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JRC Conference and Workshop Report

AI Watch
Artificial Intelligence for the public sector

Report of the "1st Peer Learning Workshop on the use and impact of AI in public services", Brussels 11-12 February 2020

Joint Research Centre

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Foreword

This report is published in the context of AI Watch, the European Commission knowledge service to monitor the development, uptake and impact of Artificial Intelligence (AI) for Europe, launched in December 2018.

AI has become an area of strategic importance with potential to be a key driver of economic development. AI also has a wide range of potential social implications. As part of its Digital Single Market Strategy, the European Commission put forward in April 2018 a European strategy on AI in its Communication "Artificial Intelligence for Europe" COM(2018)237. The aims of the European AI strategy announced in the communication are:

- To boost the EU's technological and industrial capacity and AI uptake across the economy, both by the private and public sectors
- To prepare for socio-economic changes brought about by AI
- To ensure an appropriate ethical and legal framework.

Subsequently, in December 2018, the European Commission and the Member States published a "Coordinated Plan on Artificial Intelligence", COM(2018)795, on the development of AI in the EU. The Coordinated Plan mentions the role of AI Watch to monitor its implementation.

AI Watch monitors European Union's industrial, technological and research capacity in AI; AI-related policy initiatives in the Member States; uptake and technical developments of AI; and AI impact. AI Watch has a European focus within the global landscape. In the context of AI Watch, the Commission works in coordination with Member States. AI Watch results and analyses are published on the AI Watch Portal (https://ec.europa.eu/knowledge4policy/ai-watch_en).

From AI Watch in-depth analyses, we will be able to understand better European Union's areas of strength and areas where investment is needed. AI Watch will provide an independent assessment of the impacts and benefits of AI on growth, jobs, education, and society.

AI Watch is developed by the Joint Research Centre (JRC) of the European Commission in collaboration with the Directorate-General for Communications Networks, Content and Technology (DG CONNECT).

This report addresses the following objectives of AI Watch: *To provide an overview and analysis of the use and impact of AI in public services.*

As part of this objective, this report presents a summary of the proceedings of the 1st AI WATCH Peer Learning Workshop on AI use and impact in public services, which took place in Brussels on 11-12 February 2020.

Acknowledgements

This report has been prepared by the JRC in collaboration with some of the external experts that contributed to facilitate the workshop. However, the main actors in the workshop process were the participants, and thus we would like to thank all the almost 60 participants, including representatives of Government from about 20 Member States and colleagues of various Commission's Services and experts from academia, research centres Non-Governmental Organisations and industry who actively engaged in discussions and provided input in the working group session, enriching the findings under validation and giving guidance on the way forward.

A special thanks also goes to colleagues of DG CONNECT and DIGIT who chaired and moderated panel sessions and roundtables, as well as the keynote speakers invited to ignite the debate with their knowledge.

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Executive Summary

The 1st AI WATCH Peer Learning Workshop on the Use and Impact of AI in Public Services organized by the JRC jointly with DG CONNECT was conceived with a threefold objective:

1. To discuss findings from the preliminary landscaping of AI use in public services across the EU and to outline the methodological approach for assessing social and economic impact of AI in public services;
2. To support the elicitation and sharing of current AI practices across Europe and among Member States and define priority services to focus on, while identifying case studies for further in-depth analysis;
3. To act as the starting point of a process of engagement of the EU Member States on relevant collaborative activities for monitoring and anticipating current and future uses and trajectories of AI in the Public services.

From the presentations given by the JRC regarding the current state of AI, it emerged that this technology is widely experimented across public administrations in European countries, although the data gathered so far do not provide a full picture of the current landscape. AI was found to be mostly applied in general public services, economic affairs and health services, with Chatbots often mentioned as a frequently applied solution. However, innovation based on AI, seems to be mostly incremental or technical with a limited occurrence of disruptive innovation in the public services.

This document summaries the results from the debate and knowledge sharing that occurred during the two days of workshop on two different topics:

- During the first day, the aim was to discuss existing use cases of AI in public services in the Member States and to explore ways to classify the large variety of the initiatives mapped. In addition, the different drivers and barriers influencing the use of AI in the public sector were explored. These were identified widely including law, funding, knowledge, culture, procurement, change, data availability and ethical risks.
- In the second day, participants were asked to co-design meaningful indicators for assessing the impact of AI on public services. While often mentioning that the indicators should take in consideration the context of the service, many participants highlighted the need to focus not only on economic indicators but rather also on the notions of public value and wellbeing.

Furthermore, many Member States were interested in collaborating with the AI Watch on research activities, and expect Task 6 of this initiative to focus on:

- Sharing use cases and best practices of AI for the public sector;
- Providing comparative overviews to understand own strengths and weaknesses;
- Defining jointly what is meant with AI in the public sector to support national planning;
- Publishing studies, guidelines and facilitating knowledge sharing, peer-learning & capacity building.

From the case studies collection hosted among participants it also emerged that the applications are mostly flourishing in the following domains: Health, Education, Public Order, Housing, Transport and Agriculture. These data have confirm the preliminary findings of the survey of Member States conducted before the workshop by JRC and indicate these as the policy domains on which the AI Watch task on AI for the public sector should prioritize according to the respondents.

Finally, since an important part of the debate revolved around the topic of AI and data governance, it was decided to focus the 2nd AI WATCH Peer Learning Workshop with Member States on this domain.

For this reason, the next workshop will be organised in collaboration with the School of Transnational Governance of the European University Institute and should take place at the EUI premises in Fiesole, Italy.

1 Introduction

1.1 AI Watch for the public sector – Policy context and background

Overall, the ambition is for Europe to become the world-leading region for developing and deploying cutting-edge, ethical and secure AI, as well as to promote a human-centric approach in the global context.

