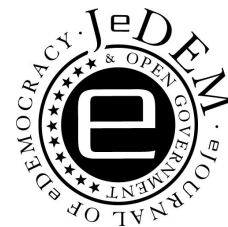


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# Values, benefits, considerations and risks of AI in government: A study of AI policy documents in Sweden

\*Daniel Toll, \*Ida Lindgren, \*Ulf Melin, \*\* Christian Ø. Madsen

\*Department of Management and Engineering, Information Systems, Linköping University, 581 83 Linköping, Sweden, {daniel.toll, ida.lindgren, ulf.melin}@liu.se

\*\*Research Centre for Government IT, Department of Computer Science, The IT University of Copenhagen, Copenhagen, Denmark, chrm@itu.dk

*Abstract: There is currently an ongoing, global race to develop, implement, and make use of AI in both the private and public sectors. How AI will affect responsibilities and public values to be upheld by government remains to be seen. This paper analyzes how AI is portrayed in Swedish policy documents and what values are attributed to the use of AI, based on an established e-government value framework. Statements are identified in policy documents and are coded into one of four value ideals, as well as being either a benefit, a consideration, or a risk. We conclude that there is discrepancy in the policy level discourse concerning AI between the different value ideals and that the discourse surrounding AI is overly optimistic. A more nuanced view of AI in government is needed to create realistic expectations.*

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

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## 1. Introduction

Artificial intelligence (AI) is currently discussed as an enabler for transforming society and a solution to administrative challenges, regardless of industry or sector (Cave & ÓhÉigartaigh, 2018). In recent years, AI has gone from being constructed as ‘science fiction’ or something that is out of reach, to being developed and applied on a large scale. This is happening for a multitude of different reasons, in different ways, in different types of organizations, and it seems as if AI is quickly becoming ubiquitous. AI is also portrayed as the next big “thing” of digitalization; some even call it a revolution, but a revolution of substantial uncertainty into uncharted waters (Makridakis, 2017).

AI is often discussed as something ‘new’, and in terms of its application areas this may be correct, as AI has previously mostly been of interest only to scholars. Since its birth in the 1950s, AI as a phenomenon has had an unstable trajectory consisting of AI winters and AI springs (Natale & Ballatore, 2017). During AI winters, funding, efforts, and interest in AI have diminished dramatically. Such periods have occurred when the technology has failed to meet the high expectations set by scholars and others. It appears that we now find ourselves in the midst of an AI spring. The current spring is different than previous ones, as everyone, not just scholars, is on board with the AI hype; the tech industry, consultancy firms, media, and governments. With the history of unmet expectations, this begs the question of whether AI will finally deliver as promised, or whether we will soon experience another AI winter. Cruz and Treisman (2018) have investigated why the current AI spring has come, and what can be done to prevent it from turning into yet another AI winter. They attribute the current AI spring to deep learning, a branch of machine learning, which itself is only a small category of all the different AI technologies that exist. In their paper they describe deep learning as the silver bullet that sparks positivity and enthusiasm, not only for deep learning itself, but for AI in general. Cruz and Treisman (2018) also point out an interesting contrast of the perspective on AI in government; that in 1973, the British government criticized AI as a mirage, but is now spending millions of pounds on AI research. Funding of AI research and development is taking place all over the globe.

It is not only by funding research that governments involve themselves with AI. AI is in use by governments, and more usage is on the horizon (Margetts & Dorobantu, 2019). One reason for governments’ emerging application of AI is the portrayal of AI as a solution to problems related to poor efficiency, a lack of resources and a lack of competence in the public sector. This echoes the praise of previous technological solutions in different waves of e-government (Chadwick & May, 2003; Heeks & Bailur, 2007; Madsen, Berger, & Phythian, 2014; Rowe & Thompson, 1996). Consequently, there are great expectations for what AI can do for public sector organizations, citizens, and society at large, in terms of e.g. improving service quality, reducing lead times, and making unbiased decisions in case handling (Lindgren, Madsen, Hofmann, & Melin, 2019). While these beneficial outcomes are inherently desirable, there are also concerns about the destructive power of AI and that an artificial intelligence arms race may be a possibility (Ramamoorthy & Yampolskiy, 2018; Taddeo & Floridi, 2018). Some scholars also emphasize the importance of data protection and integrity, with data being the lifeblood of many AI systems (Agbozo & Asamoah, 2019). There are several examples of the contrasts between utopian and dystopian accounts of the future with AI; Gurkaynak, Yilmaz, and Haksever (2016) portray AI as humankind’s best hope to prevent extinction, whereas others fear an

