Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Information Technology and Electrical Engineering
Department of Computer Science

Sigurd Øines

Automated Government Decision Making and Citizen Rights - A review of literature and current practice in Norway

Master's thesis in Informatics: Interaction Design, Game and Learning Technology
Supervisor: Babak A. Farshchian
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Kunnskap for en bedre verden

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Abstract

In this thesis, we study the implications of the introduction of automated digital services in the public sector (e-services) in the light of *digital legibility*; the right and ability to understand such services.

We performed a structured literature review to uncover what the research can tell us about digital legibility in the context of e-services. Further, we wanted to explore this issue in the light of a real-world example and consulted documents and informants from the Norwegian public sector to understand how the principles would apply in Norway.

We have shown that e-services can bring both positive and negative implications and that there are still many unknowns, thus requiring further research. In addition, we have identified an under-researched subject area on the intersection between digital legibility and proactive digital services.

We have discussed the legal framework for digital e-services, the interplay between government obligations and e-services, and how to develop services that comply with said obligations. We have concluded that an iterative and participatory approach is needed in order to provide legible services that comply with these obligations.

Norsk oppsummering

Denne oppgaven utforsker implikasjonene av automatiske digitale tjenester i offentlig sektor (e-tjenester) i lys av 'digital lesbarhet' (eng. 'digital legibility'); retten og evnen til å forstå slike tjenester.

Vi har gjennomført en systematisk litteraturstudie for å avdekke hva forskningen sier om digital lesbarhet i kontekst av e-tjenester. Videre ønsket vi å utforske dette i lys av et levende eksempel og bestemte oss for, ved hjelp av dokumenter og informanter fra norsk offentlig sektor, å utforske hvordan disse prinsippene ville gjelde i Norge.

Vi har vist at e-tjenester kan føre med seg både positive og negative implikasjoner, og at det fremdeles er mye uvisst om dette temaet; videre forskning er påkrevet. I tillegg har vi identifisert et fagområde som er underutforsket, nemlig samspillet mellom 'digital legibility' og proaktive digitale tjenester.

Vi har diskutert det juridiske rammeverket for digitale e-tjenester, samspillet mellom myndigheters forpliktelser og e-tjenester, samt hvordan man kan utvikle tjenester som etterlever nevnte forpliktelser. Vi har konkludert med at en iterativ og brukermedvirkende tilnærming er nødvendig for å levere forståelige tjenester som etterlever disse forpliktelsene.

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1 Introduction

Governments are becoming increasingly digital, enabling new opportunities. One such opportunity is to let computers make administrative decisions, so-called *Automated Decision Making (ADM)*. Expanding on this, a fairly recent trend is to allow computers to take administrative action on their own, known as digital proactivity. In this thesis, public sector use of these two concepts will be referred to as *e-services*. These concepts have been in widespread use in the private sector for a while, but their use by governments is still in its infancy. The public sector has more obligations than the private sector, and there are still many unknowns in how the public sector should use these technologies in order to be in line with these obligations. Several challenges arise, with one prominent being whether citizens should be able to understand the e-services that they are subject to, where such a requirement needs to be met with transparency measures. Great debates have taken place among legal scholars on whether there exists a right to get an explanation or understand said explanation when subject to e-services. We will refer to this concept as *digital legibility* in this thesis. This thesis will review the status quo and hopefully provide insight into how governments should make use of these emerging technologies in order to comply with their obligations.

Example: Norwegian child benefits

> Norwegian child benefits are in about 65% of cases delivered without any human action required. The process is as follows: One computer system (the proactive) looks for newborn children in the population register, and when it decides that a mother might be eligible for child benefits, this system creates a benefit application on behalf of the mother. The automatically generated application is passed on to another computer system (the deciding) which decides if the child benefits should be awarded or not. About 95% of the applications generated by the proactive system are accepted by the deciding system.

Both of these systems are examples of Automated Decision Making (ADM). However, only the deciding system triggers a right to digital legibility; the consequences of the decisions made by the proactive system are deemed not to have a significant effect on data subjects. If the proactive system does not create an application on behalf of an eligible person, they can simply apply manually.

1.1 Motivation

Automatic case processing and proactive public services are current goals of many governments, enabled by increased digitalisation (The Norwegian Ministry of Local Government and Modernisation [KMD], 2019). These technologies are not uncommon in private enterprises, but this has not yet been widely used by public agencies (H. Scholta and Lindgren, 2019). Governments have more obligations than these private enterprises, and usage of these technologies in public administration could bring harm as well as great opportunities. Discrimination, increased social inequality, and an opaque 'black-box' society have been raised as potential detriments, while it is also argued that such services could bring decreased social inequality and better public services (Larsson, 2021; H. Scholta and Lindgren, 2019).

Proactive e-services are by some referred to as *invisible services*, this name makes the arising transparency issues apparent. How should governments be transparent about a service that ideally should not be seen? When governments implement e-services, they create an algorithmic copy of the law, which de facto replaces the law it is based on (Suksi, 2021). Proponents of digital legibility are in opposition to this black-box society, requiring systems to be understandable. Scholars and governments alike have argued the importance of trust and wide public acceptance, with further arguments that proper transparency measures can foster that trust and acceptance. Some have suggested open-sourcing the code used for e-services, but this will not provide direct transparency

to the vast majority of the population that does not understand computer code. It is evident that other means of transparency is needed.

There are great debates on what the GDPR actually says about ADM, but most scholars seem to agree that it provides some sort of right to an explanation on important automated decisions and some other general transparency obligations. Malgieri and Comandé (2017) argue that the GDPR does not merely entail a right to explanation when subject to important ADM decisions, but a right to autonomously understand 'the logic, the significance and the envisaged consequences of an algorithmic decision-making', coining the term 'legibility' in the context of ADM, specifying the need for tailored explanations on ADM decisions. As shown in the example, this right to explanation does not apply to all decisions, with proactive decision generally not being covered. We want to explore what governments can do to ensure that their services are legible and, and especially look at the implications of proactive e-services.

The research we have found on digital legibility does not explore much about how digital legibility relates to the public sector. We posit that the obligations of the public sector entail that they must be more careful than the private sector when using ADM, and want to explore the impact e-service implementation has on these obligations, with special focus on legibility. We have decided to consult the existing research by performing a structured literature review.

1.2 The context of this thesis

Research literature does not show the whole picture, especially in fast-moving fields. We, therefore, wanted to supplement the research literature with real-world practice from primary sources.

The Norwegian Labour and Welfare Administration (NAV) has in the last years completely transformed its IT department (The Norwegian Labour and Welfare Administration [NAV], 2019b). Before this transformation, software deliveries were performed through large-scale procurements with software requirements specifications. Today, they have agile in-house multidisciplinary teams with rapid and frequent releases placed in production. In addition to this, the child benefits currently managed by NAV have had country-wide proactive delivery since 1998, which could uncover some of the long-term effects of proactive service delivery. The Norwegian Government and NAV have also explicitly stated goals of more proactive and non-proactive e-services.

With this in mind, we decided to use NAV as the backdrop for providing a Norwegian real-world context to our thesis. We decided to consult primary sources such as law texts, Official Norwegian Reports, other industry reports, documents, and websites to gain insight into the political and bureaucratic goals, interpretations and current practice. Additionally, we used informants in NAV and the Norwegian Digitalisation Agency, as they could allow us to gain access to information that is not readily available to the public, and their knowledge and expertise could help us retrieve relevant documents.

1.3 Research objective and research questions

The objective of this thesis is to contribute to a democratic and sustainable development of public digital services. In order to reach this objective the following research questions need to be addressed:

- What does existing research tell us about digital legibility in e-services?
- How should e-services be developed in order to comply with the obligations of the Norwegian government?

1.4 The contents of this thesis

This thesis includes a Background section, establishing more of the background for this thesis. This is followed by a Methods section, explaining the methods for the three types of data collection, namely a structured literature review, a document review and communication with industry informants. Then, the findings from the structured literature review are presented, followed by the findings from the two remaining data collection methods. Then the findings are discussed, followed by a conclusion and recommendations for further research. Some additional information is supplied in the Appendix, and support material for the structured literature review is found in Øines and Farshchian (2021).

2 Background

2.1 Governments are digitalising which enables proactivity in services

A clear trend in governance around the world is increased digitalisation (Dunleavy, 2005; H. Scholta and Lindgren, 2019). Digitalisation enables many gains, such as reduced workload (efficiency), better services and shorter case processing times (Twizeyimana and Andersson, 2019). Having citizen data available digitally enables automating tasks previously performed by humans. If the automated task is a decision rather than just a simple task, this automation is known as ADM (Automated Decision Making) (Jennifer Cobbe, 2019; Flügge et al., 2020). A subset of ADM is *proactivity*; when an action is initiated by the computer system (H. Scholta and Lindgren, 2019). ADM and proactivity are commonplace in many private businesses, but their use in public agencies are still in its infancy (Linders et al., 2018; H. Scholta and Lindgren, 2019; Hendrik Scholta et al., 2019). Governments are distinct from private enterprises in that they need not only follow the same rules; they also have an obligation to nurture public goals, such as democracy and equality (Pieterson et al., 2005). Therefore governmental agencies are usually held to higher standards compared to their private counterparts (ibid.), and therefore need to take extra precautions when using new technology.