Building on the declaration of cooperation on AI adopted by all EU Member States, Norway and Switzerland on 10 April 2018 the Communication "Artificial Intelligence for Europe" of 25 April 2018 proposed a European strategy in support of this goal. However, only if Member States and the Commission work together, will Europe be able to turn vision into reality. Therefore, in its strategy on AI for Europe, endorsed by the European Council in June 2018, the Commission proposed to work with Member States to jointly design the Coordinated Plan on the Development and Use of Artificial Intelligence Made in Europe. This plan proposes joint actions for closer and more efficient cooperation between Member States, Norway, Switzerland and the Commission in four key areas: increasing investment, making more data available, fostering talent and ensuring trust.

The coordinated plan provides a strategic framework for national AI strategies and encourages all Member States to develop their national AI strategy, building on the work done at the European level. Strategies are expected to outline investment levels and implementation measures, while recognising common indicators to monitor AI uptake and development, as well as the success rate of the strategies in place. This will also be ensured with the support of the AI WATCH that is a joint initiative of the European Commission's Joint Research Centre and DG CONNECT.

Within this context, as the use of AI in Public Sector is flourishing across Europe and along trajectories that range from incremental to disruptive innovation and from organisational to technical and sometimes radical innovation, AI WATCH is devoting a specific focus of analysis on AI for the public sector and in public services.

AI in fact can contribute to achieve better public services in a variety of ways, for example by enabling smarter analytical capabilities and better understanding of real-time processes and delivering shorter and richer feedback loops for all levels of governance. AI is assumed to have the potential to increase the quality and consistency of services delivered, to improve the design and implementation of policy measures, to allow more efficient and targeted interventions, to enhance the efficiency and effectiveness of public procurement, to strengthen security, to improve health and employment services and to facilitate the interaction with wider audiences.

The main goal of AI WATCH task on AI for the public sector is to gather information on all EU Member States' initiatives on the use and impact of AI in public services and develop a methodology to identify risks and opportunities, drivers and barriers of the use of AI.

More specifically, this task aims to provide an overview of the use and added value of AI tools supporting public service delivery by looking at most relevant examples in prioritized public services. Based on the results of the analysis the task will draw up recommendations on the way forward for further development of AI based systems and solutions in government.

In doing so it will propose a basic framework for the use of AI in public services, defining guidelines and a generic implementation roadmap, based on best practices and the results of the analysis of the re-use potential of AI based systems and solutions, identifying also opportunities for collaboration among relevant stakeholders from various sectors.

1.2 Stakeholders engagement and peer Learning – Aims and approach

The engagement with relevant stakeholders is of particular importance for better understanding the potential use and impact of AI for the public sector. Therefore, jointly with DG CONNECT "eGovernment and Trust Unit" and with support from DIGIT Interoperability Unit as part of the activities of the ISA^2 Programme, the JRC is setting up and coordinating relationships with relevant Member States representatives and a pool of experts drawn from academia, think tanks and industry working on AI for the public sector.

Through engaging with experts, stakeholders and Member States representatives as part of the "eGovernment Action Plan Steering Board" in a Peer-Learning process, the aim is to gather information that would not be possible to collect otherwise and have first-hand knowledge on processes and impact creation, as well as identifying suitable case studies for in-depth qualitative and quantitative analysis.

As part of this Peer Learning process the JRC and DG CONNECT organised the **1st AI WATCH Peer Learning Workshop on AI use and impact in public services**, which took place in Brussels on 11-12 February 2020. It involved almost 60 participants, including representatives of Government from about 20 Member States and colleagues of various Commission's Services and experts from academia, research centres, Non-Governmental Organisations and industry in 2 days of collaborative exchange on ongoing cases and experimentation of AI in the Public Sector.

The workshop was conceived with a threefold objective:

1. To discuss findings from the preliminary landscaping of AI use in public services across the EU and to outline the methodological approach for assessing social and economic impact of AI in public services;
2. To support the elicitation and sharing of current AI practices across Europe and among Member States and define priority services to focus on, while identifying case studies for further in-depth analysis;
3. To act as the starting point of a process of engagement of the EU Member States on relevant collaborative activities for monitoring and anticipating current and future uses and trajectories of AI in the Public Sector.

To achieve these goals the workshop was structured around 4 main sessions devoted to:

- Taking stock of and discuss the findings of activities of landscaping of AI use in public services;
- Sharing experiences and knowledge on how to address the challenges of adopting AI in the public sector, with a specific focus on data governance and legal and organisational barriers to adoption;
- Designing the next steps of the research activities, discuss possible cooperation and define priority services to focus on in developing the methodological approach for impact assessment;
- Identifying approach and possible case studies to assess impact of AI in public services.

The workshop has followed a participatory approach that has emphasised the benefits for EU Member States to build together knowledge and interpretations of the potentialities, diffusions and implications of AI. It has triangulated the information extracted from a first mapping of AI use and added value in public services conducted in 2019 across Europe and findings from a Survey conducted with Member States on the use of AI in public services (January 2020) with the information coming from the cases and experimentations shared by the workshop attendees.

More specifically, the workshop has been conducted through the use of a series of Design Thinking tools meant to facilitate knowledge exchange among peers and to support and speed up the process of knowledge co-creation by making it easier for participants to understand each other and to activate a positive process of collaboration.

The present report synthetises the activities of the workshop focusing in particular on the different working groups carried on during the two days. These have worked on co-creating knowledge on barriers, drivers and implications of the use of AI in government, as well as defining key dimensions and indicators for impact assessment.