Armageddon caused by AI (McCauley, 2007). While these examples may be extreme, they nevertheless exemplify the diversity and polarity in the discourse surrounding AI. These optimistic and pessimistic views of IT are a common theme that most new technologies are subject to (Rowe & Thompson, 1996). Rowe and Thompson problematize these contrasting perspectives and make a point about them having different characteristics; for example, the optimistic perspective being focused on invention and reskilling of workers, while the pessimistic perspective is focused on innovation and the deskilling of workers. This fits well with the narrative that is occasionally heard of AI on the one hand freeing up time for other types of work, but on the other hand possibly leading to increased unemployment. This discourse also points towards the fact that AI as a tool is not inherently good nor bad; it is up to us to use AI in a way that creates the values we want as a society. Here, values are not monetary values, but rather things that we want and desire; positive outcomes. For example, democracy may be a thing that we value and therefore want and desire.

As AI enters the public sector, it is likely to affect organizations and the lives of citizens. Since AI is fairly new in governmental settings, there is a lack of research analyzing how AI is portrayed in policy documents and the values associated with this technology. This and the conflicting portraits of AI call for further research. 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 (Lindgren et al., 2019). The utilization of most types of AI solutions does not merely involve installing and using just another application on a computer. Most of these systems are complex and their use requires effort and specific competence, which is sometimes new or newly developed. Al-Mushayt (2019) points towards challenges that make using AI within e-government difficult, e.g. a lack of competence or experts, low trust in these types of solutions, or a lack of computational power. Across the globe, legal-regulatory frameworks and ethics guidelines for the use of AI are being considered by academics, industry, and governments (Cath, 2018). These challenges and considerations become part of policies that act to encourage beneficiary development and use of AI. It is not uncommon for governments to use policy documents to encourage and stimulate innovation and technological development (Dolfsma & Seo, 2013). Indeed, Sundberg (2019) notes that material produced within the scope of e-government, for example a policy surrounding a technology, represents the views of what this technology is and simultaneously a call to action. A policy therefore represents the view of a certain technology and also aims to instigate change. Because of this, a policy document can be seen to be predicative to some degree of future, upcoming change. How AI is portrayed, and its associated values, may therefore affect how it is used and for what purposes.

### **1.1. Aim of the paper and research objective**

This paper aims to investigate how AI is portrayed in a set of policy documents for public sector organizations in Sweden. The analysis focuses on which value ideals are attributed to the use of AI, and further seeks to explore the potential impacts 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. This sampling is further

explained in our research approach. We contribute to e-government research and practice by identifying which values are attributed to the use of AI for public sector organizations, and relate these to previous discussions on technology in the e-government research field. We choose to not unpack the definition of AI and focus on specific AI technologies; instead, we take an inclusive approach and the study is focused on the discourse surrounding AI on a general level. This paper is a continuation of a previous paper (Toll, Lindgren, Melin, & Madsen, 2019), and more details about this are presented at the end of the 'Research approach' section.

The paper is organized as follows: First, we present our theoretical framework. Next, we describe the policy documents in our analysis and their origin, followed by our method and analytical strategy. We then present our findings from the analysis, and discuss our findings in relation to the analytical strategy and previous analyses of e-government policy and technology. Finally, we present our conclusions, discuss the limitations of the study, and share some reflective thoughts on future research.

## 2. Theoretical framing

Previous e-government research shows that IT development and implementation in government organizations is difficult to plan and organize, and that IT often results in unexpected outcomes (Hood & Dixon, 2015). 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 (Almarabeh & Abuali, 2010). The public sector exists to serve the people and to create various values (ref.). The study of these values can easily become abstract. For example, 'democracy' may be a value, but its definition and measurability are difficult to formalize. Values may also exist on different levels of abstraction and in hierarchies relating to each other (Jørgensen & Bozeman, 2007). There is also a distinction between values on a personal or individual level and those of the public collective. Sundberg (2019) concludes that public values are distinct from individual values, and that public values are subject to the public ethos. Bannister and Connolly discuss how the use of new types of information and communication technology (ICT) may transform such public values (Bannister & Connolly, 2014). Sundberg also notes that certain technologies are prone to promote certain values more than others. AI as a type of technology may then be associated with and have the capability to transform certain values more than others. This makes it interesting to study which values are associated with AI, as this may be indicative of where its transformational power lies.

