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# Artificial Intelligence in Swedish Policies: Values, benefits, considerations and risks

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**Abstract.** Artificial intelligence (AI) is said to be the next big phase in digitalization. There is a global ongoing race to develop, implement and make use of AI in both the private and public sector. The many responsibilities of governments in this race are complicated and cut across a number of areas. Therefore, it is important that the use of AI supports these diverse aspects of governmental commitments and values. The aim of this paper is to analyze how AI is portrayed in Swedish policy documents and what values are attributed to the use of AI. We analyze Swedish policy documents and map benefits, considerations and risks with AI into different value ideals, based on an established e-government value framework. We conclude that there is a discrepancy in the policy level discourse on the use of AI between different value ideals. Our findings show that AI is strongly associated with improving efficiency and service quality in line with previous e-government policy studies. Interestingly, few benefits are highlighted concerning engagement of citizens in policy making. A more nuanced view on AI is needed for creating realistic expectations on how this technology can benefit society.

**Keywords:** Artificial intelligence, e-Government values, public sector, benefits, risks

## 1 Introduction

Artificial Intelligence (AI) is currently discussed as an enabler for transforming the public sector; in fact, AI is described as a solution to most types of administrative challenges, regardless of industry or sector [1]. In recent years, AI has changed from being ‘science fiction’ to being developed and applied on a large scale and is quickly becoming ubiquitous. AI is also portrayed as the next big area of digitalization; some even call it a revolution [2]. AI is portrayed as a solution to many of the problems related to poor efficiency, lack of resources and competence experienced in the public sector. This echoes the praise of previous technological solutions in different waves of e-government [3–6]. Consequently, there are great expectations on what AI can do for public sector organizations, citizens and the society at large, in terms of e.g. improving service quality, reducing lead time and making unbiased decisions in case handling [7].

AI is often discussed as something ‘new’, and in terms of its application areas this is correct. However, since its birth in the 1950s, AI as a phenomenon has had an unstable trajectory consisting of AI winters and AI springs [8]. During AI winters, funding, efforts and interest in AI have diminished dramatically. Such periods occur when the technology fails to meet the high expectations set by scholars and others. It appears that we now find ourselves in the midst of an AI spring. Currently, everyone is aboard; the tech industry, consultancy firms, media, and government. With the history of unmet expectations, it begs to question if AI will finally deliver values as promised, or if we will soon experience another AI winter. We currently see both utopian and dystopian accounts of AI; e.g., [9] portray AI as the humankind’s best hope to prevent extinction, whereas others fear an Armageddon caused by AI [10]. As AI enters into the e-Government domain, it is likely to affect public sector organizations and the lives of citizens. The conflicting portraits of AI call for further research in the area. It is imperative that we scrutinize how AI comes into play in the government domain, whether the expected transformative potential is realized, and what the implications for policy making are [7].

This paper aims to investigate how AI is portrayed in a set of policy documents for public sector organizations, and what value ideals are attributed to the use of AI. We depart from a case where the Swedish government asked a number of organizations to map the usefulness of AI for Swedish industry and society. The resulting documentation from this initiative sets the frame for the discourse on AI in the Swedish public sector. We contribute to e-government research and practice by identifying what values are attributed to the use of AI for public sector organizations, and relating these to previous discussions on technology in the e-government research field.

The paper is organized as follows; first, we present the policy documents in our analysis and their origin. Next, we explain our method and analytical strategy. Then, we present our findings of the analysis and discuss our findings in relation to the analytical framework by Rose et al. [11] and previous analyses of e-government policy and technology. We contribute to e-government research and practice by illustrating how AI is portrayed in Swedish policies, illustrating a need for a more nuanced understanding of the potentials of this technology for public sector organizations.