Proactivity is generally regarded as the next step in governmental development (Linders et al., 2018; H. Scholta and Lindgren, 2019; Hendrik Scholta et al., 2019). Merriam-Webster defines *proactivity* as 'acting in anticipation of future problems, needs, or changes' (Merriam-Webster, n.d.). This is carried over to the ICT concept of proactive service delivery, which H. Scholta and Lindgren (2019) defines as 'delivering service to a recipient without the recipient having to request for the service'. Proactivity need not be fully digitised and automated; some proactive services could be initiated by human caseworkers (Hendrik Scholta et al., 2019) however, in our context, we will use the term 'proactivity' to describe digital proactivity based on automated decisions.

NAV (2021) state that they in 2035 believe that many of NAV's services will be so-called *invisible services*, based on a definition by OECD (2020): 'proactive public services that require little to no action by the user'. This goal is shared by the Norwegian Government's 'One digital public sector' strategy, which outlines proactive services based on life events (KMD, 2019). One example of such a service is the Norwegian *child benefits*, which has been a country-spanning proactive service since 1998, with trials starting as early as 1990 (The Norwegian Ministry of Children and Families, 1998). Child benefits are automatically paid out to mothers when NAV discover that she has given birth. However, there are many exceptions where the benefit is not automatically granted, where parents still need to apply manually (Larsson, 2021; NAV, n.d.[a]).

During his case study of the Norwegian child benefits, Larsson (2021) found that digital governmental services must necessarily separate citizens into 'automatable' and 'un-automatable' groups, where the latter experience more administrative burden. He describes that since typical cases are favoured, atypical citizens have the highest risk of experiencing administrative burdens. Of the 50,463 child benefits applications he looked at, about 68% of the applications were generated proactively by the system, while 32% were submitted manually. Larsson (ibid.) attests that 'the more complex the rules of a programme are, the more difficult it would be to award it

automatically', explaining why cases using more complex criteria are still processed manually.

Larsson (2021) also established that government automation can lead to reduced street-level bureaucracy and that the citizens most reliant on street-level bureaucracy might also be the most 'un-automatable' citizens, and these are the ones least able to carry that additional burden. In his research, he found that low-income citizens were disproportionately required to apply for child benefits manually. He also states that administrative burden can impact more severely those who have fewer resources to carry them; hence automation can reinforce social inequalities. However, he concludes that citizens applying manually today through a digital application likely experience less administrative burden than they would've during the pre-digital application process.

2.2 Legal framework for proactive public services

GDPR Article 22 includes a right not to be subject to automated decision making (European Union [EU], 2016), but what counts as an automated decision under that law is still up for debate (Malgieri and Comandé, 2017). One requirement for Article 22 to come into play is that the decision 'produces legal effects concerning him or her or similarly significantly affects him or her'. Scholars have yet to agree on what should be regarded as having 'similarly significant effects' (Malgieri and Comandé, 2017; Wachter et al., 2017).

The right to not be subject to ADM is exempt if (a) the ADM is necessary for a contract between the data subject and controller, (b) the ADM is written into law, or (c) the data subject has explicitly consented to the ADM. For (a) and (c), 'the data controller shall implement suitable measures to safeguard the data subject's rights and freedoms and legitimate interests, at least the right to obtain human intervention on the part of the controller, to express his or her point of view and to contest the decision'. For (c), the law needs to '[also lay] down suitable measures to safeguard the data subject's rights and freedoms and legitimate interests', note the lack of specified required safeguards which are present in the two other exemptions. As long as the Norwegian law regarding child benefits lays down 'suitable measures to safeguard', then the ADM is permissible under Art. 22. However, what counts as 'suitable measures to safeguard' is also debated among scholars (Malgieri and Comandé, 2017; Wachter et al., 2017).

Norway has ratified the GDPR into law (The Norwegian Ministry of Justice and Public Security [Justisdept.], 2018), so all the aforementioned safeguards apply in Norway. In addition, governmental agencies in Norway need to follow the Public Administration Act (Norw. 'Forvaltningsloven') (Justisdept., 2019b). The Public Administration Act requires that decisions ('vedtak') should be understandable. This also applies to automated decisions, provided that they meet the definition of a *'decision'* (Norwegian: 'vedtak'). See excerpt from The Public Administration Act Section 25: 'The grounds shall refer to the rules on which the administrative decision is based unless the party is familiar with the rules. Insofar as it is necessary in order to enable the party to understand the administrative decision, the grounds shall also cite the contents of the rules or the assessment of the problem on which the administrative decision is based. [...] The grounds shall also mention the factual circumstances upon which the administrative decision is based.'

2.3 Trust, acceptance and algorithmic 'shadow laws'

Pieterson et al. (2005) lists essential factors for gaining (and keeping) user acceptance in ICT governmental systems, namely trust, control and privacy. They further suggest that the most critical factor is trust. Transparent policies allowing citizens to gain an understanding of how the government is processing their personal information could be a step in establishing that trust (ibid.).

Pieterson et al. (ibid.) on these extra obligations of the public sector:

> In contrast to the private sector, for the public sector, widespread acceptance of user profiling and personalized e-government services is of the utmost importance since

> public organizations have to offer their services to each citizen on an equal basis. This creates problems for citizens who lack sufficient computer skills to create, maintain, use or control a user profile, let alone to those who simply don't have any internet access. For that reason, in the public sector users should play a much more important role in developing and implementing personalized e-services then in the private sector.

When public agencies use manual processing of cases, their internal guidelines might still leave room for human discretion. However, computers require clear and well-defined rules in order to perform tasks, which means that the rules fed into ADM systems leave no room for discretion (H. Scholta and Lindgren, 2019). Therefore, when implementing fully automated services, the public agency needs to create law interpretations using simple conditional expressions. Suksi (2021) explains that when public authorities implement ADM based on existing laws (not specifically tailored to ADM), the algorithmic code produced might 'replace' the legislation enacted by Parliament. 'From that point of view, there is self-evidently a need for supervision, oversight and transparency and for ADM-adapted legislation' (ibid.).

Interpreting and understanding laws is not trivial, as a full understanding of current laws includes reading the law texts themselves, related preambles/recitals and relevant court decisions (Malgieri and Comandé, 2017). Since ADM systems in the public sector *de facto* represent a 'shadow copy' of the written law, it is important to make this interpretation accessible to the public eye in order to gain citizen's trust in the system (Suksi, 2021). As established earlier, transparency might be important in order for the public to trust the system. One might theorise that explanations based on the algorithmic code should be easier to understand for the public since they represent a condensed version of all related legal documents. If such an explanation actually is easier to understand remains to be seen, and it will differ greatly depending on the specific implementation.

The algorithms are just as susceptible to be based on wrong or outdated interpretations of the law as previous caseworker guidelines. One could speculate that the public eye spot errors earlier, if these are public by default as compared to internal guidelines that were not. However, that benefit would also arise if agencies made their previously internal guidelines available to the public. Benefits could though be reaped if the ADM description is more readily available and/or easier to understand. In addition to work on uncovering errors, the algorithms need to be updated based on that knowledge if the law and algorithm is to stay in sync, as Suksi (ibid.) writes: '[...] there must be constant willingness and ability to modify the ADM solution and the software it is running on'. Of note is the mention of 'ability to modify'. If public agencies deploy ADM systems without having people with competence to alter said systems available, they will not be able to quickly make changes to their ADM when changes in the law occur.

2.4 Digital legibility

Mortier et al. (2014) first coined the term *legibility* (for human-centric data views of data), with the following definition: 'legibility is concerned with making data and analytics algorithms both transparent and comprehensible to the people the data and processing concerns'. Malgieri and Comandé (2017) expanded upon the concept in the context of GDPR and automated decision making, defining it as 'the capability of individuals to autonomously understand the logic, the significance and the envisaged consequences of an algorithmic decision-making [...]', and they further state that this includes tailoring to the receiving individual. In this thesis, we have decided to use the term *digital legibility* to refer to this concept in order to explicitly distinguish the digital nature of this concept from other conceptions of this word.