In general, the working group activities have gained a high degree of acceptance by all the participants. Very positive feedback has been expressed on: the tools' (or canvases') ease of use and comprehensibility, the effectiveness of the methodology to rapidly bring the groups to produce valuable knowledge, the effectiveness of the tools to catch relevant information and to support active discussion.

The workshop also allowed JRC to validate findings from the landscaping analysis and confirm results of case studies. The discussion also served to better target the outline of the methodology for impact assessment and define the priority services to focus on, as well as identifying examples and country candidates for in-depth analysis while better shaping the directions of the activities for the next phase of the research.

As a matter of fact the Workshop took place just few days before the launch of the European "Digital Package", which saw the light on 19th February 2020, and included a combined set of policy documents to substantiate the proposed Digital Strategy for Europe, and in particular the European Data Strategy and the AI White paper.

2 Plenary discussions – Shaping the policy debate around AI governance

In light of the great interest and potential in harnessing the benefits of the current and upcoming AI technologies to enhance policy making, improve public services and increase the wellbeing and welfare of citizens, the workshop aimed at discussing the findings of the first landscaping of AI use in public services in the EU and outlining the approach for assessing the impacts of AI in public services and society at large.

The analysis so far in fact showed that in spite of the AI policy discourse and academic debate, there are many unexplored challenges in developing and using AI for public services in a human-centric way and in ensuring that AI provides value for all citizens. Likewise, many public organizations might not be fully ready to integrate AI technologies into their practices due to organisational or legal barriers.

2.1 Setting the stage for AI in the public sector

The aim of the first day of the workshop was to explore current applications of AI in the European Member States, to learn from their experiences and to share this knowledge across Europe to further stimulate the use of AI in the public sector.

The opening session, chaired by **Massimo Craglia (JRC)**, started with **Irina Orssich (CNECT)** highlighting the cooperation of Member States and European Commission begun with the Coordinated Action Plan, and pointing to the forthcoming AI White Paper. This set the stage of the workshop by highlighting the great importance of AI for the new Commission. **Dietmar Gattwinkel (CNECT)** sketched the questions guiding the coming two days: *which are the tasks in the public administration, where AI can outperform humans? Where can the public sector contribute to the development of European AI? What does the adoption of AI mean for the public sector?*

Following the opening, the first session included a discussion with **Prof Andrea Renda**, from CEPS, Member of the High-Level Expert Group on AI Ethics, and **Prof Stefan Kulk** from Utrecht University, to set the stage for the challenges of introducing AI in the public sector.

Andrea Renda emphasized that the developments regarding Ethical AI are good but stressed that solely having ethics will not be enough to guarantee that the risks of AI will be avoided. Any regulatory approach should include legal as well as technical elements, but guidelines should be adjusted to the use of the technology in specific contexts (combining technological elements, purpose and policy domain e.g difference between face recognition to open your phone vs face recognition to track individuals on the street) as it is likely that a one-size fits all approach on AI will not work. He urged the public sector to concentrate on AI working on data not from people's profile but from sensors and things. This would be AI which is not centrally administered but computed on the edge. The efficiency gained by AI may endanger other values like fairness or solidarity.

Stephan Kulk highlighted that there are a number of serious risks associated with the deployment of AI, namely with regards to fundamental human rights. The perseverance of privacy and data protection are two of the greatest risks, as the bigger the generation and storage of data, the more likely it creates a data hungry society (and government). Another big issue is the explainability of AI-based decisions, which creates accountability issues in both government as well as in court cases. However, the proportionality of the risks of AI will depend on the context in which it is used.

Gianluca Misuraca, Senior Scientist at JRC and AI for the public sector task leader for the AI WATCH, then presented the outcomes of the first-year activity of mapping AI use in public services in the EU.

This included the results of the analysis of 221 cases collected and the new findings from the responses of 18 Member States to the exploratory survey launched in January 2020.

The study showed that many European countries are experimenting with or already using AI technologies, although there are several challenges in the adoption and difficulties in defining the meaning of AI in public services.

The first day concluded with a round table discussion with **Jana Novohradska**, Vice Premier Office for Investments & Informatization, Slovak Republic; **Olli-Pekka Rissanen**, Chief Special Adviser, Ministry of Finance, Finland; and **David Suolaimanen**, Advisor, Division for Digital Development, Ministry of Infrastructure, Sweden; on the different policy interventions, strategies and examples of AI in their public services.

In Slovakia, AI is not regarded as a policy objective on its own but is linked to other policy objectives such as establishing digital sovereignty. Therefore, Slovakia has adopted policy measures to enable building an AI ecosystem in line with the EU values, aiming to achieve control of the "unstoppable force" of AI.

In Finland, the government is taking AI as an opportunity to reassess how the public sector is functioning as a whole. The strategic goal of Finland is to use AI as a way to improve social wellbeing and economic competitiveness. Therefore, it is important to create public-private partnerships to stimulate AI. The public sector should therefore identify which governmental datasets might be valuable for other public and private actors and try to develop AI based on this data in an ethical matter. Overly restrictive legislation is seen as a risk.

Similarly in Sweden it is likely that the public sector will not able to compete with the large funding on AI of the private sector, thus the government is interested in understanding the social and economic impact of AI and, for this reason, it is paying particular attention on the careful analysis of the potential benefits and risks while developing a framework to evaluate the broader implications of AI in the public sector and on society at large.

2.2 Going beyond the "sirens of self-learning" for AI in public services and society

The second day opened with an expert panel discussion chaired by **Natalia Aristimuño-Perez Head of Interoperability Unit at DIGIT** with introductory speeches by **Matthias Spielkamp**, Director of Algorithm Watch and **Erika Widegren**, CEO of Re-Imagine Europa.