## **2 Theoretical framing**

e-Government research shows that IT-development and implementation in government organizations is difficult to plan and organize for and that IT often results in unexpected outcomes [12]. Why should the implementation of AI technologies be any different? One possible reason for the difficulties of managing e-Government initiatives is the multitude of public values that government organizations are designed to uphold [13]. Bannister and Connolly discuss how the use of new types of information and communication technology (ICT) may transform such public values [14]. Several scholars have created value typologies as analytical lenses for studies of ICT’s transforming power [15, 16]. Rose et al. [11] have synthesized four value positions in e-Government management: professionalism, efficiency, service, and engagement (see Table 1). The

professionalism ideal concerns legality, durability and infrastructure. The efficiency ideal concerns value for money, efficiency, productivity and automation. The service ideal concerns utility of the government for the citizen, accessibility and service quality. The engagement ideal concerns engaging with the citizen, democracy and participation. Much of the research on public values in e-Government is purely theoretical, therefore scholars have called for empirical research that puts these models to use [17].

**Table 1.** Four value ideals for e-Government management (adopted from [11], p.542).

<b>Value ideal type</b>	<b>Definition and representative values</b>
<i>Efficiency</i>	Providing lean and efficient administration, which minimizes waste of public resources gathered from taxpayers. Representative values: Value for money, cost reduction, productivity and performance
<i>Service</i>	Maximizing the utility of government to civil society by providing services directed towards the public good. Representative values: Public service, citizen centricity, service level and quality.
<i>Professionalism</i>	Providing an independent, robust and consistent administration, governed by a rule system based on law, resulting in the public record, which is the basis for accountability. Representative values: Durability, equity, legality and accountability
<i>Engagement</i>	Engaging with civil society to facilitate policy development in accordance with liberal democratic principles; articulating the public good. Representative values: Democracy, deliberation and participation.

### 3 Methodology

We seek to analyze how AI is portrayed in Swedish policy documents, and the values attributed to the use of AI. We have chosen 10 documents for our analysis, which are presented in Table 1. The policy documents chosen for analysis are all a result of the initiative by the Swedish government to map and investigate the role of AI in Sweden, led by VINNOVA. They form a generative and representative sample of the discourse on AI for the Swedish public sector and are published by the following organizations;

- *VINNOVA* – Sweden’s innovation agency, under the Ministry of Enterprise and Innovation, acts as the government’s expert authority regarding innovation policy.
- *Governo* – a Swedish management consultancy firm, known for their close collaborations with public sector organizations e.g., VINNOVA.
- *the Swedish Association of Local Authorities and Regions (SALAR)* – a interest organization working for municipalities and regions in Sweden.
- *Inera* – an organization under SALAR focusing on healthcare.
- *WASP* – Wallenberg Artificial Intelligence, Autonomous Systems and Software Program. A research initiative initiated and financed by the Wallenberg foundation.
- *The Swedish government.*

We treat the documents as *policy documents* in the sense that their content is likely to trickle down through the governmental structures in Sweden and constitute the foundation of policies in this area for both public sector and private sector organizations. There are similar reports that mention AI in the Swedish public sector, focusing more on digitalization and automation in general. We excluded these documents from our analysis, and focused instead on reports in which AI has a dominant role. We have a broad and inclusive treatment of AI in this paper and have not defined AI in a technical sense as to make limitations to a subset of specific AI technologies. The analysis instead focuses on the discourse regarding AI and as such encompasses a broad variety of AI technologies and definitions associated with the term ‘artificial intelligence’.

**Table 2.** The policy documents in the analysis.

Document (title, translated if originally in Swedish)	Year	Author organization	Doc.ID	#Pages
Mapping and analysis of artificial intelligence and machine learning’s capabilities and application in Swedish industry and society	2017	Sweden’s Government Offices	#1	3
Artificial intelligence – possibilities for welfare	2017	SALAR	#2	17
AI and automation of first line care	2017	Inera	#3	51
Artificial intelligence in Swedish business and society	2018	VINNOVA	#4	188
Artificial intelligence in the public sector	2018	Governo	#5	50
Correct payments with the help of AI	2018	Governo	#6	33
Automation of work	2018	SALAR	#7	36
Decisions within 24 hours	2018	SALAR	#8	4
Collecting ideas and identifying challenges for future AI research in Sweden	2018	WASP	#9	28
National alignment for artificial intelligence	2018	Sweden’s Government Offices	#10	12