Malgieri and Comandé (ibid.) have proposed a 'legibility test': 'we have developed a test that can both convey legibility of the architecture and of its implementation and be the basis for auditing algorithms, empowering users in black-box scenarios'. This test, however, only briefly covers aspects of presenting information to the end-user: 'Are the outputs produced in an intelligible and easily accessible form, using clear and plain language?'. What is required from the user interface in order to accomplish this envisaged *legibility* is not expanded upon.

The GDPR took effect in 2018 and aimed to provide harmonised data protection regulations across the EU/European Economic Area (EU, 2016). The GDPR includes general rights to information and insight, as well as some rules specifically regarding automated decision making (GDPR Article 22). Scholars have yet to agree fully on how these rules should be interpreted (Jennifer Cobbe, 2019; Goodman and Flaxman, 2017; Malgieri and Comandé, 2017; Selbst and Powles, 2018; Wachter et al., 2017). However, the prevalent view amongst scholars seems to be that such safeguards exist in some form, even if the specifics may be unclear (Malgieri, 2019; Veale and Edwards, 2018). As established earlier, governments are held to higher standards than private enterprises and should therefore err on the side of caution when interpreting the GDPR. Malgieri (2019) argues that the previous concept of *legibility* (which we dubbed *digital legibility*), is a requirement under the GDPR, so governments might choose to subscribe to that interpretation.

Central terms used in this thesis

- **ADM:** Automated Decision Making / Algorithmic Decision Making. A term used to describe computerised decision making. The terms *Software Robots* and *Robotic Process Automation (RPA)* are used interchangeably (Jennifer Cobbe, 2019; Flügge et al., 2020).
- **Proactivity:** Describes taking action that is not initiated by the recipient, a form of ADM (H. Scholta and Lindgren, 2019).
- **Proactive service delivery:** Delivering a service with little-to-none action required on the recipient's end, such as notifying a user of a service they might be eligible for and allowing them to apply with just a few clicks (ibid.).
- **No-stop shop/Non-interaction:** Delivering a service with no action required on the recipient's end (ibid.).
- **Digital government/e-Government/Digital-era governance (DEG):** Used to describe governmental bodies with widespread use of digital technologies, often with an organisational structure specifically adapted to support this digitalisation (Dunleavy, 2005; H. Scholta and Lindgren, 2019; Twizeyimana and Andersson, 2019).
- **E-service:** We use this term to describe digital public sector services that use ADM (both proactive and reactive services).
- **Right to explanation:** Mainly used to describe the right to ADM decisions that many scholars argue is included in the GDPR (Jennifer Cobbe, 2019; Goodman and Flaxman, 2017; Malgieri, 2019; Malgieri and Comandé, 2017; Selbst and Powles, 2018; Wachter et al., 2017).
- **Right to legibility:** Coined by Malgieri and Comandé (2017) to expand on the aforementioned right to explanation with a right to autonomously understand ADM, both before and after the decision has taken place.
- **Digital legibility:** We use this term to refer to the concept of data subjects being able to understand ADM. Use

3 Methods

Our review consists of three data sources; a systematic literature review, a document review and online conversations with informants. In the systematic literature review, several document types such as articles, conference papers and systematic literature reviews were included. In order to avoid confusion with the separate document review, the peer-reviewed publications included in our systematic literature review will mainly be referred to as 'articles'.

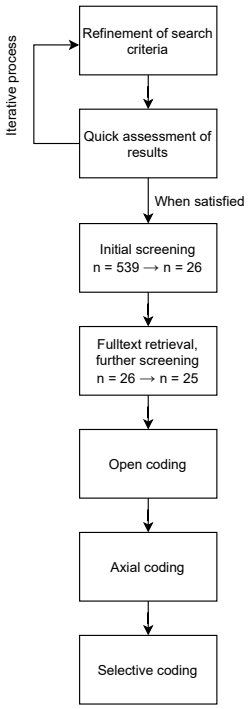

Figure 1: Brief overview of how the structured literature review was conducted.

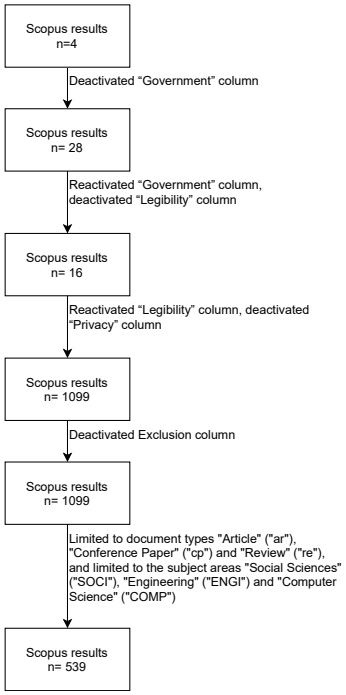

Figure 2: Brief overview of the history of the Scopus search criteria. See (Øines and Farshchian, 2021) for more details.

The use of a structured literature was chosen to provide insight into what the literature has to say about this intersection of different subject areas. The use of a structured literature review allows repeatability of this thesis, as well as re-running the search at a later point in time to observe if this body of research has evolved. Figure 1 provides an overview of how the structured literature review was conducted.

The use of document analysis was seen as paramount to providing a Norwegian context to this thesis, as there is not much peer-reviewed literature on Norwegian governmental ADM use.

3.1 Systematic literature review

We have based our systematic literature review on the guidelines from Kitchenham and Charters (2007). The main steps are 1) defining research questions, 2) defining search string and exclusion/inclusion criteria, 3) search and document retrieval, 4) data extraction, and analysis and 5) data synthesis. We also chose to specifically employ the grounded theory approach defined in Wolfswinkel et al. (2013) to extract, analyse and synthesise the data. This approach entails coding all the articles and allowing concepts and themes to emerge from the data set.

3.1.1 Definition of research questions

Our research questions were created based on an initial exploratory literature review we employed in order to identify what we believed to be a gap in the literature. The final research questions are as follows: *What does existing research tell us about digital legibility in e-services?* and *How should e-services be developed in order to comply with the obligations of the Norwegian government?*

3.1.2 Definition of search phrases and inclusion/exclusion criteria

We chose to use Scopus to perform our literature search, as it is the largest abstract and citation database of peer-reviewed literature (Mongeon and Paul-Hus, 2016).

Our search criteria were created by identifying different themes we wanted to include and making a spreadsheet column for each of these. In each column, we listed keywords related to that theme. For each of these columns, the keywords were joined with the logical OR operator creating a search string for that theme. Each of these search strings were then joined with the logical AND operator, except for the Exclusion sub-search, which was joined with the others using the logical AND NOT operator. We modified these through several iterations, at each step studying the results before making alterations. The final search is shown in Table 1. See Figure 2 for a brief overview of this process, a more detailed view is found in Øines and Farshchian (2021). In the end, we discovered that our Exclusion criteria did not make any difference on the search, so they were removed. We limited the search to only include English publications.

During the last iteration, we employed a subject area limitation and document type limitation. The subject area limitation was performed by clicking 'View All' on the Subject area search refinement taskbar in Scopus and screening through the 28 listed subject areas looking for relevancy. We then limited the search to the subject areas 'Social Sciences', 'Engineering' and 'Computer Science'. Note that documents in Scopus can belong in several subject areas. The use of 'limit to' these three meant that only articles not belonging to any of these subject areas were excluded. In our final search result, 23 of these subject areas were still represented even though this operation had nearly halved the number of documents. In addition, we limited the search to only include the document types 'Article', 'Conference Paper' and 'Review' (from the available types 'Article', 'Conference Paper', 'Book Chapter', 'Review', 'Book', 'Note', 'Conference Review', 'Editorial', 'Short Survey'), as we identified these three as the most scholarly relevant.

Table 1: Table showing the columns used in the literature search.
All keywords within each column was joined with the logical 'OR' operator, while the columns were joined with the logical 'AND' operator.

Digital Government	**Proactivity/automatic decision making**	**Legibility/ explainability**
AND	**AND**	
'Digital government'	proactivity	Legibility
'Digital governance'	proactive	Explainability
e-government	'Automated decision making'	explanation
e-governance	'Algorithmic Decision Making'	explainable
'public sector'	ADM	understanding
governmental	'Software Robots'	understand
public	'Robotic Process Automation'	
government	RPA	
DEG	'automated decision-making'	
'Digital-era governance'		

For the final search, we had total n = 539 peer-reviewed documents in our Scopus results. These documents (from now on referred to as 'articles') spanned three document types, see Table 2. The results also spanned 23 different subject areas; each article can belong in several subject areas. The three subject areas we limited the search to in the last iteration were not surprising, the three most common in our results. These are listed in Table 3, and the subtotal makes the overlap between them apparent.

The inclusion/exclusion criteria for manual screening were refined over several iterations, as shown in After making modifications, the criteria were tested on a subset of the search results to look for inconsistencies. After the criteria had become stable, the initial selection screening began. In this process, only the title, abstract and keywords on Scopus were used.

