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Stimulating the Uptake of AI in Public Administrations: Overview and Comparison of AI Strategies of European Member States

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Abstract: There is an interest in governments to stimulate the uptake of AI technologies within their administrations. However, little is still known about the policy initiatives countries are taking to facilitate the development and usage of AI within governmental organizations. This paper analyses, through the lens of policy instruments, existing AI strategies of European Member States to give a first overview of the different policy actions proposed to tackle adoption challenges in the public sector. Our findings suggest that there are significant differences between the number and type of policy actions taken and that many of the countries favour the exploitation of soft policy instruments over harder, regulatory approaches or active funding and other financial incentives.

Keywords: Artificial Intelligence, Public Sector, Strategy, Policy Instruments

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1. Introduction

Governments across the world have increasingly committed themselves to actively stimulating the development and diffusion of Artificial Intelligence (AI) in the public sector. In particular, AI in Europe has been regarded as highly important on the political agendas already since the Tallinn Declaration signed in 2017, where political leaders took notice of the potential of AI to enhance political decision making (European Union, 2017). Currently, there are numerous European actions to further stimulate investments in AI, such as the signed Coordinated Action Plan on AI (European

Commission, 2018). As part of this document, countries were asked to draft national AI strategies to further detail their policy plans on stimulating AI development and adoption. In general, AI includes systems which perform human-like cognitive functions, often by making predictions, recommendations and decisions (OECD, 2019). What makes AI different from earlier technological waves is its potential to be delegated with decision-making capacity, rather than solely providing information (Just & Latzer, 2017; Latzer & Just 2020). However, challenges lie in the adoption and use of AI solutions within government. As illustrated by Wirtz et al. (2019) in a recent review, there are currently four major dimensions which are limiting the use of AI in the public sector: technology, laws, ethics and social factors. For example, the development and usage of AI technology requires high levels of data quality and integration, and specialized staff to develop and work with AI solutions – resources that are often missing in government.

Thus, considering the wide amount of identified challenges on AI adoption already identified by recent research, there is a great need to understand how governments are planning to overcome these adoption barriers in government (Wirtz et al., 2019; Sun & Medaglia, 2019). The swift emergence of different national strategies for AI in Europe has led to a mushrooming of diverse policy instruments designed by governments to stimulate the uptake of AI. The aim of this paper is to provide an overview and a first analysis of the policy instruments highlighted in these strategies, enabling the identification of different policy styles with regards to the use of AI in the public sector. Analysing the AI strategies is likely to give fruitful insights on the intentions – as well as the importance – of stimulating AI within government and outline possible directions for policy and research.

2. Theoretical Framework

In our analysis, we adopt the lens of policy instruments to capture the diversity of national strategies for AI in the public sector. Policy instruments are generally defined as "techniques of governance that […] involve the utilization of state authority or its conscious limitation (Howlett, 2005). ". As such, policy instruments "encompass the myriad techniques at the disposal of governments to implement their public policy objectives" (Howlett, 1991).

The study of policy instruments arises from the need to both unpack the connections between policy formulation and implementation, and to understand public policy decision-making processes [9]. In the research area of innovation, policy instruments are emphasized in their purposive nature, as a "set of techniques by which governmental authorities wield their power in attempting to ensure support and effect (or prevent) social change" (Vedung, 1998).

Nevertheless, attempts at classifying policy instruments provide useful heuristics for comparison, benchmarking, and cross-country learning processes (Linder & Peters, 1998), in particular in relation to the digitalization of the public sector (Hood & Margetts, 2007). While there is no agreement on a single approach to all classifications of policy instruments, a general, three-fold typology of policy instruments has been proven useful in a variety of practical contexts (Bruijn & Hufen, 1998; Tools of Government, 2002). This three-fold typology includes regulatory instruments,

economic and financial instruments, and "soft" instruments also referred to, respectively, as the "sticks", the "carrots", and the "sermons" (Vedung, 1998).

Regulatory instruments (the "sticks") include bindings laws and regulations, ranging from e.g., the establishment of Intellectual Property Rights, competition regulation, or ethical regulations. Economic and financial instruments (the "carrots") refer to the allocation of economic resources and economic incentives. Examples include direct cash transfers, tax incentives, competitive research funding schemes, venture and seed capital support. "Soft" instruments (the "sermons") represent a residual category, often used in conjunction with the other two categories of policy instruments. Soft instruments include, for instance, communication campaigns, private-public partnerships, and voluntary codes of conduct.

We adopt this categorization as a lens to systematize the diversity of policy instruments for AI in public sector within the AI national strategies of European Members States. Besides allowing us to make sense of the complexity and the diversity of such strategies, this categorization lens can contribute to define shared criteria of the choice and implementation of future policy instruments to stimulate the uptake of AI in the public sector.

3. Methodology

In order to understand which policy instruments are adopted to stimulate the use of AI in the public sector within national strategies in Europe, this research uses a comparative policy document analysis approach. Comparative policy document analysis is a well-established approach in public administration research that aims to understand the intentions, plans and political interests in policy-making (Karppinen & Moe, 2012; Pollitt & Bouckaert, 2017).[1] For such an approach, comparability is essential. This study analyses all the official governmental AI strategies published by European Member States by the 25th of February 2020, taking note of the comparative overviews of the strategies in the AI Watch (van Roy, 2020).