After an introduction by Natalia Aristimuño-Perez on the importance of AI for transforming governance systems and public services, Matthias Spielkamp presented key insights from the recent study of Algorithm Watch which highlights the growing use of automated decision making within the EU, in both the private and public sector. Any form of automated decision making in the public sector ought to be subject to higher standards compared to the private sector, as many citizens will not have any alternatives and the consequences of its usage could be much more severe. However, we still understand little about this new form of technology and in which services it is used, therefore it is recommended to make a public register of automated decision-making systems to provide more transparency and increase citizens' trust.

Erika Widegren highlighted the role that the public sector plays in improving societal wellbeing with AI technologies. On one hand, it is likely that current AI solutions focus too much on one specific task, which creates unwanted externalities and sub-optimal solutions for society as a whole. Governments have to ensure that negative externalities are limited, and that AI will act as a benefit for all. On the other hand, governments can use AI itself to understand the complexity of societal impacts of policy options and thus improve public policy. This is the challenge we are facing now: how can we move from seeing AI as something useful for individuals to something good for the whole of society?

Following, a panel discussion on the impacts of AI and regulatory governance took place with the participation of **Antoine Cao**, Prime Minister Office of France, **Gatis Ozols**, Ministry of Environmental Protection and Regional Development, Latvia, and **Marieke van Putten**, Ministry of the Interior and Kingdom Relations, The Netherlands. Antoine Cao mentioned that all innovations in the public sector require strong support from the highest level of governance in order to stimulate awareness and successful ecosystems. In France, after president Macron highlighted the importance of AI, many other ministries, citizens and representatives from civil society joined the discussion. Creating a successful ecosystem for new innovations is crucial for sustainable adoption. This requires the involvement of actors all across society, including sufficient financial support, a legal framework and more, especially if the aim is to move from short term successes of pilots towards the future.

On the other hand, Gatis Ozols highlighted that while there are many discussions happening on AI, there is still a significant lack of public sector adoption. It is possible that the culture of the public sector makes it trickier to use innovations such as AI as a tool for radical innovation, but this is not always a negative point as it keeps the required checks and balances for the state in place. He also underlined that as incremental changes with AI are easier to implement, Latvia is already using a large amount of Chatbots. However, any form of innovation that requires process changes and reorganization, as well as regulatory changes will be more challenging.

Marieke van Putten explained that in the Netherlands, there are different levels of maturity in AI government adoption. While the police might be more advanced in utilizing AI technologies, smaller municipalities might not be yet ready. Possibly, there are also policy sectors where privacy constraints are more severe or sectors where there are simply more data available to start innovation with AI. However, learning by doing is very important in innovation with AI. The application of AI is much more than making a model, but it is more about process redesign and understanding feedback loops of data. While a pilot might be a great success, challenges remain in scaling it up and ensuring implementation of new solutions.

The remaining part of the day discussed the proposed outline for developing a methodological approach to assess impacts of AI in public services. First, **Gianluca Misuraca** of JRC, and **Gabriela Bodea** from TNO presented the goals, aims and planned tasks of the AI WATCH activity to develop a proposed methodology to assess the social and economic impacts of the use of AI, and the support study that TNO is conducting for JRC.

As an example, **Patrick Eckemo**, Director, Digital Transformation Agency, Sweden, shared insights on the methodological approach developed in Sweden to assess the current use and potential impacts of AI in the country. While there are great benefits to be gained from using AI, not all actors have the resources to start using AI and this creates the need to understand whether the investments in AI for government will have a return on their costs. Based on their first analysis, it is possible that AI will bring over 14 billion euros of benefits to the Swedish economy, while the current estimation is that 2% of the government budget could be saved due to AI.

The event ended with closing remarks by **Fabiana Scapolo,** Head of the Foresight Centre of Competence of the JRC at the EU Policy Lab and a presentation by Gianluca Misuraca of the next steps of the AI Watch research activities on AI for the public sector, who also announced that the 2nd AI WATCH Peer Learning Workshop on AI use and impact on public services will be organised jointly by JRC and the School of Transnational Governance at the European University Institute, and will focus on the topic of AI and Data Governance in the European Union and beyond.

3 Design Thinking for AI – Takeaways from the participatory workshops

The workshop involved over 50 attendees that worked organised in different tables of 12-14 participants each. The profiles of the attendees where mixed to obtain a right balance of representatives from Member States, external experts and representatives from the Commission.

During the **first day** of the workshop working groups aimed to stimulate a peer to peer exchange among participants on their experience of the current "uses/applications/trajectories" of AI in their respective countries and to **co-create knowledge on drivers, barriers and implications** of the use of AI in government.

In the **second day** of the workshop, a similar set up was used in order to **discuss approaches and indicators to assess the impact and the effects of AI in government**. Participants were asked to present the AI cases of the first day and to come up with methods to validate the expected effects of AI.

For the conduction of the working groups the approach has been the one known as Design Thinking (DT). Design Thinking is an area of the design discipline that has developed especially in the last ten years with the aim to mainstream the principles of human centred design as a new sustainable innovation paradigm.

At the basis of the Design Thinking approach there is the idea that innovation should start from real needs and challenges that exist in real contexts and co-designed or co-produced together with end users and the other stakeholders affected by the needs or that held competences relevant for the development of a solution.

3.1 Design Thinking on mapping of AI in EU Member States

Overall, 32 cases of AI use in public services were collected and discussed during the first working group session. Even in this small sample, the results confirm some of the preliminary findings obtained through the survey and categorisation previously conducted as part of the AI-Watch activities.