We have performed a qualitative content analysis [18]. The research presented in this paper is hence qualitative and interpretive [19], although we quantify the results as a part of exploring patterns and interpretations. As an analytical lens, we used the four value ideals presented by Rose et al. [11]. We combined these value ideals with an inductive and iterative approach for analyzing the documents. We find the model by Rose et al. fitting for several reasons. First, it synthesizes previous literature on public sector values. Second, the Scandinavian origin of the model corresponds well with the Swedish culture and welfare system. Third, the model itself reflects the expectations and responsibilities of Scandinavian government organizations. In this paper, we have no ambition to further develop this model, but instead apply it as-is.

The analysis was performed in the following steps. (1) Each document was read to identify statements describing the nature and use of AI for public sector organizations. In total 522 statements were identified. (2) Each statement was condensed by highlighting its main message, e.g., the statement “*AI can contribute to shortening lead times*

*for case handling*” (Doc.#10, p. 4) was condensed to “Shortened lead times”. (3) Each condensed statement was then coded in relation to the Rose et al.’s value set [11]. This coding was performed in an interpretive manner, seeking to find a match between the statements and the value ideals in the analytical framework. The condensed statement “Shortened lead times” was categorized as belonging to the “Efficiency” value ideal. (4) As the analysis progressed, it became evident from the empirical material that the statements could also be characterized along a different dimension, highlighting negative and positive outcomes of AI for the public sector. Thus, additional categories were formed inductively, including *benefits*, *considerations* and *risks* associated with use of AI (further described in findings). (5) We returned to the original statements and categorized each statement in relation to the inductively generated categories. For example, the statement “AI can contribute to shortening lead times for case handling” was categorized as a “Benefit” of AI. (6) Finally, we combined the two sets of categorizations for each statement, thereby integrating the theoretical and empirical dimensions.

## 4 Findings

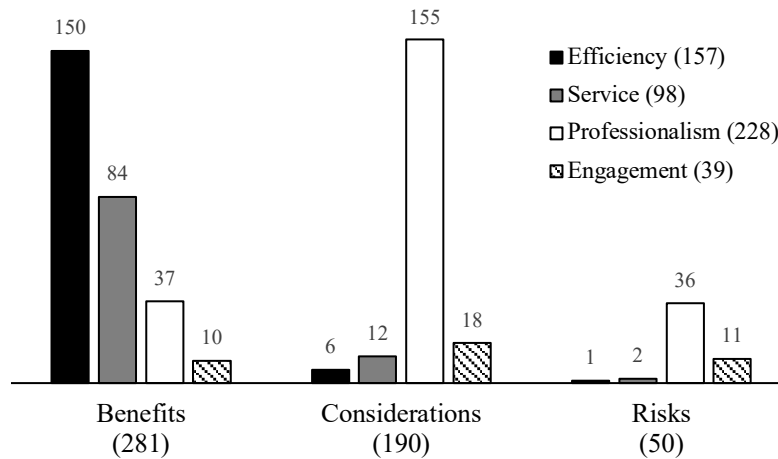
In our analysis of how AI is portrayed in Swedish policy documents, we identified three categories in the empirical material. These inductively generated categories are *benefits*, *considerations* and *risks* associated with use of AI, as described in Table 3.