Only the final published AI strategies were considered for the full review. Upon further inspection into the published AI strategies, some countries have published AI-related policy initiatives in other documents rather than – or in addition to – the official AI strategy. These initiatives have been excluded for this overview, to ensure the comparability and to avoid some countries being under- or overrepresented. Due to language barriers, only the AI Strategies which have been available in English, Dutch, Italian, Danish and Spanish were considered for the full text review. Therefore, 13 AI strategy documents[2] have been considered for this research.

During the document review, the AI strategies were analysed to discern any actions governments are considering or have already taken to stimulate and facilitate the development of AI in their

[1] Often, a report was published with these recommendations which may or may not have ended up on the official AI Strategy. However, these 'expert' reports were not considered in our analysis.

[2] Those from the Czech Republic, Denmark, Estonia, France, Finland, Germany, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Sweden and the United Kingdom.

public administrations, by scoping mentions of "public administration", "public sector", "public services", "government", and "state". Strategies consequently analysed and discussed by at least two of the authors and, when discrepancies in the categorizations arised, documents were further discussed until a consensus emerged. Following, a summary was written including the policy initiatives mentioned in the full strategy report to exclude non-relevant information (e.g., regarding actions boosting R&D in AI in universities). Lastly, these different policy initiatives were then analysed using the three-fold typology on policy instruments.

4. Findings

Following our analysis, a variety of different policy initiatives are considered by the countries to stimulate the use of AI in the public sector, tailored to their specific situation. Some initiatives are tasked with stimulating the awareness of the potential of AI technologies among civil servants. This should improve their understanding of the technological potential and perhaps discover use cases to explore AI in their line of work, through holding awareness campaigns, organizing regular meetings between civil servants with AI experts or by creating opportunities to participate in (European) AI policy events.

Related to these awareness campaigns are policy actions aimed at improving the internal capacity of public administrations to develop and implement AI into their daily workflows. Hence, some governments are exploring the creation of internal AI training: either a general AI training course for all civil servants to assist them with working with AI technologies, or a specialized training course for technical personnel to stimulate in-house development of AI applications, potentially facilitated by new AI related positions or departments. In the Danish example, an internal academy will be established to provide general training courses for civil servants, while there are plans to develop specialist AI courses in collaboration with universities (The Danish Government, 2019).

Other initiatives are tasked with improving the data on which the AI applications are built upon. Common actions are establishing data management programmes, organizing internal training for civil servants to improve data literacy and by creating a new technological infrastructure for data governance across the public sector as methods to improve the overall data quality. Another set of policy initiative focus on improving access to public sector data among different institutions.

Unique for the public sector, however, it is mentioned to consider improving the access to data held by private sector institutions, potentially valuable for public organizations. This is why the UK government is exploring the use of 'data trusts' to facilitate private sector data exchange to the government in a responsible and trustworthy way (HM Government, 2019).

As many organizations and governments have expressed the possible ethical concerns associated to the development and use of AI, many strategies mention the consideration of the ethical implications of adopting AI, especially when they are used in the public sector. Such a framework document could assist in establishing trust – among both civil servants and citizens – that the AI used in government is of high quality and in line with ethical values. In Finland, there are plans to

create an ethical code of conduct as part of the AuroraAI public sector reform programme (Ministry of Economic Affairs and Employment of Finland, 2019).

Other initiatives aim to conduct legal reforms to facilitate AI development and use in various policy areas, while the Estonian strategy mentions the possibility to explore general AI laws which – among other goals – has the objective to clarify the accountability and transparency issues related to the use of AI in public services (Government of the Republic of Estonia, 2019).

Some strategies also mention the need for revisions to existing public procurement regulation in order to provide more accessible ways to contract with the public sector. As an example, the Dutch strategy mentions the plans to use innovative procurement processes to assist SMEs in developing AI for government, such as hackathons (Ministerie van Economische Zaken en Klimaat, 2019).

In addition, some strategies mention the allocation of funding to stimulate the development and uptake of AI in the public sector. As an example, the Danish strategy mentions that the government is planning to allocate 27 million euros to test and deploy AI in municipalities and regions (The Danish Government, 2019). While some of these funding programmes are aimed at administrations themselves, others focus on stimulating the GovTech Startup landscape, assuming they will bring innovative AI solutions to the market for government organizations.

Lastly, some of these initiatives aim to facilitate the experimentation of this technology to learn from the challenges in developing and applying AI in public sector contexts. Therefore, a variety of countries have mentioned some AI flagship projects which will be used to learn from AI implementations and its effects. Based on the experiences of these initiatives, knowledge could be shared among institutions and revisions of the AI strategies made in the future. As part of this experimentation, some mention that regulatory sandboxes are being established to provide an experimental setting or safe area to test AI applications before they are deployed on a larger scale.

In the following table, an overview of each of these initiatives in all countries under investigation can be found.