There have been several efforts by scholars to create inventories and models of values for use as analytical lenses for studying ICT's transforming power (Beck Jørgensen & Bozeman, 2007; Rutgers, 2008). A model synthesized of pre-existing research in this area and grounded in theory is put forward by Rose, Persson, Heeager, & Irani (2015). Their model consists of four value ideals: 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. We present an overview of these value ideals in Table 1.

Table 1. Four value ideals for e-government management (adapted from Rose et al., 2015, p. 542) (Toll et al., 2019).

Value ideal	Definition and representative values
Efficiency	Providing lean and efficient administration, which minimizes waste of public resources paid for by taxpayers. Representative values: value for money, cost reduction, productivity, and performance.
Service	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.
Professionalism	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.
Engagement	Engaging with civil society to facilitate policy development in accordance with liberal democratic principles; articulating the public good. Representative values: democracy, deliberation, and participation.

Much of the research on public values in e-government is theoretically oriented, and scholars have therefore called for empirical research that puts these models to use (Twizeyimana & Andersson, 2019). We apply the model proposed by Rose et al. (2015) in this paper as our analytical lens. Rose et al. themselves mention that predecessors (models/frameworks) within this area are often without substantial empirical or theoretical support. Their model, however, has both of these. It was initially formed by investigating the major trends in public administration literature over the last 15 years, and was then tested empirically in a case study and subsequently refined based on their findings. This model has been applied in several other studies as an analytical lens (Pedersen, 2017; Persson, Reinwald, Skorve, & Nielsen, 2017; Sundberg, 2019). In the case of Persson et al. (2017), the model is used to analyze policy documents and they conclude that they found the model useful. Additionally, the model is of a Scandinavian origin and corresponds well with the Swedish culture and welfare systems. The model also represents the expectations and responsibilities of Scandinavian government organizations. For these reasons we find Rose et al.'s (2015) model useful and fitting for this study. We will not attempt to develop this model further in this study. Instead, we will apply the model as-is and will reflect on its use as an analytical lens.

### 3. Research approach

In this section we present our research approach and method. First, we explain the selection of documents used for our analysis and present them. Second, we explain the type of analysis that has been performed and its steps.

### 3.1. Documents used for analysis

In 2017, the Swedish Government started an initiative to map and investigate the role of AI in Sweden. This initiative was led by VINNOVA, the official innovation agency of Sweden. As a result of this initiative, VINNOVA and other related organizations produced reports on this investigation. This continued and built upon an ongoing snowball effect of other investigations into what AI could be used for in Swedish society. Together, these form a generative and representative sample of the discourse on AI for Swedish society and the Swedish public sector. They also represent a contemporary snapshot in time, as they were all published within two years of each other in 2017 and 2018. Policy documents may also encapsulate certain biases, and analyzing these documents enables these biases to be accessed (Abraham, 1994; Bryman, 2016). The reports that are used in this study were published by the following organizations:

- VINNOVA – Sweden’s innovation agency, under the Ministry of Enterprise and Innovation, acts as the Swedish Government’s expert authority regarding innovation policy.
- Governo – a Swedish management consultancy firm, known for its close collaborations with public sector organizations, e.g. VINNOVA.
- The Swedish Association of Local Authorities and Regions (SALAR) – an interest organization working for municipalities and regions in Sweden.
- Inera – an organization under SALAR, focusing on healthcare.
- WASP – The 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. This is because there is a strong tradition in Sweden of governing society using policy documents and recommendations, with a high degree of trust in public agencies. Several initiatives strongly indicate that these types of documents have led to impact, with the initiatives echoing the discourse in these policy documents. One such initiative of note is the WASP foundation, which is the largest research initiative in Sweden, funding AI research with a total of SEK 5.5 billion, 400 PhD students, and 60 new research groups (WASP, n.d.). Another example is that the Swedish innovation agency, VINNOVA, is investing millions of kronor in AI projects in both the public and the private sectors (e.g. VINNOVA, 2019). Similar reports mention AI in the Swedish public sector but without an explicit focus on AI, focusing instead on automation or digitalization in general. We did not consider these types of documents in our analysis. Instead, we only included those documents in which AI has a dominant role. We apply a broad and inclusive treatment of AI in this paper and have not defined AI in a technical sense, as this would limit AI to a subset of specific AI technologies. The analysis is instead focused on the discourse regarding AI, and as such encompasses a broad variety of AI technologies and definitions associated with the term ‘artificial intelligence’.

