful** (usability is actually defining the real value of the services -better than existing alternatives e.g. in health), **necessary** (where no other valid alternatives –e.g. environment), **wanted** (never imposed to the final users), **accepted** (amongst equally valid alternatives), **suited to/preferred by** the target contexts/users (not disrupting underpinning values and needs e.g. education -*cognitive development*), **attractive** (e.g. appealing and users friendly -not leading to dystopic approach), **nourishing and enriching/empowering** (not as an escape room to hide from reality), **accountable and measurable** (governance should be aligned to public interest), and **respectful** of Public Sector mandates, underpinning principles, and social values (institutions should monitor responsibilities and impacts).

Prerequisites for AI application in the PS

To reflect these prerequisites, AI based services have to show:

- **clear added value** for the users (being them Public Administrations or citizens and businesses) with reference to existing solutions,
- respect **proportionality** between benefits and risks has to be assessed and taken into account and, last but not least,
- **ethics, law and human rights** implications have been carefully examined and addressed with the necessary means before taking any decision.

Let's remember.....

- **Technology** is always **context** related and strongly depends on its **use**, even within the same sector (e.g. education)
- Good public administration is **transparent and explainable**. if the enabling technology is not, just use something else until it is.....!

THANK YOU

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