**Table 3.** The inductively generated categories, with examples.

Category	Definition	Representative quotes
<i>Benefits</i>	Desirable, positive effects or statements of how AI solutions will affect society in a positive way.	“The [AI] system makes the process more effective and saves time for personnel.” (Doc.#7, p. 10) “High risk work environments do not need to be populated by people and strenuous jobs can be performed by automatons.” (Doc.#4, p. 56)
<i>Considerations</i>	Things that public sector actors must carefully think about and keep in mind when using AI.	“This is an area that needs to be investigated and where it can become necessary to change laws and regulations” (Doc.#7, p. 15) “Naturally, it has to be performed in a safe and transparent way” (Doc.#5, p. 33)
<i>Risks</i>	Undesirable, negative effects or statements of how AI solutions will affect society in a negative way.	“AI can involve new types of intelligent cyberattacks or manipulated data which can have serious consequences” (Doc.#10, p. 12) “An example of such a risk could be decision support systems in the area of jurisdiction falling into the hands of criminals, enabling them to find ways to avoid prosecution.” (Doc.#7, p. 12)

Figure 1 presents the distribution of the 522 statements across the two dimensions. First, most statements concern benefits associated with AI (281 statements) or considerations for public organizations when using AI (190 statements). Notably, only 50 statements

concern risks associated with AI. Related to the four value ideals, most statements fall into professionalism (228 statements) and efficiency (157 statements). The service ideal appears less frequently (98 statements), and the engagement ideal is the least frequent one (39 statements). Professionalism is therefore the most frequent value ideal, and occurs almost six times as frequently as the least frequent ideal (engagement).



**Fig. 1.** The distribution of categories and value ideals associated with the use of AI.

Fig. 1. represents the distribution of statements across the categories and value ideals. In order to further display the content of the discourse on AI in the Swedish public sector, we have extracted condensed statements that exemplify the topics according to categories and value ideals (Table 4). These topics are discussed in the next section.

**Table 4.** Typical statements for each category and value ideal.

<b>Category</b>	<i>Benefits</i>	<i>Considerations</i>	<i>Risks</i>
<b>Value ideal</b>			
<i>Efficiency</i>	Efficiency Competitiveness Profits/Savings Automating processes	Costs Resources	Economic damage
<i>Service</i>	Service quality Personalization Accessibility	Loss of jobs Service quality	Data quality Loss of jobs
<i>Professionalism</i>	Security Sustainability	Competence Infrastructure Data availability Legality	Security Integrity Misinformation
<i>Engagement</i>	Citizen interaction	Transparency Trust Co-operation	Transparency Trust Democracy

## 5 Analysis and discussion

This paper aims to investigate how AI is portrayed in a set of Swedish policy documents, and what value ideals are attributed to the use of AI. We depart from a Swedish case in which the Swedish government asked a number of organizations to map the usefulness of AI for Swedish industry and society. In the research discourse on AI, we see a strong polarization, where some scholars describe AI as a necessity for creating and maintaining a functioning society [9], and others see AI as a threat to the world we live in [10]. In the documents analyzed in this paper, we see a strong tendency towards the former (positive) view on AI; AI is presented as a way to maintaining and improving the well-functioning Swedish welfare system.

The main finding from our analysis is that the benefits of AI are highlighted extensively, whereas the potential risks of AI are few. Relating these statements on AI in the Swedish public sector to the value ideals presented by [11], we see that most benefits relate to increased efficiency of public sector processes. It is interesting, that the discourse does not regard risks to efficiency as a result of AI; using AI to increase efficiency is solely seen as creating desirable and positive effects. The second most frequent type of benefits concern service quality; hence, AI is described as both a way to increase competitiveness, make profit and savings, but also to increase quality and effectiveness of public sector processes. The focus on benefits may be explained by the purpose and nature of the documents included in the analysis; they are a result of an initiative to map the usefulness of AI for Swedish industry and public sector organizations. Hence, the purpose of the document is to inspire organizations to adopt and implement AI technologies. Overall, the discourse on AI is in line with the general discourse on digitalization in the public sector, highlighting the positive impact of the technology. In particular, technologies are promoted as means for increased efficiency and effectiveness, e.g., [3–6]. Consequently, our analysis confirms that the discourse on AI for the public sector is characterized by an optimistic outlook on AI, and that there are great expectations on what AI can do for public sector organizations, citizens and the society at large.