We present the policy documents used for our analysis in Table 2, with their respective title, year of publication, author organization, number of pages and a document ID used for reference throughout this paper.

Table 2. The policy documents used for our analysis (Toll et al., 2019).

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

### 3.2. Analysis process

We have performed a qualitative content analysis (Krippendorff, 2004). The research presented in this paper is hence qualitative and interpretive (Walsham, 1995), although we quantify the results as part of exploring patterns of different dimensions. As an analytical lens, we used the four value ideals presented by Rose et al. (2015). We combined these value ideals with an inductive and iterative approach for analyzing the documents.

The analysis was performed in the following steps:

- 1) Identification of statements. Each document was read to identify statements describing the nature and use of AI. In total, 522 statements were identified.
- 2) Condensation of statements. 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) Coding of value ideals. Each condensed statement was coded in relation to Rose et al.'s (2015) value set. 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.

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. (These additional categories are further described in the ‘Findings’ section.) We then returned to each statement and categorized it in relation to the inductively generated categories:

- 4) Coding of inductively created categories. Each statement was coded in relation to the inductively created categories. As with the coding of the value ideals, this was also performed in an interpretative manner. For example, the statement “AI can contribute to shortening lead times for case handling” was categorized as a “Benefit”.
- 5) Finally, we combined the two sets of categorizations for each statement, thereby integrating the theoretical and empirical dimensions in order to explore patterns.

A rule we applied for the coding was that a single statement could only be coded to belong to one value ideal and one inductively created category, where the interpretation in deciding on its condensation depended on its main message. However, an exception was made for ‘list statements’, which were statements that listed several things in one and the same statement. A statement was considered a list statement when it proved impossible to decide on just one single condensation that represented the statement in its entirety, i.e. the statement contained more than a single main message. An example of a list statement is “AI is used to get more cost-efficient processes, better and more personalized offers to customers and to increase the quality of products” (Doc. #5, p. 7). As can be seen in this statement, three things are highlighted; cost-efficiency, personalization, and quality. These were considered to be three different condensations that existed in one and the same statement. To remedy this, the list statement was split into the following three statements; “AI is used to get more cost-efficiency processes”, “AI is used to get better and more personalized offers to customers” and “AI is used to increase the quality of products”. In essence, the statement was split according to its present condensations and its subordinate clauses. This means that in the original document this is one statement, but for our analysis it is three separate statements. This splitting of list statements was carried out in order not to lose data, as would have happened if the above example was only considered as a statement concerning cost-efficiency, thus ignoring the personalization and quality aspects. This made the analysis more thorough and precise in its content.

This paper is a continuation of a previous paper presented at the International Conference of E-Government (EGOV) in San Benedetto del Tronto, Italy, in September 2019 (Toll et al., 2019). The paper received a best paper nomination at this conference, and we were therefore invited to submit this extended version to the Journal of eDemocracy and Open Government (JeDeM). For this version of the paper, we continued working on the study by doing the following:

- Extending the overview of prior research related to the concepts involved.
- Explaining the method and analytical process with increased acuity and examples.
- Describing the findings with more nuance and empirical examples.



- Extending the discussion based on feedback from the EGOV conference as well as our own reflections since the first version of the paper.

## 4. Findings

In this section we present the findings of our study. First, we present the inductively created categories that were generated during the analysis. Second, we present empirical examples of the coding, showing empirical examples (statements) with their corresponding condensation, value ideal, and inductively created category. Third, we present the two integrated dimensions (the theoretically grounded value ideals and the empirically grounded inductively created categories) with the frequency distribution of statements across these dimensions.

Table 3. The inductively generated categories, with empirical examples (Toll et al., 2019).

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

### 4.1. Empirical examples and the results of the coding

During the coding, each statement was condensed down into a condensation representative of the main message of the statement. These condensations were then matched to one of the four value ideals used as our analytical lens. For the sake of transparency, and to give an idea of the kind of statements that this study is based on, we present four tables that showcase empirical examples (statements) with their corresponding condensation, coded value ideal, and inductively generated category. The number of condensations here does not represent all of the condensations used in the analysis. Instead, the number of condensations here roughly represents the relative frequency of statements within each intersection of value ideal and inductively created category. The most prevalent condensations were picked for these tables to form a representative overview. In some

cases, the same condensations appear in several categories, for example the condensation Costs appears within both Benefit and Consideration, within the Efficiency ideal, as can be seen in Table 4. This relates directly to the definitions of the categories and how the statement has been interpreted in its context. As such, condensations are not exclusive to a single category. This is because statements relating to a certain condensation (e.g. Costs) were interpreted in some instances to be positive (Benefit) but in other instances to be neutral (Consideration).