Table 2: Exhaustive list of document types included in the n = 539 Scopus results.

Type of document	Count
Article	389
Conference paper	129
Review	21
Total	**539**

Table 3: Non-exhaustive list of subject areas included in the n = 539 Scopus results.

Subject area	Count
Social sciences	347
Engineering	167
Computer science	116
Subtotal	**630**

Table 4: Inclusion-exclusion criteria

Inclusion	Exclusion
Document is an article, conference proceeding or review.	Does not cover anything related to the ICT field.
Discusses governmental use of and ADM (Automated Decision Making / Algorithmic Decision Making) / proactive digital (citizen-facing) services in an ICT context.	The paper focuses on technical aspects of Artificial intelligence (AI)
The paper is published in English	Unable to access full version of article online

After the initial manual screening based on title, abstract and keywords, we were left with n = 26 articles shown in Appendix subsection A (see Øines and Farshchian (2021) for full details). As shown in Figure 3, all except one were published in the last seven years. This, combined with the sharp upward trend, indicates that this body of research is fairly young and expanding. Of note is that three of these articles were already known to us, as we had used these for the background material, namely Flügge et al. (2020), H. Scholta and Lindgren (2019) and Srivastava and Teo (2005).

After making this selection, we began retrieving the fulltext PDF versions of these. One article was then excluded since we could not find the fulltext online (see subsection A in Appendix, or Øines and Farshchian (2021) for full details), leaving us with n = 25 articles. These are listed in subsection A as well as in Figure 5 in Appendix subsection C.

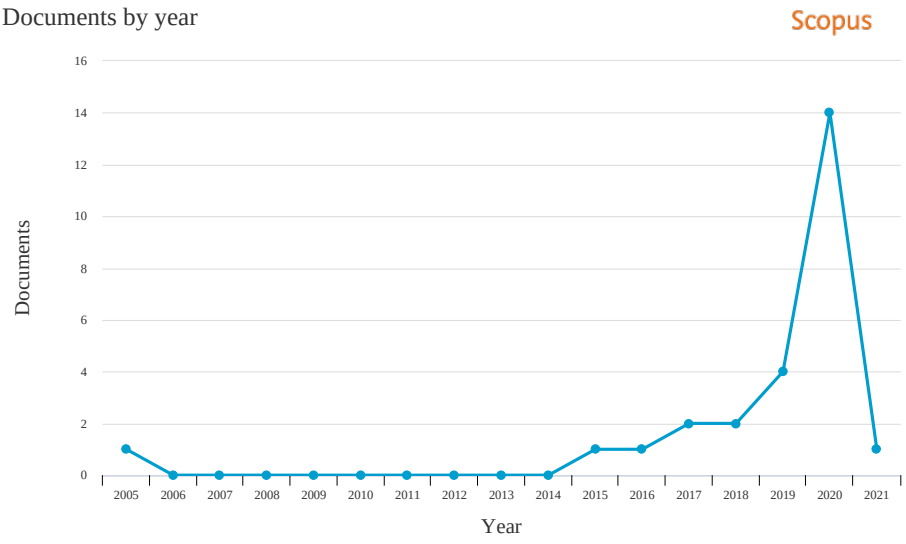

Figure 3: Year distribution of articles in literature review

3.1.3 Data extraction, analysis and synthesis

Based on Wolfswinkel et al. (2013), we began coding the articles in NVIVO, beginning with open coding, followed by axial and selective coding. During open coding, one almost blindly code the low-level concepts found in the texts. These concepts are refined during reading and re-reading, and some low-level categories will emerge, but some codes will still be uncategorised. During axial coding, the codes and low-level categories from open coding are further categorised into higher-level core categories. Selective coding is a highly mental effort, where the researcher identifies and theorises relations between the core categories. This process allows the data to speak for itself, as the process begins by 'blindly' coding the data, with most of the theorising happening at the later stages. During this process, the data presented in our Findings emerged, as well as the theories discussed in our Discussion.

3.2 Document analysis

In addition to looking at peer-reviewed articles, we have also looked through many documents regarding ADM, proactivity, digitalisation and public administration in Norway. Some of these documents were obtained through an exploratory search, while others were sent to us by informants. These are shown in Table 5 in Appendix. Some documents were coded in NVIVO, but this was not feasible nor appropriate for all documents. The three documents that were coded, namely Den Norske Dataforeningen and Norstella (2019), Røstad and NAV (2020) and NAV (2021), were deemed to provide a relevant baseline understanding without representing unnecessary work. NAV (2021) includes several segments not strictly relevant to ICT, and these parts were just read through without thorough coding to save resources.

This coding happened early on when scope of this thesis was still unclear. A simple thematic analysis was performed in NVIVO, identifying themes in the data. This allowed us to gain a baseline understanding of the public sector stance on this subject area. Later on, the documents were read with these themes (and partially the themes from the structured literature review) in mind, highlighting and collecting relevant excerpts. These excerpts were organised in a mind map, based on the structure from the thematic analysis, which allowed the interrelations to become clear.

3.3 NAV & Digdir Informants

During the course of this study, we communicated with six informants in NAV IT through digital textual communication channels. The informants had the following roles: developer, researcher, product owner, jurist, business architect and IT architect. The author had a summer internship in NAV IT during the summer of 2020 and therefore knew some employees. We sent open questions mainly based around the proactive nature of child benefits, some directed at whole NAV teams, while others were sent to specific informants. Some questions asked specifically for help obtaining documents, while others were more general about information relating to NAV we could not find online. Even though no personal information (other than names and job titles) were collected, these exchanges were treated confidentially, and the informants were granted full anonymity.

Early on in the thesis, we also had some communication with an informant working as a senior adviser in The Norwegian Digitalisation Agency (Digdir), which provided general pointers to data sharing and digitalisation development in Norway. We came in contact with this informant through a research project the thesis supervisor is involved in.

4 Findings from literature review

4.1 Lacking research and information on use of e-services

Several articles call for more research on governmental ADM (J. Cobbe, 2019; Kuziemski and Misuraca, 2020; Robinson, 2020), and especially on proactive governments (Kuhn and Balta, 2020; H. Scholta and Lindgren, 2019; Sirendi, Mendoza et al., 2018; Sirendi and Taveter, 2016). Kuhn and Balta (2020) points specifically to the interplay of non-interaction and service quality, and Sirendi, Mendoza et al. (2018) point to the lacking discussions on 'how to best design and roll out proactive public e-services within society'.

The term 'legibility' is not widely used in the articles included in the systematic literature study; the only usage of that term is when Kaminski (2019) and J. Cobbe (2019) cite Malgieri and Comandé (2017). The term 'right to explanation' is, however, used in several articles.

4.2 What is ADM/proactivity

Several articles (J. Cobbe, 2019; Gacutan and Selvadurai, 2020; Kaminski, 2019; Rizvi et al., 2017; Sovrano et al., 2020) quote the GDPR Art 22. definition of ADM. EU (2016):

> [...] a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.

Some articles mainly discuss 'ADM' in the context of AI decision-making (J. Cobbe and Singh, 2020; Henman, 2020; Kuziemski and Misuraca, 2020; Langford, 2020; Robinson, 2020; Sovrano et al., 2020), while other articles discuss all computerised decision making (rule-based and AI) (J. Cobbe, 2019; Flügge et al., 2020; Gacutan and Selvadurai, 2020; Goad and Gal, 2018; Kaminski, 2019; Kuhn and Balta, 2020; Ranerup and Henriksen, 2020; H. Scholta and Lindgren, 2019; Shadowen et al., 2020).

H. Scholta and Lindgren (2019) use the terms *attentive government* and *no-stop government* for different levels of proactivity. With the former, the government acts proactively, but the citizen has to give explicit consent to accept a service. With the latter, the service is delivered without any action on the part of the citizen. Kuhn and Balta (2020) uses the term *non-interaction* to describe what H. Scholta and Lindgren (2019) refers to as *no-stop*. Erlenheim et al. (2020) describes this concept as 'background life-event-based services'. These levels of proactivity are opposite from what Erlenheim et al. (2020), Kuhn and Balta (2020), H. Scholta and Lindgren (2019) and Sirendi, Mendoza et al. (2018) refer to as the *reactive government*, where the government only acts after the recipient has taken explicit action. H. Scholta and Lindgren (2019) states that mandatory proactive services should either be obligations or be rights with clear benefits and no disadvantages to the recipient.

H. Scholta and Lindgren (ibid.) further argue that no-stop governments need not care about usability, as information is only transmitted from the government to the citizen, there is no need for interactivity on the citizen's part.