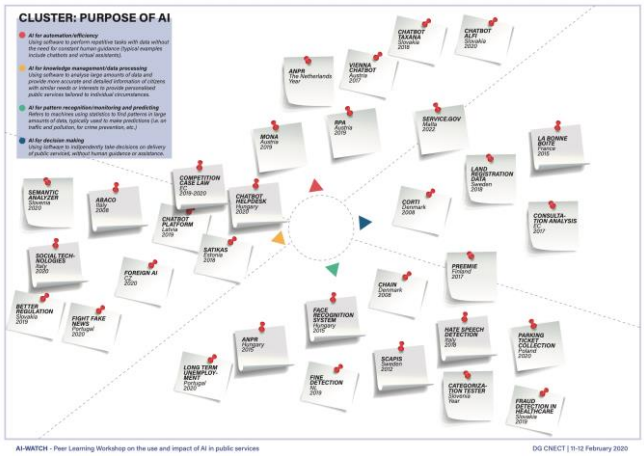
In particular, the discussion confirmed that:

Currently AI is mostly used for pattern recognition/monitoring and predicting with 10 cases assigned to this category coming from 9 different Member States;

AI for knowledge management/data processing follows with 8 cases in 7 different countries;

AI for automation/efficiency is at the third place with 6 cases from only 3 countries;

AI for decision making is the least experimented with only 3 cases from 3 countries and one example from within the EC directly.



This seems to indicate that the main interest of the public sector to leverage AI potentialities is not only to monitor and understand better the population, but also to predict needs, habits and behaviours of citizens, and consequently use these predictions either for creating a more secure society or to deliver tailored services to more granular needs.

The public sector is in fact looking for this type of innovation as the old "one size fits all" approach has come to contrast the current diversities in the population. This insight draws a dynamic future for the public sector, where the new possibilities provided by AI represent a strong driver for change.

This is also evident in the type of cases mapped, ranging from Chatbots to help citizens navigate public services more easily and more efficiently, to complex platforms that help create better matches between job offer and demand, to systems for detecting fraud in healthcare coming both from doctors and patients.

A more in-depth qualitative analysis will be beneficial to understand further if more general categories of cases could be detected for each cluster, thus providing a larger nuanced understanding of what public administrations seek when investing in AI applications. Indeed, this is part of the AI Watch research design for the near future.

3.1.1 Drivers for AI in the public sector

The groups have identified drivers for introducing AI in the public sector, such as simplifying regulatory frameworks, making data more accessible, and having better capacity to process languages. From the start, it was mentioned that most of the AI is driven by efficiency goals, usually to streamline a certain process or to enhance detection capabilities. The need for efficiency, often combined with budget pressure, makes public organizations more likely to explore the opportunities of AI to handle large amounts of tasks with limited funds. However, few more disruptive applications (still a minority in current applications) have also been mentioned, trying to lead to the development of entirely new services through AI, moving beyond merely efficiency gains. Moreover, as one participant highlighted, in some policy sectors, there is simply an abundance of data to enable the development of AI tools, so there might be some sector-specific drivers influencing the use of AI.

At the same time, increased efficiency and better decisions seem to be the main expected outcomes. However, the question arose of whether decisions are truly better or more objective when done by machines. This remained an open question in the group discussions. Likewise, despite the prevalent driver of efficiency, participants noted that AI could, or ought to, be used to achieve other values so to enhance the effectiveness and quality of the services.

3.1.2 Barriers for AI in the public sector

Although the interest in using AI in public services is high, the participants mentioned various barriers hindering its application in a government context. Some barriers identified are mainly linked to the lack of awareness of what AI really entails. In particular, one group discussed the difference between complexity and complication, as there seems to be the will to solve the complexity of modern issues with AI, but complexity is not predictable through technology. Furthermore, the difference between knowledge and evidence was also discussed, as to experts it is evident that AI cannot produce knowledge, while non-experts expect this type of output. Therefore, it was suggested that AI should be introduced through iterations, where initially it is not applied to predicting behaviours, so to allow time to training and understanding.

Furthermore, an important barrier is represented by data: public sector data availability is fragmented; thus, it should be better organised, made available, of a higher quality, and unbiased. Language has also been signalled as a potential barrier to technological development, as it was suggested that "small languages (many in Europe) equal small datasets for training". The use of AI for pattern recognition tends to be the most privacy invasive application as it often requires sensitive, personal information, although not always. This intrusion of citizens' privacy, as well as the difficulties associated with the use and sharing of personal data, limit the opportunities to develop and deploy AI. Even with anonymous datasets, as one representative highlights, the application of the predictive models will be very personal to the citizens. In addition, the participants highlighted the challenge of following up on the predictions due to a lack of capacity, knowledge or interest.

These challenges are even further enhanced due to resistance against predictions or classifications made by AI by citizens' attitudes on pro-active services provided by the government. Even administrative traditions of the public institutions may limit the acceptance of personalised services, which may imply inherent different treatment of citizens based on their data and profile, incompatible with state traditions which treat all citizens as equals. In a way, a proactive government might require a new way of thinking about the social contract and the role of the government in society.

3.2 Design Thinking on assessing the impact of AI on public services

The working group sessions organised during the second day of the workshop focused on AI impact assessment. The debate underlined that any form of impact assessment should take the context of the AI system very much into account. While, in general, there could be forms of impact done over a larger number of systems, by measuring the efficiency gains, participants of the workshop warned that solely focusing on indicators regarding the efficiency will not provide a full picture of the impact. Instead, any study working on measuring the impact of AI should take into consideration other indicators based on value and well-being, which the AI is supposed to address. Indicators relevant to measuring the fairness, inclusion or transparency of the public service using AI would be crucial, although challenging to always measure in a quantitative way. A mixture of different indicators and approaches are therefore needed to evaluate what the effects are of using AI in government.