For the sake of readability, we present four tables that focus on each value ideal: efficiency (Table 4), service (Table 5), professionalism (Table 6), and engagement (Table 7). As only one of the documents used in our analysis was in English, most of the following empirical examples have been translated from Swedish to English. Again, we have included representative quotations with references to enhance traceability. The following table, Table 4, presents empirical examples (statements from the policy documents), their condensations, and their corresponding categories within the 'Efficiency' value ideal.

Table 4. Empirical examples of condensations and their categories for the 'Efficiency' value ideal.

Value ideal	Category	Condensation	Empirical example
Efficiency	Benefit	Costs	"The [AI] system makes the process more effective and saves time for personnel." (Doc. #7, p. 10)
		Competitiveness	"For companies of all types there are opportunities to develop their competitiveness using AI." (Doc. #10, p. 8)
		Profits/savings	"But there is also a potential to save money by automating time-consuming methods that are currently part of the routine." (Doc. #4, p. 41)
		Automating processes	"Artificial intelligence is used in different ways to make commerce smarter and more automated." (Doc. #2, p. 7)
	Consideration	Costs	"The cost to develop new technological solutions, especially within AI, are big and will increase." (Doc. #3, p. 25)
		Resources	"Some of the speakers stressed how limited network capacity and latency can be a challenge." (Doc. #9, p. 25)
	Risk	Economic harm	"AI can lead to discrimination, lower trust, cause economic harm, and affect how democracy functions." (Doc. #10, p. 4) Note: This is a list statement.

The following table, Table 5, presents empirical examples (statements from the policy documents), their condensations, and their corresponding categories within the 'Service' value ideal.

Table 5. Empirical examples of condensations and their categories for the 'Service' value ideal.

Value ideal	Category	Condensation	Empirical example
Service	Benefit	Service quality	<i>"There also are significant opportunities to improve quality by implementing assessments/analyses that are beyond human capabilities." (Doc. #4, p. 41)</i>
		Personalization	<i>"The focus in this area has so far been on tools that help to better understand the customer and contribute to a better customer experience." (Doc. #6, p. 12)</i>
		Accessibility	<i>"Accessibility has increased in two ways, in terms of time of day and in terms of location." (Doc. #8, p. 2)</i>
	Consideration	Loss of jobs	<i>"One challenge is a loss of jobs due to rapid changes to tasks and jobs in society." (Doc. #4, p. 74)</i>
		Service quality	<i>"It may require other types of data, although this leads to questions regarding ownership, quality assurance, and accessibility. These questions need answering." (Doc. #3, p. 7) Note: This is a list statement.</i>
	Risk	Data quality	<i>"Risks can arise in the form of inaccurate or otherwise undesirable results if the data quality is insufficient, for example due to mistakes in registrations, systematic (known as well as unknown) faults in the collection [of data], choice of sources or labeling of data." (Doc. #10, p. 10)</i>
Loss of jobs		<i>"A fear that has been voiced is that the type of job many junior legal practitioners have previously carried out is no longer required, making it more difficult for them to enter the profession in a natural way." (Doc. #6, p. 22)</i>	

The following table, Table 6, presents empirical examples (statements from the policy documents), their condensations, and their corresponding categories within the 'Professionalism' value ideal.

Table 6. Empirical examples of condensations and their categories for the 'Professionalism' value ideal.

Value ideal	Category	Condensation	Empirical example
Professionalism	Benefit	Security	<i>"Processing applications for damages has thus far been monotonous and time-consuming. The monotony can lead to mistakes. When AI is used in this context, the case handlers focus on the more complex cases and the risk for mistakes decreases." (Doc. #6, p. 19)</i>