4.3 GDPR right to explanation

All articles included in the systematic literature study that mention this right conclude that this right exists (J. Cobbe, 2019; Gacutan and Selvadurai, 2020; Goad and Gal, 2018; Henman, 2020; Kaminski, 2019; Sovrano et al., 2020). However, their research shows large uncertainties in what this right entails (Gacutan and Selvadurai, 2020; Kaminski, 2019).

The GDPR includes a right challenge a decision based on contractual obligations or explicit consent (EU, 2016), and Gacutan and Selvadurai (2020) suggest that 'such a right to explanation is critical to give effect to an individual's right to challenge decisions that affect him or her' and that 'an

absence of such a right to explanation in the age of AI serves to substantially undermine the effectiveness of a right to review or challenge decisions'. Gacutan and Selvadurai (2020) also state that the legal literature justifies a right to explanation 'on the basis that an individual adversely affected by an automated decision has the right to "understand why"' framed in 'deontological terms of control and dignity as a human being'.

4.3.1 How to make an understandable explanation?

No articles state that they have a solution to this problem.. However, several have suggested broad qualities of these explanations and how they should come about. The need for tailored, human-centric explanations have been argued by Golbin et al. (2020), Malgieri and Comandé (2017), Sirendi, Mendoza et al. (2018) and Sovrano et al. (2020). Kaminski (2019) state that several scholars have suggested allowing the recipient to tinker with a simulation of the service before the actual decision-making takes place. Iterative human-centric processes such as participatory design, collaborative governance, co-creation have been suggested as strategies to ensure better and more understandable services (Erlenheim et al., 2020; Flügge et al., 2020; Golbin et al., 2020; Kaminski, 2019; Pieterson et al., 2005; Shadowen et al., 2020; Sovrano et al., 2020).

4.4 Public agency laws - right to understand the government

J. Cobbe (2019), Gacutan and Selvadurai (2020) and Henman (2020) argue that since public agencies are bound by some sort of public administration act, all decisions these agencies make are bound by such laws, regardless of how that decision was reached. Gacutan and Selvadurai (2020) and Henman (2020) further argue that a right to explanation for government ADM decision can be derived from the right to challenge said decision; you need to be able to understand a decision in order for the right to challenge it to be valid. The obligation states have to uphold citizen dignity has also been used as an argument for a right to explanation (Gacutan and Selvadurai, 2020; Kaminski, 2019; Langford, 2020).

4.5 Threshold for GDPR definition 'automated decision'

GDPR Art 22 only applies to 'a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her' (EU, 2016).

What is 'solely based on automated processing'? J. Cobbe (2019) and Kaminski (2019) maintain that in order for a decision not to be 'solely based on automated processing', a human decision-maker with the authority and ability to change the decision must perform something more than just superficial analysis when reviewing a decision made by ADM. J. Cobbe (2019), Gacutan and Selvadurai (2020) and Kaminski (2019) all quoted the Article 29 Data Protection Working Party (2018) as a source for regulatory interpretation of this wording:

> To qualify as human involvement, the controller must ensure that any oversight of the decision is meaningful, rather than just a token gesture. It should be carried out by someone who has the authority and competence to change the decision. As part of the analysis, they should consider all the relevant data.

Gacutan and Selvadurai (2020) claim that the GDPR right to explanation is overly narrow, as this opens the potential for decisions with an element of human intervention to be opaque. They reason that it is not readily apparent to the subject 'what aspect of the decision has been made using automated processes and which component has been made by a human or being the subject of human oversight'. They further propose that Australia should adopt an 'expansive definition of "AI decision" to enable the right of explanation to provide meaningful assistance to

individuals affected by both automated and semi-automated decisions generated by government and commercial entities'.

What counts as 'which produces legal effects' or 'similarly significantly affects him or her'? The GDPR does not specify what this entails (J. Cobbe, 2019; Gacutan and Selvadurai, 2020; Kaminski, 2019). Gacutan and Selvadurai (2020) explains examples from the GDPR Recital 71 and the Article 29 Working Party Guidelines, such as 'refusal of an online credit application and e-recruiting practises without any human intervention[...], decisions that affect financial circumstances, access to health services, access to education, deny employment or put someone "at a serious disadvantage"' (ibid.). Kaminski (2019) agrees that the denial of a loan is a significant effect but notes that whether being subjected to targeted advertisement fulfils that requirement has been subject to debate. J. Cobbe (2019) assert that 'clearly, many decisions made by public bodies are likely to have "legal or similarly significant effects" concerning the data subject'.

4.6 Equality and fairness

J. Cobbe (2019) cites the GDPR's first data protection principle: Article 5(1)(a) (EU, 2016):

> 1. Personal data shall be:
>
> > (a) processed lawfully, fairly and in a transparent manner in relation to the data subject ('lawfulness, fairness and transparency');
> > [...]

It is argued that ADM can lead to discriminatory decision (J. Cobbe, 2019; J. Cobbe and Singh, 2020; Corbett-Davies et al., 2017; Doski, 2015; Flügge et al., 2020; Fortes, 2021; Goad and Gal, 2018; Golbin et al., 2020; Henman, 2020; Kaminski, 2019; Kuziemski and Misuraca, 2020; Langford, 2020; Rizvi et al., 2017; Robinson, 2020; Shadowen et al., 2020; Sovrano et al., 2020; Wang et al., 2020). On the other hand, H. Scholta and Lindgren (2019) argues that proactive service delivery (attentive government & no-stop government) can potentially increase democratic values such as equality, responsiveness, availability and social inclusion by reducing the information imbalance between users. They further assert that a no-stop government can ensure these democratic values, as services are delivered without any action or consent from the recipient (they compare this to an attentive government, where the recipient can forget or ignore the government's recommendation). Roughly in line with this sentiment, Robinson (2020) explains what he found in the Norwegian AI Policy document:

> The guide asserts ADM and automation can promote equal treatment of citizens seeking services, and through consistent implementation of regulations, will prevent unequal practice. And when decisions about grant benefits are automatically decided when conditions are met, it enhances the implementation of rights and obligations, especially for the most disadvantaged in society.

Golbin et al. (2020) discussed how grades in the UK were predicted using historical data, which resulted in primarily lowering the grades of students from lower-income neighbourhoods, as some of these schools have had a poor historical performance. This resulted in significant uproar (ibid.). In his words:

> Can a model be used to predict students' scores? Perhaps. Should it be used to determine them? Perhaps not.

4.7 Trust, transparency, acceptance

4.7.1 Algorithmic transparency

Opacity is the opposite of transparency, so looking at what the literature says about algorithmic opacity can help us learn about algorithmic transparency. J. Cobbe (2019) introduces three types of algorithmic opacity; intentional opacity, illiterate opacity, and intrinsic opacity. In the first one, 'the system's workings are concealed to protect intellectual property'. The second is described as 'a system [that] is only understandable to those who can read and write computer code'. Goad and Gal (2018) problematise this sort of opacity, as the 'logic is black-boxed from most of the population and, in most cases, from the businesses, people, and communities whose lives are impacted by ADM'. In the third, 'a system's complex decision-making process itself is difficult for any human to understand' (J. Cobbe, 2019). Goad and Gal (2018) describe the latter in the following excerpt: 'In some cases, the development of ADM unfolds over time, through multiple design iterations and the use of patched code by multiple programmers. In these cases, the algorithmic logic is hard to decipher, even for those who were involved in its development. As a result, often even data scientists cannot explain how the ADM application that they have built makes a prediction or comes to a decision.' J. Cobbe (2019) specifies that these types of algorithmic opacity might also be combined. She concludes that 'The result of algorithmic opacity is that an automated system's decision-making process may be difficult to understand or impossible to evaluate even for experienced systems designers and engineers, let alone non-technical reviewers. In many cases, it will be virtually impossible to determine how or why a particular outcome was reached.'

4.7.2 Trust and acceptance

Srivastava and Teo (2005) states that 'trust emerges as a major enabler of e-Government acceptance and adoption by citizens'. Research on trust in automated decision making has found that two different outcomes; algorithmic aversion, where people trust human decisions more than algorithmic decisions even when the algorithm makes more accurate predictions, and algorithmic deference, where people mindlessly trust computer decisions (Fortes, 2021; Henman, 2020; Wang et al., 2020). Robinson (2020) asserts that equality through fair ADM has a reciprocal effect on trust; citizens that trust their government allows for fast adoption of new ADM, and if citizens discover that the implementation is indeed equal and fair, their trust in the government will be upheld or even further strengthened. Robinson (ibid.) also pointed to the increasing income inequality in Nordic countries; which, stating that research indicates that income inequality leads to a decline in trust. He further states that restoring said lost trust is hard, even when citizens are aware of the benefits increased trust would bring.

Goad and Gal (2018) and Kuziemski and Misuraca (2020) call for more research on the relationship between governmental ADM and government legitimacy, citizen empowerment and acceptance.