Furthermore, the participants highlighted the need to differentiate between first order and second order effects of AI impact. The first order effects hereby refer to the immediate and measurable differences by assessing one public service using AI. However, the general use of AI in the public sector might create second order effects which will be overlooked by solely assessing individual services one at the time. Perhaps there will be broader societal effects when multiple agencies start using AI in their public services, such as increased discrimination or loss of trust in government. These second order effects will be even more challenging to measure but are crucial to understand the societal effects of an AI-powered government.

The working group discussions were organised around two main groups of topics:

- Aim/purpose and effort: what was it aiming to achieve and to which part of government responsibilities does the service adhere; were there any KPIs defined for the application? And, what were the organizational efforts needed to get the novel service development started and how was that measured?
- Outcome and Impact: What were the outcomes of the services; were they as expected; and how were they measured? And what were the broader impacts of the AI application, what was their relation to the original aims and purposes; were there unexpected impacts; and how are the impacts measured?

3.2.1 Purpose and effort to develop AI-enabled public services

One of the main purposes mentioned by the participants fall in the generically known reasons mentioned by governments to invest in digitisation, which are to improve quality of services, either by optimization in the back-end and/or increased accessibility and findability of services to citizens in the front-end. Moreover, costs savings are mentioned being another generic goal. Here, the idea is that AI systems facilitate automating processes thus saves costs of manual labour, of slow paper processes, of finding the right documents, of checking correct information, which resonates with another reason mentioned: that of efficiency of administrative process, where AI technologies can point to the right information or the correct procedure faster. Finally, social cohesion, solidarity and inclusiveness were also mentioned under the umbrella of generic democratization through digitisation and now "AI-enabled innovation".

Another reason to introduce AI-based services indicated was the need to improve accuracy, to be able to generate better measurements and personalisation of services. However, the offering of services to everyone equally was also mentioned as an important goal to use AI in the development of public sector services, due to a potential to decrease face to face contact (which can diminish at-the-counter-bias) – offering the same service digitally helps to increase transparency of those services. Connected to the latter point was the setting of a positive example by the government to others in society on how to develop AI-based services in a responsible and ethical way; to take the role of the government as a frontrunner of AI-based service innovation.

This links also to another remark made by participants, that developing AI services can lead to governments becoming competitive market players in this field and the possibility to engage in Public-Private Partnership with a different role and capacity.

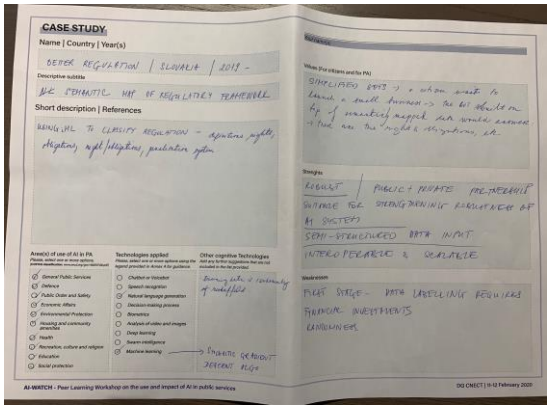
One of the main points of debate during the discussion was what types of efforts were most needed in getting an AI pilot or project started and implemented. Some of the recurring challenges, or barriers mentioned were:

- Trust and legal efforts, by which participants referred to the efforts needed to get contracts, to convince legal departments to go along with the experiment, massaging trust between different parties for starting a project, obtaining consent and approval, gathering data and getting approval to run pilots, to acquire top management support;
- Expertise efforts. By which the participants pointed the challenge of finding specific personnel and finding and organizing training courses.
- Operational/business efforts. There is work to do in gaining business understanding in the field of AI, to find ways to secure knowledge about technology and the market within teams.
- Technical efforts. There exists a myriad of challenges with regard to infrastructure, but also in understanding data and data labelling plus semantics, and a better understanding of which algorithms or models are best fit for purpose, how to do clean data, knowing which technology to choose and others.
- Political efforts. A point related to trust, and mentioned by many participants, is the difficulty of getting project approval from top management and to obtain c-level alignment / political alignment, which takes considerable effort and time and can truly delay project implementation.
- Market estimation efforts. Some attendees mentioned the need for better understanding of both the supply and the demand side, which also require the need of engaging the private sector earlier in the process, allowing time for owners to understand what needs to be done (and to get approval and buy-in time), and finding use cases and applications.
- Financial efforts. The need to better anticipate budget for scaling up and implementation was highlighted, also taking into account unforeseen costs in the experimental phase – which sometimes require getting additional funds during an experiment, and to decide for long-term investments.
- Scalability efforts. Finally, almost all participants mentioned that the projects of AI in public services are often still in a pilot-phase. Some stop there due to the efforts and difficulties of getting solutions across departments. More technical challenges were also pointed out, including the need to better understand how to address software challenges of machine learning and AI systems, including the maintenance, platform architecture etc.).

3.2.2 Implications of using AI in the public sector

In terms of outcomes and impacts, the participants provided answers that lie in between actual outcomes of their AI-enabled service pilots and prospective outcomes and aimed impacts.

One of the outcomes of the existing pilots mentioned often by participants was that of potential efficiency improvements within government itself and the learning effect of such pilots, in order to develop new skills for the future. Connected to this was the point made by some participants that not only doing such pilots leads to more satisfied workers, cost savings and specialized, more detail-oriented services, but also that it improves attractiveness of working for government and can lead to faster new recruitments as AI development could be a pull-factor to work for government. By improving efficiency through AI-enabled services in some areas, could free up capacity and resources for other tasks.



Another more direct outcome identified is that of decreasing administrative burden using AI services internally to make clearer workflows and processes. An effect that is linked to this is the possibility to lower the threshold for technology adoption in agencies with limited capabilities through collaboration in the development of AI-enabled services and pilots, as through such process other public organizations learn, and this can create a ripple-effect throughout the value-chain and enhance deployment and quality of public services.