In spite of the purpose of inspire AI use in the public sector, some considerations and risks are mentioned in the policy documents. The considerations typically fall under the professionalism value ideal [11]. We believe this as a result of the particular context highlighted in the professionalism ideal; the functioning bureaucracy. AI challenges the focus on the internal stability of government (status quo), e.g. in terms of how AI may lead to job redundancy in the public sector and a need for new competences. AI also requires new and different digital infrastructures, and poses questions on how the legality of public administration can be upheld. For these reasons, it is perhaps not surprising that the risks with AI highlighted in the policy documents were related to the values related to the professionalism ideal, e.g., security, integrity, and misinformation. Concerning the risks of AI, there are only a few risks mentioned that concern engagement. The engagement ideal is about engaging with society, about citizen participation and democracy; the communication between the citizen and the government [11]. Engagement is relatively underrepresented in the AI discourse; AI is not presented as an enabler of engagement and democratic discussions. This is interesting, because the



Swedish Digital Agenda explicitly mentions citizen engagement as a benefit of digitalization [20]. However, in the discourse on AI we have analyzed, the values related to engagement of citizens in policy making are notably absent. This finding corresponds to previous policy studies in the e-government field, which have found that the democratic ideals often are sidelined in favor of New Public Management ideals of increased efficiency and effectiveness [21–23].

Based on the findings from our analysis, we see a likelihood that the discourse on AI is overly optimistic and resemble previous hypes on various uses of technologies in the public sector (cf. [3, 8]). Returning to the metaphor of AI winters and springs, it appears that we are indeed in the midst of an AI spring [8]. A core issue for future research will be to investigate whether we will soon find ourselves in a new AI winter, or if the AI spring will turn into an AI summer; where the AI-technologies are widespread and meet the high expectations attributed to them. An interesting difference that we see, compared to previous AI springs, is that the interest for AI is now widely spread, and not just seen in academia. It also appears that AI technology is likely to become more generally applied. As AI becomes more mainstream the expectations on this particular technology is likely to evolve and become more nuanced; therefore, it is vital that the e-government research community continue to follow this development.

## 6 Conclusions, limitations and future research

In this paper, we performed a content analysis on 10 policy documents describing the usefulness of AI for public sector organizations and industry in Sweden. We applied the value ideals model presented by Rose et al. [11], combined with three inductively generated categories for coding value statements in the documents. We found that;

- AI is described as an enabler for increased efficiency and effectiveness in the public sector. This reflects an optimistic view on AI, highlighting the benefits of AI for public sector organizations.
- AI challenges the values related to professionalism, reflected in an emphasis on considerations and risks concerned with legality, security and integrity.
- AI is not described as an enabler for citizen engagement in government. This is an interesting contrast to general national policies stating that digitalization should be used to increase citizen engagement.
- The AI-discourse analyzed in this paper is in line with previous e-government research.
- A more nuanced view on AI is needed for creating realistic expectations on what this technology can do for society.

This paper has several limitations. First, the analytical model gives a simplified overview of the values guiding e-Government management. In the future, the findings presented here could be complemented with additional value conceptualizations or a modified version of the current analytical lens [11] with improved suitability for analyzing AI. A second limitation concerns that the particular discourse analyzed is taken from one national context at one point in time. Furthermore, the documents we have analyzed

dealt with both industry and public sector organizations combined. Future research could add additional national contexts to the analysis and focus on the public sector context alone (but from multiple perspectives, e.g., from the viewpoint of trade-unions, citizens, and businesses). We also see potential for investigating the discourse on AI in a longitudinal manner and see if and how the policy documents come into practice. A third limitation concerns our interpretation of AI. AI encapsulates a variety of different technologies and we have not unpacked the meaning of AI here. Instead, we have treated AI in the same overarching manner as is found in the policy documents that we analyzed. As AI evolves, the meanings attributed to this concept are likely to become increasingly differentiated and hence more important to state explicitly.

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