4.7.3 More transparency not necessarily better

However, more transparency does not necessarily lead to improvements and more acceptance (J. Cobbe, 2019; Flügge et al., 2020; Goad and Gal, 2018). Goad and Gal (2018) discusses 'the myth that is organizational transparency' and argues that information does not necessarily equate to insight and that transparency does not necessarily equate to information. He points out that research on the allocation of public health care resources in Sweden found that greater transparency did not necessarily guarantee procedural acceptance or decision acceptance. Goad and Gal (ibid.) also explains that if citizens don't like what they discover when they gain an increased understanding of an organisation this has the potential of leading to loss of trust and acceptance.

Other effects can also come from increased transparency, as Gacutan and Selvadurai (2020) describe that by knowing the algorithm, individuals may identify ways to trick the system to their own advantage, and that such transparency has the potential to subvert the efficiency and fairness

of the ADM. J. Cobbe (2019) presents the seemingly counter-intuitive finding that 'increased transparency over the internal workings of [ADM] models seems to reduce people's ability to detect even sizeable mistakes'. And Goad and Gal (2018) further explains that 'it has been argued that increased information can lead to a distancing of individuals from their surroundings, making them less capable of comprehending the world in which they live'.

J. Cobbe (2019) concludes that significant further research is required on mandating ADM transparency, as well as the development of tools for exercising meaningful review.

4.8 Legal

4.8.1 GDPR legal basis for processing

As established earlier, GDPR allows ADM under three distinct legal bases; (a) contractual obligations, (b) the ADM is written into law, or (c) explicit consent from data subject. J. Cobbe (2019) declare that public bodies should generally not use consent as the legal basis, and if they do, refusal to consent should not detrimentally affect the individual in question. She quotes GDPR Recital 43 (EU, 2016):

> consent should not provide a valid legal ground for the processing of personal data in a specific case where there is a clear imbalance between the data subject and the controller, *in particular where the controller is a public authority* and it is therefore unlikely that consent was freely given in all the circumstances of that specific situation.

Kaminski (2019) asserts that for consent to be a valid legal basis for ADM, the individual must 'understand exactly what they are consenting to' (Article 29 Data Protection Working Party, 2018). Kaminski (2019) explains further:

> If a company does not adequately communicate to an individual both the purpose of data processing and information about the use of data for automated decisions, then consent may be deemed invalid. This again incentivizes disclosure of a particular kind: the kind individuals can meaningfully understand that contributes to individuals' ability to give or withdraw consent under the GDPR.

4.8.2 ADM does not support discretion

J. Cobbe (2019) states that when using discretionary powers, the decision-makes should 'take individual circumstances into account', 'make each decision on its merits rather than adopting a one-size-fits-all approach' and 'be prepared to depart from policies or guidelines where appropriate'. H. Scholta and Lindgren (2019) puts forward a similar definition of discretion. J. Cobbe (2019) further explains that since machine learning typically uniformly applies a single statistical model to all decisions, the decision-maker might be fettering its discretion when using machine learning for decisions, and that such use of machine-learning may be inappropriate for decisions where discretion is needed. 'Since many areas of public administration involve discretionary powers, this is a potentially significant problem for the use of ADM in those areas. It may be the case that their use in such circumstances is unlawful' (ibid.). This concern is also recited by Ranerup and Henriksen (2020):

> The 2020 study [Zouridis et al. (2020)] suggests that the increased use of automated decision making (system-level bureaucracy) could mean the end of decision-making discretion.

H. Scholta and Lindgren (2019) claim that a no-stop government allows for no discretion, since proactive service delivery is only applicable only to services with clear-cut assessment criteria for service eligibility. This is supported by Sirendi and Taveter (2016), describing how child benefits in Estonia cannot be fully proactively provisioned, as there are overlapping eligibility criteria.

Kaminski (2019) argues that the need for decisional discretion and individual process rights on the basis of not just error prevention, but on the need to 'adequately recognise and respect individuality'. Corbett-Davies et al. (2017) and Fortes (2021) argue the need for human discretion in the US criminal justice system, as relying completely on automated scores fails to capture all aspects of the case. Langford (2020) on the effects of lost discretion:

> [On algorithmic governance in the welfare state] Harlow and Rawlings worry that "the good governance triad of transparency, accountability and participation may be restricted, even reversed," especially through the loss of reason-giving and discretion.

4.8.3 Need for laws better suited for e-services

Rules for social services are not wholly schematic, and might even contradict each others (Ranerup and Henriksen, 2020). For a fully proactive no-stop government to be possible, the rules need to be rewritten with clear-cut eligibility criteria (H. Scholta and Lindgren, 2019). Another aspect of the law not compatible with full proactivity is that in many cases current laws do not allow delivering a service to a recipient without their explicit consent (ibid.). 'If proactive service delivery is wanted, legislators have to reformulate laws to make service delivery without a recipient action possible.' (ibid.)

Tightly related to explicit consent is the concept of free will and autonomy. Sirendi, Mendoza et al. (2018) cites a stakeholder in the Estonian Ministry of Economic Affairs and Communications, which stated that 'providing a public service [today] is based on a voluntary will. [If] you do not want a service, it is not provided to you because actually there are people who do not want a service because, for example, they do not want to admit the disability of their child.'. H. Scholta and Lindgren (2019) also touch on this, by discussing the difference between compulsory and voluntary public services. They state that in a 'no-stop government' context, 'proactive and predictive delivery are possible only for compulsory public services'. They further state that 'These services should be obligations or - in case of rights - provide clear benefits and no disadvantage to the recipients, since a no-stop government delivers services without recipient consent.' Kuhn and Balta (2020) also discuss the benefits and disadvantages of proactive non-interactive services: 'proactive, non-interactive public student loans in Germany would spare the beneficiary the application effort, but also cause him or her an automatic debt that has to be paid back later.' H. Scholta and Lindgren (2019) on the difference between compulsory and voluntary services (our highlighting):

> Interestingly, the no-stop government highlights the difference between compulsory and voluntary public services, i.e. lack of exit. The attentive government can make suggestions for both voluntary and compulsory services, since the final decision to receive a service is made by the recipient. However, since a no-stop government delivers a service without an explicated recipient decision, proactive and predictive delivery are possible only for compulsory public services. For example, every citizen with an income may have to submit a tax return (implementable in proactive delivery) whereas marriages are voluntary (not implementable in proactive delivery). *This aspect is also related to viewing the service recipients in terms of being citizens, rather than consumers. As stated above, an attentive government supports the fulfilment of a citizen's rights and obligations and the accessibility to the government by suggesting services to citizens.*

4.8.4 Right to legibility on proactive e-services

We classified all articles from the literature (see Figure 5 in Appendix) and discovered that none of the included articles discussed both the right to explanation and proactivity in a meaningful way. The issue of digital legibility on proactive e-services is therefore not explained in detail in our data.

5 Findings from document analysis & informants

5.1 Data sharing and life events

A prerequisite for proactive services is having the necessary information available, and today, citizen's data are stored within different governmental bodies, with little data sharing between them (Den Norske Dataforeningen and Norstella, 2019). Different laws and regulations restrict for which purposes data can be used, which limit opportunities for automated digital services (ibid.).

In 2014, the Norwegian government made 'Digital by default' (Norwegian: 'Digitalt førstevalg') official policy, which meant that electronic communication should be the primary means by which the government communicates with its citizens (The Norwegian Agency for Public Management and eGovernment [Difi], 2014). This was later followed up by the recent digitalisation strategy for 2019-2025 named 'One digital public sector' (KMD, 2019). It states, 'The public sector shall share data when it can and protect data when it must' (KMD, 2019, p. 20). This strategy does not merely allow the public sector to share data; it makes data sharing mandatory. As a follow-up to this strategy, The National Resource Center for data sharing was opened in September 2020 (The Norwegian Digitalisation Agency [Digdir], 2020b).

One Digital Public Sector points to the need for more competence and knowledge (KMD, 2019, p. 22):

> There is a need for enhanced competence in regulations and frameworks for data sharing and in the relationships between law and technology, and between business and management models. There is also a need for more knowledge of how infrastructure in both the central and local government sectors can be adapted for data sharing. There is a need for an arena that can help data owners and users in this area and that can facilitate the exchange of experience in the public sector. Such an arena will be important in connection with developing seamless services, cross-sector digitalisation projects and work on more digitalisation-friendly regulations.