A direct effect of improved work processes is that of cost efficiency, often through avoiding duplication. This in turn leads to structured datasets that can be repurposed through automation of data collection; repurposing becomes possible and workflow rationalization can be achieved learning from the processes of automation. Improved workflows and structured processes are consequently easier to manage through *platformisation*, allowing for faster and better refinements when required.

For both the back-end and the front-end user, automation and the use of AI can lead to better, continuous feedback loops of services which provides better way of structurally collecting and processing feedback. This would allow for establishing objective testing and measuring methods through AI-based services.

Besides quantitative goals, an outcome of better service delivery through AI is the possibility to develop new ways to gather citizens' feedback and input into government systems and develop more accurate and personalised services, increasing findability and user satisfaction.

Finally, participants mentioned that the development of AI-based services also leads to potential new avenues for services development, rather than merely automating existing ones, to both discover and measure potential of new services in monitoring impact, and to see new ways for services (for example, as a result of citizen service pathway classifications using AI).

Throughout the case-studies mentioned by participants, some specific outcomes were also highlighted that even if difficult to generalize, are worth reporting: a Danish health-service app resulted in better and faster diagnoses, answering to a clear societal need (reducing pressure on health sector, lowering wrong diagnosis percentage, reducing re-hospitalization), and an AI-based speeding ticket-application achieved a decrease in speeding in cities and in (lethal) accidents, increasing road safety. In a French example, the AI-based application seeking services improved accessibility to that service and user satisfaction.

In terms of long-term impacts, the boundary between the aforementioned outcomes and often more indirect impacts was sometimes difficult to draw, especially considering that specific indicators for measuring and evaluating AI impact on public services are seldom available and the effects of AI-enabled services on social and economic impact is difficult to discern. However, it is expected that the long-term effects of using AI in the public sector will cause the following direct and indirect impacts, in addition to higher efficiency of services:

- Real-time feedback on governmental portals - via AI/automated services, as it becomes easier to provide and collect real time feedback;
- Time savings through digital services;
- Prevention / prediction – AI use to create more predictive services (debt relief for example);
- Dissemination of the use of new technologies by citizens;b
- Inclusiveness (of services) through equal offering and equal (because AI-based) interaction;
- Quality of life – increased societal value and even poverty reduction as pointed out by someone.

4 Conclusions

The 1st AI WATCH Peer Learning Workshop on the Use of and Impact of AI in Public Services organized by JRC jointly with DG CONNECT started a process of engagement of the EU Member States on relevant collaborative activities of monitoring and anticipating current and future uses and trajectories of AI in the Public Sector.

The workshop aimed at discussing findings from the preliminary landscaping of AI use in public services across the EU. It outlined the methodological approach for assessing social and economic impact of AI in public services, supporting the elicitation and sharing of current AI practices across Europe and among Member States so to define priority services to focus on, while also identifying case studies for further in-depth analysis.

Though yet in its infancy, the use of AI in Public Sector is growing across Europe along trajectories that range from incremental to organisational innovation with disruptive and sometimes radical change in the way service delivery is designed and provided..

From the presentations given by the JRC regarding the current state of AI, it emerged that AI is widely experimented across European countries, although the current data gathered do not provide a full picture of the current landscape. AI was found to be mostly applied in general public services, economic affairs and health services, with many Chatbots often mentioned. Most AI-based innovation, however, seems to be incremental or technical, with innovation truly causing disruptions in the public service model being limited.

However, the workshop debate validated findings of the analysis, showing how AI can contribute to better public services in a variety of ways, for example by enabling smarter analytical capabilities and better understanding of real-time processes and delivering shorter and richer feedback loops for all levels of governance.

The participants underlined the potential of AI to increase the quality and consistency of services delivered, to improve the design and implementation of policy measures, to allow more efficient and targeted interventions, to enhance the efficiency and effectiveness of public procurement, to strengthen security, to improve health and employment services and to facilitate the interaction with wider audiences.

A specific issue discussed during the working group sessions were the implications that the use of predictive AI systems could have on public organisations, and on society. The leading driver in the use of these AI systems has implications related to increases in efficiency and effectiveness of the AI-powered services: e.g., lower mortality rates, faster transactions, reduction of polluting emissions. These systems could also be used to empower civil servants in making decisions, but it is often also feared that they could be used to replace jobs and save costs. The degree of autonomy of the AI systems will magnify risks and biases of AI, hence it is often preferred to use predictive analytics to empower staff rather than replace them.

In order to improve the AI systems used in government, participants highlighted the need to collaborate and to perhaps share datasets to create common predictive models, which are likely to be more accurate and trustworthy than institutions only using their own available data. Notably, the implications of one of the cases included a spill-over effect of the AI application, designed for one specific area (i.e., cardiac arrest) to another one (i.e., detection of psychiatric illnesses).

In this regard, it was also mentioned that the citizens' perspective should be taken more into account, to find ways to communicate to people that AI is trustworthy and not to be feared. Furthermore, an important implication is connected to the purpose of data, as data per se cannot solve issues at hand, but domain experts should also be involved to interpret the results that are then fed to the AI systems themselves.

The working groups organised using Design Thinking also served to gather additional information on Member States' initiatives and their insights on how to develop a methodology to identify risks and opportunities, drivers and barriers of the use and impact of AI in public services and on an alternative approach to AI impact assessment.

Several Member States also expressed interest in collaborating with the AI Watch on research activities in the area of AI for the public sector, and offered to support in both case studies and impact analysis at national and especially at local and municipal level, where most of the initiatives are actually being developed and social and economic impacts on citizens and society is higher and more evidence.