	Consideration	Sustainability	<i>"AI can be used to optimize processes, ensure better sustainability and integrate value chains."</i> (Doc. #4, p. 55) Note: This is a list statement.
		Competence	<i>"A fundamental prerequisite for the whole of Sweden benefitting from AI is that enough people have the knowledge needed to develop and use the AI technology. Knowledge and competence within AI must exist in many areas of society, in both large and small businesses, in municipalities, in regions and in agencies."</i> (Doc. #10, p. 6)
		Infrastructure	<i>"Different types of infrastructure are also of significance for the development and utilization of AI. For example, certain aspects of AI development require access to large data sets and big computational capacity."</i> (Doc. #10, p. 11)
		Data availability	<i>"Data availability and opportunities to combine different data will be of fundamental importance for which implementations [of AI] are possible to develop."</i> (Doc. #4, p. 9)
		Legality	<i>"This is an area that needs to be investigated on a general level, and it may be necessary to alter laws and regulations."</i> (Doc. #3, p. 28)
	Risk	Security	<i>"There is a risk of increased vulnerability as the systems become more advanced with more connections."</i> (Doc. #4, p. 57)
		Integrity	<i>"Other risks concern security and integrity in handling personal data and information."</i> (Doc. #5, p. 8)
		Misinformation	<i>"Risks of deliberate data manipulation to affect organizations and society in a negative way."</i> (Doc. #10, p. 8)

The following table, Table 7, presents empirical examples (statements from the policy documents), their condensations, and their corresponding categories within the 'Engagement' value ideal.

Table 7. Empirical examples of condensations and their categories for the 'Engagement' value ideal.

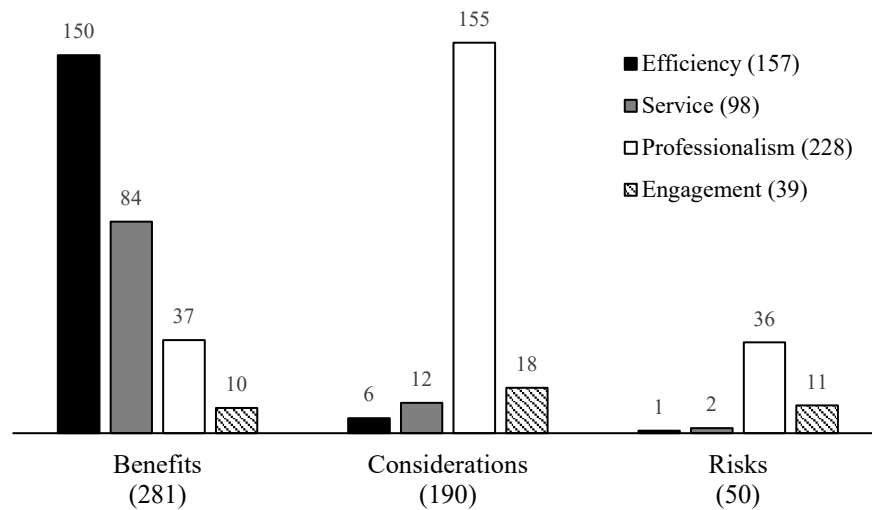
Value ideal	Category	Condensation	Empirical example
Engagement	Benefit	Citizen interaction	<i>"Just like banks, insurance companies seem to be heading towards chatbots and are focusing on automating different processes to improve customers' contact experience."</i> (Doc. #6, p. 13)
	Con-sidera-tion	Transparency	<i>"Issues relating to personal integrity and legal prerequisites for privacy protection were highlighted at WASP AI4X. Data protection, transparency, and the need to develop systems for</i>

			<i>anonymization were issues raised by several speakers.” (Doc. #9, p. 25)</i>
		Trust	<i>“The Swedish-American professor and cosmologist Max Tegmark points towards the research needed into security and dependability, and is of the opinion that this will be a deciding factor if people accept a growing role of artificial intelligence in areas where up until now there has been a need for human input.” (Doc. #3, p. 27)</i>
		Co-operation	<i>“Co-operation in research, development, data availability and competence development for AI innovation that connects needs within different value chains and sectors for joint forceful development.” (Doc. #4, p. 14)</i>
	Risk	Transparency	<i>“The risks concerning AI are not only technical, but also ethical, especially concerning applications in the public sector. The use of AI algorithms needs to be transparent and understandable.” (Doc. #10, p. 8)</i>
		Trust	<i>“Both overly optimistic faith in AI and overly pessimistic skepticism can be a threat.” (Doc. #4, p. 57)</i>
		Democracy	<i>“AI can also lower the threshold of attacks against democratic functionality, for example via misinformation.” (Doc. #10, p. 8)</i>

#### 4.2. The two dimensions integrated

In the previous section, we presented statements according to a value ideal and an inductively created category. Next, we want to present a quantified overview of these two dimensions. The purpose of this presentation is to show the relationship and explore patterns. Note that this integration focuses only on the frequency distribution of these dimensions. Figure 1 presents the distribution of the 522 statements of AI in the policy documents according to value ideals (efficiency, service, professionalism, engagement) and the inductively created categories (benefit, consideration, risk).