Table 9: Overview of Policy Initiatives per Country

Policy actions	CZ	DK	DE	EE	FI	FR	LIT	LU	MA	NL	PT	SW	UK	Total
Awareness campaigns on AI		X		X		X	X	X	X	X	X		X	9
Hosting regular AI meetings	X			X						X				3
Participation in EU events				X				X		X		X		4
Improving Data quality	X	X	X	X			X	X			X	X	X	9
Improving Data accessibility	X	X	X	X	X		X	X			X	X	X	10
Access to private sector data													X	1
General AI training		X		X		X	X		X	X	X	X		8
Specialist AI Training		X		X					X	X	X	X		6
New positions or institutions				X	X		X			X	X		X	6
AI pilot projects	X	X		X	X	X		X	X	X	X	X		10
Regulatory Sandboxes for AI				X	X		X					X		4
Development ethical framework		X			X	X	X			X	X	X	X	8
Reform of data sharing laws	X			X									X	3
General AI Law				X										1
Funding for AI projects		X		X				X					X	4
Stimulation of GovTech Startups	X						X				X		X	4
Revising procurement processes	X			X	X				X	X				5

The analysis of the policy actions proposed in the different AI national strategies shows that not all countries have explored the same depth and scope of initiatives to stimulate the adoption of AI within the public sector. As it can be seen in the overview, there are considerable differences in what actions Member States are taking to ensure the uptake of AI in the public sector. Nevertheless, some of these initiatives seem to be more reoccurring than others, as most strategies mention to improve the data used for AI in the public sector, having flagship AI projects, hosting awareness campaigns, training programmes and developing ethical frameworks.

Following, these different policy actions have been classified according to the three-fold typology of policy instruments sticks, carrots and sermons, as shown in Table 2.

Table 2: Overview of Policy Instruments in AI Strategies

Policy instrument	Sticks	Carrots	Sermons
Policy initiatives	Creating regulatory sandboxes for AI	Starting AI pilot projects	Holding awareness campaigns for civil servants
	Developing ethical frameworks	Special funding for AI experiments	Organizing regular meetings within institutions regarding AI
	Reforming data sharing regulation	Stimulating GovTech Startup	Participating in related policy events
	Drafting of a General AI Law		Internal, general AI training courses
	Revising the procurement process		Internal, specialist AI training courses
			Establishing new positions or institutions
			Facilitating access to private sector data
			Improving data quality of public sector data
			Improving data accessibility within the institutions

As can be seen in the overview, many of these policy instruments could be classified as the 'sermon' policy instruments, meaning that they are relatively soft policy instruments aimed at facilitating AI development and usage. By comparison, far less of these policy instruments could be

regarded as either 'sticks' or 'carrots'. In total, we count the frequency of policy instruments belonging to the 'sticks' as 13, the 'carrots' as 15 and 'sermon' as 55.

In sum, many of the existing and planned policy initiative which are aimed to tackle would be relatively soft policy instruments, aimed at facilitating civil servants into experimenting, while far few policy initiatives are of regulatory or financial nature. While it is too early to say what this will mean for the future development and usage of AI in the public sector, having limited financial resources and regulatory policy support might mean that many of the other well-intentioned policy initiatives might not be effective to promote AI adoption. Further research is very much needed into further assessing each country's policy action, their effectiveness, and limitations in stimulating AI usage in the public sector.

5. Conclusion and Future Research

In conclusion, the analysis of AI national strategies reveals a wide variety of initiatives and techniques that Member States are putting in place or intend to put in place to foster the use of AI in the public sector, both directly and indirectly. Using the vocabulary of a classic categorization of different policy instruments (Vedung, 1998) into "sticks" (i.e., regulatory instruments), "carrots" (i.e., economic and financial instruments), and "sermons" (i.e., soft policy instruments, such as training and dissemination programmes), we can observe that, for the time being, most of the emerging national strategies on AI in the public sector in Europe seem to focus more on a "sermon approach" over "sticks" and "carrots". Soft policy instruments, such as campaigns for awareness, encouragements to improve data quality, and employee training, are in fact prevalent across almost all countries. Regulation and financial resource allocation, such as project funding and procurement process reviews, on the other hand, are instruments that are less uniformly distributed at this stage. This overview of national approaches to fostering the implementation and use of AI in the public sector is a snapshot of a swiftly developing scenario, which is very likely to transform over time. However, such an attempt to capture the "spirit of time" of European initiatives for AI in the public sector can serve as a practical first step to systematically assess potential impacts of AI in public services in the European Union. Ideally, most public policy reviews combine document analysis with expert interviews to ensure that necessary information regarding the policy is not lost or misunderstood (Bowen, 2009). We notice this limitation, as it is likely that some policy actions regarding AI are included into other initiatives, such as the Digital Government strategies. Therefore, as part of the AI Watch studies, additional research activities such as a workshop (van Noordt et. al., 2020 *forthcoming*) and a survey on AI policy initiatives with Member States' eGovernment representatives have already been held, which can be consulted in the full report (Misuraca & van Noordt, 2020 *forthcoming*). The future research activity will build on these insights, by including additional policy documents, and interviews with stakeholders to further interpret the strategies, the rationale and possibly, the effects, of different policy initiatives.

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