Finally, since an important part of the debate revolved around the topic of AI and data governance, it was decided to focus the 2nd AI WATCH Peer Learning Workshop with Member States on this domain. For this reason, the next workshop will be organised in collaboration with the School of Transnational Governance of the European University Institute (EUI) and should take place at the EUI premises in Fiesole, Italy.

Annex. Agenda

EUROPEAN COMMISSION
DG JRC - JOINT RESEARCH CENTRE
Directorate B – Growth & Innovation / Unit B6 – Digital Economy

DG CNECT – COMMUNICATIONS, NETWORKS, CONTENT and TECHNOLOGY
Directorate A – Artificial Intelligence and Digital Industry with Unit H4 – eGovernment & Trust

AI-WATCH

Monitoring development, uptake & impact of Artificial Intelligence for Europe

Task 6 – Analysis of the use and impact of AI in public services in the EU

Peer Learning Workshop on the use and impact of AI in public services

11-12 February 2020

DG CNECT, "Innovation Space", Avenue de Beaulieu 25, 1160 Auderghem, Brussels

11 February, 2020

09:30 – 10:00	*Arrival of participants and registration with welcome coffee*	
10:00 – 12:30	**Setting the stage – AI Made in Europe** **Chair: Massimo Craglia, Senior Expert, Digital Economy Unit, JRC/B6**	
10:00 – 10:30	Welcome remarks: the European perspective on AI	Massimo Craglia, Senior Expert, JRC/B6
	Overview of the coordinated Action Plan on AI	Irina Orssich Team Leader, CNECT/A2 Technologies and Systems for Digitising Industry
	The importance of AI for the public sector in the EU	Dietmar Gattwinkel, Policy Officer, CNECT/H4
10:30 – 11:30	Challenges for AI in the public sector: insights from policy analysis and research implications towards building European Digital Governance	Andrea Renda, Head, Governance, Regulation, Innovation & Digital Economy, CEPS Stefan Kulk, Assistant Professor in Law, Economics & Governance, Utrecht University
11:30 – 12:00	Use and impact of AI in public services: results of AI WATCH first mapping of AI in government in the EU	Gianluca Misuraca, Senior Scientist, AI WATCH Task Leader for AI in the public sector, JRC/B6
12:00 – 12:30	Q&A & open discussion	All participants
12:30 – 13:30	*Lunch break*	
13:30 – 17:30	**Mapping AI in government - Sharing experiences across EU Member States** **Chair: Dietmar Gattwinkel, Policy Officer, eGovernment & Trust Unit, CNECT/H4**	
13:30 – 13:45	Introduction to working groups: aims and structure	Gianluca Misuraca & Andrea Perego, JRC/B6
13:45 – 15:15	Working groups on drivers, barriers and implications of the use of AI in government	All participants – Facilitated by POLIMI (Alessandro Deserti, Francesca Rizzo, Marzia Mortati), Anys Boukli & Colin Van Noordt
15:15 – 15:30	*Coffee break*	
15:30 – 16:00	Reporting from Working Groups to plenary	Working Groups Rapporteurs
16:00 – 17:00	Roundtable discussion on policy interventions, strategies and examples of AI use in public services	Jana Novohradska, Vice Premier Office for Investments & Informatization, Slovak Republic Olli-Pekka Rissanen, Chief Special Adviser, Ministry of Finance, Finland David Suolaimanen, Division for Digital Development, Ministry of Infrastructure, Sweden

12 February, 2020

8:30 – 9:00	*Arrival of participants*	
9:00 – 12:30	**Towards a methodological approach to assess impact of AI in public services** **Chair: Natalia Aristimuño Pérez, Head of Interoperability Unit, DIGIT/D2**	
09:00 – 09:45	"Sirens of self-learning": opportunities and risks of AI in the public sector – Quick talks	Matthias Spielkamp, Director, Algorithm Watch Erika Widegren, CEO, Re-Imagine Europa
09:45 – 10:30	Panel discussion on AI impacts & regulatory governance implications on society	Antoine Cao, Direction Interministérielle du numérique, French Government Gatis Ozols, Ministry of Environmental Protection and Regional Development, Latvia Marieke van Putten, Ministry of the Interior and Kingdom Relations, The Netherlands
10:30 – 10:45	Q&A	All participants
10:45 – 11:00	*Coffee break*	
11:00 – 11:45	AI4GOV impact assessment: rationale and outline of the proposed methodological approach to assess socio-economic impacts of AI in public services	Gianluca Misuraca, JRC/B6 Gabriela Bodea, TNO
11:45 – 12:15	Q&A & open discussion	All participants
12:15 – 12:30	Introduction to working groups: aims and structure	Anne Fleur van Veenstra & Tjerk Timan, TNO
12:30 – 13:30	*Working Lunch*	
13:30 – 16:30	**The value of bench-learning on AI impact in public services** **Chair: Fabiana Scapolo, Deputy Head of Unit, JRC/I2, EU Policy Lab and Head of the JRC Competence Centre on Foresight**	
13:30 – 15:00	Working groups on value dimensions, methods & indicators to assess impacts of AI in public services	All participants – Facilitated by TNO (Gabriela Bodea, Anne Fleur van Veenstra & Tjerk Timan) with Rony Medaglia & Maciej Kuziemski
15:00 – 15:15	*Coffee break*	
15:15 – 15:45	Reporting from Working Groups to plenary	Working Groups Rapporteurs
15:45 – 16:15	Presentation Swedish AI impact methodology and discussion	Patrick Eckemo, Digital Transformation Agency
16:15 – 16:30	Learnings & next steps of the AI4GOV research	Dietmar Gattwinkel, CNECT/H4 Gianluca Misuraca, JRC/B6
	End of workshop	

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