Fig. 1. The distribution of categories and value ideals associated with the use of AI (Toll et al., 2019).



For the inductively created categories, most statements concern benefits associated with AI (281 statements), followed by considerations (190 statements). Notably, only 50 statements concern risks.

For the value ideals, most statements fall into the 'Professionalism' value ideal (228 statements), followed by 'Efficiency' (157 statements), 'Service' (98 statements), and 'Engagement' (39 statements). 'Professionalism' is therefore the most frequent value ideal, and occurs almost six times as frequently as the least frequent ideal ('Engagement').

## 5. Discussion

In this section, we discuss our findings in relation to the analytical strategy and previous analyses of e-government policy and technology. The discussion will consider the findings from the perspectives of both the value ideals of Rose et al.'s (2015) model and the inductively created categories. As such, the discussion will act as a go-between between these two dimensions.

This study aims to investigate how AI is portrayed in a set of Swedish policy documents, and which 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 society. In the research discourse on AI, we identify a strong polarization, where some scholars describe AI as a necessity for creating and maintaining a functioning society (Gurkaynak et al., 2016), while others claim that AI is a threat to the world we live in (McCauley, 2007). In the documents analyzed in this study, we identify a strong tendency towards the former (positive) view of AI; AI is presented as a way to maintain and improve the already effective Swedish welfare system. This optimistic view fulfills many of the characteristics that Rowe and Thompson (1996) present as belonging to the optimistic view of IT.

The main finding from our analysis is that the benefits of AI are highlighted extensively (281 benefits), whereas the potential risks of AI are relatively few (50 risks). Relating these statements on

AI in the Swedish public sector to the value ideals presented by Rose et al. (2015), we conclude that most benefits relate to the increased efficiency of public sector processes. It is interesting that the discourse does not explicitly regard risks to efficiency as a result of AI; using AI to increase efficiency is seen solely as creating desirable and positive effects. There is only one statement that considers the opposite (which is the single and only risk within the efficiency value ideal). The second most frequent type of benefit concerns service quality; hence, AI is described as a way to increase efficiency, competitiveness, profit and savings, but also as a way to increase the quality and effectiveness of public sector processes. Quality and efficiency therefore seem not to be seen as competing with each other, but that AI is capable of achieving both at the same time. It is worth noting here that efficiency can be seen as an aspect of quality, and vice versa. We were aware of this in our analysis, and interpreted the statements in the policy documents at face value regarding this distinction when categorizing the efficiency and service ideals, meaning that if the word 'quality' was mentioned it was categorized as the service ideal, and words alluding to efficiency in terms of speed and productivity were categorized as the efficiency ideal. 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, in a positive and rather optimistic way, to inspire organizations to adopt and implement AI technologies.

Overall, the discourse on AI is much in line with the general discourse on digitalization in the public sector, highlighting the positive impact of different kinds of technology. In particular, technologies are promoted as means for increased efficiency and effectiveness (e.g. Chadwick & May, 2003b; Heeks & Bailur, 2007; Madsen et al., 2014; Rowe & Thompson, 1996). 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 society at large.

In spite of the purpose of promoting and inspiring 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 (Rose et al., 2015). We believe this to be a result of the particular context highlighted in the professionalism ideal: 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 redundancies in the public sector and a need for new competences. AI also requires new and different digital infrastructures, and poses questions about how the legality of public administration can be upheld. For these reasons, it is perhaps not surprising that the risks of AI highlighted in the policy documents were related to the values of the professionalism ideal, e.g. security, integrity, and misinformation. There were a great number of considerations: 190 statements out of the total of 522. A consideration – in comparison to a benefit or a risk – constitutes the neutral middle ground, and is therefore less impactful. These considerations are however of vital importance. For example, some considerations concern competence and infrastructure. The definition used for considerations in this paper is "Things that public sector actors must carefully think about and keep in mind when using AI", corresponding well to how competence and infrastructure was portrayed in the policy documents. These are also prerequisites for AI to be developed and used. If competence and infrastructural

needs are not met, this would result in something of a roadblock that jeopardizes progress. Considerations, then, can be viewed as risks-to-be, or simply as nascent risks that have yet to mature. The sheer number of considerations we identified in the policy documents (190) shows that there is widespread awareness of the potentially negative impacts of AI, even though these are not explicitly stated as risks in the documents