Central in the strategy are seven life events, where services should be proactive (Digdir, 2020a; KMD, 2019):

- Having children (Ministry of Labour and Social Affairs)
- Having a seriously ill child (Ministry of Health and Care Services)
- Losing and finding a job (Ministry of Labour and Social Affairs)
- New in Norway (Ministry of Education and Integration)
- Death and inheritance (Ministry of Local Government and Modernisation)
- Starting and managing a voluntary organisation (Ministry of Culture and Equality)
- Starting and managing a business (Ministry of Trade, Industry and Fisheries)

KMD (2019) assigns these life events to one single ministry, which has the responsibility for that event. Røstad and NAV (2020) use the term 'life situation', and show how the several events that

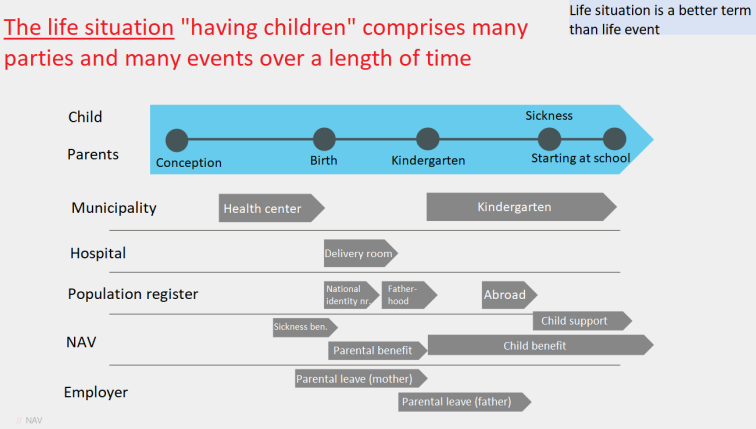

Figure 4: Life event 'Having children', from Røstad and NAV (2020). Translated

comprise this situation span several governmental actors, including municipalities, hospitals, the National Population Register, NAV and the employer (see Figure 4). In order to properly fulfil the goal of proactively delivering services to support a life event like this, information needs to flow efficiently between the relevant actors (KMD, 2019, p. 47).

5.2 The impact of NAV's e-services

NAV (2021) (with our highlighting):

> The opportunities NAV can and should use must comply with the legislation, including data protection rules, ethics, and social acceptance. Some people predict that there may be a delay in the use of algorithms and data-driven services due to greater attention to issues such as discriminatory outcomes of algorithms or *that the outcomes cannot be explained*. As the most important actor in the field of welfare, it will be particularly important for NAV to have an *ethical and responsible approach to the use of data-driven services with a broad acceptance in the population.*

NAV (ibid.):

> Information and communication technology currently have a pervasive and transformative effect on society. Digitalisation brings with it many new opportunities but also several changes that can put society and the 'Norwegian model' to the test.

5.3 Changes in the Labour and Welfare Administration Act

In December 2020, a new addition (§ 4 a) was permanently added to the Labour and Welfare Administration Act ('NAV-loven'), which grants NAV the right to process any personal information when such processing is required in order to fulfil its obligations (The Norwegian Ministry of Labor and Social Affairs [ASD], 2020a). The addition also granted the right to perform decisions solely based on automatic decision making. The processing needs to ensure the affected party's right to fair (Norwegian: 'forsvarlig') case processing and be in line with the GDPR. Automatic decisions based on discretionary terms in law or regulations is prohibited unless the decision is unequivocal. The affected party was also granted a right to a manual review of the automated decision.

This permanent law change followed a regulation temporarily granting these rights from the 29th of April 2020 to the 31st of December 2020 (ASD, 2020b). This temporary regulation was grounded in increasing efficiency to handle the increased workload caused by the COVID-19 pandemic.

5.4 Duty to notify

Recipients of Norwegian child benefits have a duty to notify NAV 'as soon as possible' about changes in several personal matters. To provide an example, a decision letter for child benefits is appended, these duties are found in Appendix subsection D Figure 9. These duties to notify are included on most benefits that NAV delivers, see NAV (2019c, n.d.[b],[c],[d]) for some specific examples. A NAV informant confirmed that NAV.no does not contain a single view listing all these duties triggered by different benefits. Therefore, a user that receives several benefits need to consult several pages/documents at NAV.no in order to see all the duties to report they are currently bound by.

A NAV informant said that these duties are only actively sent to recipients when a decision is made, giving the example that a recipient of child benefits might not have seen the list of these duties the past 17 years unless they have actively consulted the decision notice. The informant also stated that a lot of people do, in fact, forget the duty to notify on child benefits, which leads to many cases where NAV has to recollect payments the recipients were not eligible to receive.

5.5 Legal basis for processing

Den Norske Dataforeningen and Norstella (2019) states that consent is not a valid legal basis for processing for exercising public authority. However, before publishing, a notice was added stating that the expert group discovered that not all members supported this interpretation (translated):

> It has come to light that there is disagreement among the experts in the group on whether or not public authorities can use consent as a legal basis for processing in some specific occasions where public authority is being exercised or when making an individual decision ['enkeltvedtak'].

They further explained that during the short time frame of the project, they were unable to come to an agreement, and they call for further work to clarify how this should be interpreted.

Paraphrased definition of an 'individual decision' ('enkeltvedtak') (Justisdept., 2019b):

> a decision made in the exercise of public authority which generally or specifically determines the rights or duties of one or more specified private persons (individual persons or other private legal persons)

5.6 Caseload of proactive service

A NAV informant told us that 'roughly estimated, about 80% of the total caseload on child benefits is processed manually'. The informant provided some examples of what the total caseload includes: applications, reassessment, appeals, claiming back benefits.

5.7 Discriminatory child benefits

A NAV informant also told us that Norwegian child benefits are gender-discriminatory. By default, the benefits are awarded to the child's mother. Parents have to apply manually if they want the money to be transferred to the father or split equally between them.

5.8 Current laws requiring actively applying for benefits

A NAV informant informed us that most laws governing Norwegian benefits specifically require the recipient to actively apply for the said benefit, so law changes are needed in order to create

'no-stop shop' proactive services. This is also documented at length in Den Norske Dataforeningen and Norstella (2019). A NAV informant suggested that a possible proactive solution within today's laws is *nudging*, where the system notifies the citizen with a suggestion to apply, and the user only has to click one button in order to submit the application.

5.9 New Norwegian Public Administration Act

A new Public Administration Act was enacted in 2019 (Justisdept., 2019b), and as part of the preparatory work for that law change was an Official Norwegian Report discussing this change and future issues facing the public administration (Justisdept., 2019a).

This report explicitly states the importance of transparency, accessibility and understanding (Justisdept., 2019a)(translated):

> **10.8.3 The public administration shall be transparent, accessible and understandable**
>
> A transparent, accessible and understandable public administration makes it easier for people to contact it with questions, requests and applications. It will contribute to people receiving services they are eligible for and permits that they may have a legitimate expectation of. Third parties being able to inspect the inner workings of the public administration has a rearing effect on the administration and a demystifying effect on the citizen. The more transparent the administration is, the fewer activities can be kept from the public eye.

The following six paragraphs are paraphrased and translated from the Official Norwegian Report Justisdept. (ibid.)

Creating an ADM system entails creating a legal specification based on laws and regulations, which is then transformed to algorithms and later program code. For each of these transformation steps, there is a possibility that something gets lost in translation. The question is whether or not the specification created by the jurists is what was actually created by the software developers.

Related to the publishing of the logic involved is online simulation of decisions. The citizen can fill in their information and immediately known the plausible outcome. This simulation will be built on the same program code used in the real decision. Such a solution affords predictability and can inform people that otherwise wouldn't have had the prerequisites necessary to understand the laws and regulations.

Human caseworkers will to some degree be able to determine the legality of a written instruction for case processing. This will not happen with ADM, and faults in the instructions must be discovered at other stages. The report exemplifies routine inspections, or when decision outcomes are challenged or amended. By the time a fault has been discovered, it could have made heaps of formal decisions based on this fault.

Pseudocode will give a more precise description of the system logic than natural language, as pseudocode is a formalisation of natural language, clarifying the logical and arithmetic operations. The pseudocode should be accompanied by explanations in natural language where necessary. Pseudocode will probably satisfy the GDPR requirement to inform about the data used and the logic involved.

The documentation shall point to the laws and regulations that it is based on and explain the terms and concepts in use. The documentation should be especially thorough when describing how interpretation doubt is handled and if and how discretion is handled.

Documentation based on pseudocode will not necessarily perfectly present how the system works. More precise information may allow more thorough control, but such control would necessitate subject matter expertise on behalf of the reader, limiting the added value by publishing such information. Some logic of the system might also be deliberately kept away from the public, such

as fraud detection software. Disclosing the logic of fraud detection would enable manipulating and circumventing the system. Open-sourcing the code can also make the system an easier target for attackers.