Based on the findings in this paper, we claim that there is a likelihood that the discourse on AI is overly optimistic and resembles previous hype on various uses of technologies in the public sector (cf. Natale & Ballatore, 2017; Rowe & Thompson, 1996). However, there are also explicit risks stated concerning AI, constituting more of a pessimistic perspective. 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 (Rose et al., 2015). 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 (Näringsdepartementet, 2017). However, in the discourse on AI we have analyzed, the values related to citizen engagement in policy making are notably absent. This finding is somewhat worrying, but corresponds to previous policy studies in the e-government field, which have found that the democratic ideals are often sidelined in favor of New Public Management ideals of increased efficiency and effectiveness (Chadwick & May, 2003; Jæger & Löfgren, 2010; Persson et al., 2017). The absence of engagement in this analysis does not necessarily indicate that engagement on a general level is overlooked. Certain technologies promote certain values more than others (Sundberg, 2019). It may be that AI as a type of technology is not capable of being – or suited to be – a technology that increases engagement. However, as chatbots and virtual assistants (such as Siri, Alexa, or Google Assistant via smartphones and smart speakers) are a common use of AI, this is something that could be investigated further through empirical studies.

Returning to the metaphor of AI winters and springs discussed in the introduction to this paper, it appears that we are indeed in the midst of an AI spring (Natale & Ballatore, 2017). 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 AI technologies are widespread and meet the high expectations attributed to them, meaning that AI is here to stay for good. An interesting difference that we see, compared to previous AI springs, is that the interest in AI is now widespread, and is seen not only in academia, but also in most sectors of a contemporary society. It also appears that AI technology is likely to become more generally applied. As AI becomes more mainstream, the expectations on this particular technology are likely to evolve and become more nuanced; therefore, it is vital that the e-government research community continues to follow this development.

Finally we would like to reflect upon the use of the model by Rose et al. (2015) as an analytical lens for this study. The model, according to Rose et al., is aimed at management and public sector managers. In spite of this, we found it to be applicable and useful as the analytical lens for our study. An initial worry we had was that the sheer number of values that exist (for example, Rutgers (2008) lists over 100 values) would be difficult to fit into just four value ideals and that there would be grey areas where it would be difficult to decide which value ideal a statement belongs to. This did occur



in a few cases, especially with more abstract statements and values that can have multiple interpretations. However, only a small number of statements were difficult to classify, with a marginal impact on the overall results.

## 6. Conclusions, limitations, and future research

In this paper, we performed a content analysis on ten 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. (2015), combined with three inductively generated categories for coding value statements in the documents. We found that;

- AI is described as an enabler of increased efficiency and effectiveness in the public sector. This reflects an optimistic view of 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 of 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 of AI is needed to create realistic expectations of 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 supplemented with additional value conceptualizations or a modified version of the current analytical lens with improved suitability for analyzing AI. A second limitation concerns the particular discourse analyzed being 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 viewpoints of trade unions, citizens, and businesses). We also see potential for investigating the discourse on AI in a longitudinal manner and seeing whether 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 dealt with AI in the same overarching manner as 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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## About the Authors

### *Daniel Toll*

Daniel Toll has a background in cognitive science and information systems, and is currently working towards his PhD in information systems at Linköping University, Sweden. His research is focused on how the use of artificial intelligence and automation technologies in public sector organizations affects society.

### *Ida Lindgren*

Ida Lindgren is an associate professor in Information Systems, Linköping University, Sweden. She conducts research on information systems development in the public-sector context. Her work is published in e.g. Government Information Quarterly, Transforming Government - People, Process, Policy, and in proceedings from several IS conferences and the IFIP Electronic Government conference.

### *Ulf Melin*

Ulf Melin is a full professor in Information Systems, Linköping University, Sweden. His research is focused on public sector digitalization. Ulf is active in several IS conferences and has published in e.g. Government Information Quarterly, Transforming Government - People, Process and Policy, International Journal of Electronic Governance, International Journal of Public Information Systems.

### *Christian Ø. Madsen*

Christian Østergaard Madsen is an assistant professor at the Research Centre for Government IT at the IT University of Copenhagen. His research concerns public digitalisation, service design, and multichannel management. He has published in Government Information Quarterly, International Journal of Public Administration in the Digital Age, the Electronic Journal of e-Government and the IFIP Electronic Government conference.