5.10 NAV user participation

The 'Strategy for user participation in NAV' was published in late 2018 and followed up by the following words from the leader of the central user committee in the Labour and Welfare Administration (NAV) (translated) (NAV, 2019a):

> A long-lasting, exciting and educative project has culminated in a 'Strategy for user participation in NAV'. As user representatives, we have witnessed an enormous increased interest in user participation and user cooperation in NAV in the last two to three years. It is completely new that NAV - in cooperation with user participants - develops a platform for participation.
>
> It is a milestone and represents a cultural shift that user representatives and NAV employees - on all levels - through more than a year and through several large participation arenas have placed the user perspective in the driver's seat, and this strategy is meant to support this shift and all the great active work.
>
> In this way, a common understanding of why and how user participation is important and can be beneficial to all parties is created. User competence and professional competence is participating on an equal basis and this will gradually be felt, embodied in better user interactions and better, and more correct, services in all arenas when users meet NAV. It is, therefore, important that the 'Strategy for user participation in NAV' is discussed everywhere in NAV and in all departments of the Ministry [of Labour and Social Affairs] and that good implementation throughout NAV is ensured.
>
> This project was initiated by the central user committee, and we will keep working to ensure that this great cooperation in the user's best interests continues and becomes a 'spinal reflex' [second nature] in NAV. Great gratitude is extended to the top management with the Director-General of Labour and Welfare Sigrun Vågeng, who has spearheaded the support for this project, participated in the whole process and contributed to an exceptionally good collaborative environment.
>
> Oslo, February 2019
> Elin Stoermann-Næss
> Leader of the central user committee in the Labour and Welfare Administration (NAV)

The background work for this strategy mentions that user participation has been explicitly required by the Labour and Welfare Administration Act since the inception of NAV in 2006 (NAV, 2019a). But, according to Stoermann-Næss, the large-scale focus on user participation is a relatively new phenomenon. This coincides well with the pivot to highly iterative work that NAV has performed during the last few years (NAV, 2019b).

The strategy outlines several goals for how user participation in NAV should be conducted in order to create better services. The strategy calls for NAV to develop knowledge and methodologies on user participation, enacting a culture of participation and good facilitation of user-driven service development.

Select goals from the strategy (translated) (NAV, 2019a):

> An open and participating NAV - Openness and participation must be central to NAV and information need to be accessible and transparent.
>
> [...]
>
> Services are developed in a systematic way together with user representatives and user contributors, and new solutions are created together

[...]

User participation is central to the development of digital services, and NAV must facilitate good and tailored participation in the system development process.

[...]

Increased awareness about simpler, easy-to-read and user-tested language.

6 Discussion

6.1 Legal ambiguity regarding digital legibility

Several articles in our review conclude that a right to digital legibility for e-services can be derived from the GDPR (J. Cobbe, 2019; Gacutan and Selvadurai, 2020; Goad and Gal, 2018; Henman, 2020; Kaminski, 2019; Sovrano et al., 2020), and that such a right can be argued from the obligations of the public sector (Gacutan and Selvadurai, 2020; Henman, 2020; Kaminski, 2019; Langford, 2020). And the Norwegian Public Administration Act requires 'individual decisions' grounds to be understandable (Justisdept., 2019b). However, these rights do not always apply. In the case of GDPR, the decision in question needs to have a legal or significant effect, and what precisely this means is still unknown. The requirement for understandable grounds in the Public Administration Act only applies to decisions following its definition of an 'individual decision'.

A decision to perform a proactive act might not fulfil these requirements, and therefore not covered by this right to digital legibility. In our structured literature review, not a single article discussed both digital legibility and proactivity in a meaningful way, indicating that this is an under-researched area.

6.2 Governmental obligations

Both the scholarly community (see subsection 4.7) and NAV (see subsection 5.2) point to the importance of broad public acceptance for e-services, with some stating that transparency could foster this acceptance. The research shows that transparency only matters if the materials are accessible and understandable (i.e. legible). Researchers and Justisdept. (2019a) explained that transparency could enable misuse. Research further showed that transparency can reduce trust and acceptance if citizens don't like what they discover when transparency uncovers the inner workings of an organisation. Transparency does not magically fix all problems, it only works when it is done right, and it is only one tool in the toolbox needed for successful e-service implementation.

We have seen that the implementation of e-services can both lead to increased and reduced discrimination (see subsection 2.1, subsection 4.6 and subsection 5.2), depending on the situation and the implementation. The public sector has more obligations to not be discriminatory than the private sector and therefore need to take great care when implementing e-services to avoid discrimination. Due to these obligations, a government should not implement ADM at the same velocity as the private sector; they should rather take a more sober approach.

Many laws governing administrative decisions require human discretion in this decision process. Researchers argue the importance of this discretion; it gives the individual a thorough assessment on its merits, taking individual circumstances into account. Keeping discretionary powers while transitioning to e-services present several challenges, as ADM is not able to perform discretionary decisions (see subsubsection 4.8.2 and subsection 5.9). This presents us with two options if an analogue service is to be made into an e-service; either rewrite the laws regarding this service to remove the discretion or employ a mixed approach with computer and human decision making working alongside each other. The first approach would remove the important discretionary powers from this service, which could lead to unknown negative repercussions. The second approach is not without challenges either. If some cases are handled without any human review, has that case received an individual assessment on its own merits, or has the government body fettered their

discretionary powers? One solution could be to send all negative ADM decisions through a human review. Such an approach could reduce the e-service time savings benefits if the number of ADM negative decisions is large. If the humans reviewing these cases can infer, even subconsciously, that the ADM rejected this case, the algorithmic deference documented in subsubsection 4.7.2 could soil the decision.

Looking at the recent changes in the Norwegian Labour and Welfare Administration Act could provide some insight into how this could be done in practice (see subsection 5.3). This law allows NAV to use ADM for decisions but prohibits ADM decisions based on discretionary terms in law or regulations, *unless the decision was unequivocal*. Only allowing negative ADM decisions when there is no doubt could allow some of the discretionary powers to remain intact, given that one is able to develop code that can properly determine this doubt.

Free will and autonomy are important principles in democracies. Being able to make informed choices has been argued as reasons why digital transparency and understanding, what we call digital legibility, is needed. Non-interaction proactive e-services raise important questions about free will raise some important questions about this free will (see subsubsection 4.8.3). H. Scholta and Lindgren (2019) argued that a non-interaction e-service should either be an obligation (like taxation) or a benefit without any disadvantages to the recipient, on account of these services being delivered without any consent. As established in subsection 5.4, benefits from NAV include legally binding duties to notify NAV on changes in many aspects of your life. These duties can definitely be argued to present a disadvantage to the recipient. With the example of child benefits, receiving this service does entail some disadvantages, but this service is not an obligation; those who do not receive it proactively are not required to apply for it. These child benefits do not follow the pattern proposed by H. Scholta and Lindgren (ibid.). Introducing a requirement to actively consent before receiving a proactive benefit would fall in line with the pattern, but that might not be an ideal solution as it would reintroduce workload on what is today a non-interaction service for a majority of citizens. Removing the duty to notify would also satisfy the pattern, but until we have perfect data quality and proactive ineligibility checks, this would entail that some citizens could knowingly receive benefits they are not eligible for and not face any legal repercussions. Not great for fairness, equality and trust.

We propose a solution where citizens could opt out of automatic approvals of proactive benefits, with opt-in being the default state. For citizens that have activated this opt-out, the process is identical as to the opt-in group until the last step in the proactive process. Where the opt-in group would receive a letter stating that they are eligible and that the benefit has been activated, the opt-out group would receive a letter stating that they have been deemed eligible and that the benefit will be activated as soon as they express their consent. The letter to the opt-in group could also include instructions on how to reject the award of this benefit. This solution would still not satisfy the pattern proposed by H. Scholta and Lindgren (ibid.), but it would alleviate some of the concerns. Making opt-out the default state could also be done, but this would likely entail lower adoption of non-interaction e-services. We leave this further weighing of free will versus non-interaction services up to legal scholars.

6.3 Achieving digital legibility

The discussion of digital legibility does not end with rights and obligations. Exploring what information should be presented and how this information should be presented is just as important. One explanation that is legible to one person might be completely illegible to another. Providing too much information could lead to information overload, and the end result could be the same level of understanding as with no information provided. Some people do not want any information; they just want to rush through the process. Public e-services should ideally cater to the needs and goals of all these different people.

Proactive services further complicate the issue of how e-services should inform the citizens. A proactive service might check the entire population for eligibility every day, and it would obviously be infeasible to inform about all these rejections, which would entail an extreme case of the aforementioned information overload. As mentioned in the introduction, the proactive Norwegian

child benefits are split into two services, and a rejection notice is only sent out in the rare (about 5%) event where the proactive system suggested that a citizen was eligible, while the formal decision system decided otherwise (Larsson, 2021). This setup ensures that the proactive system does not make an important decision; rejection is not a big disadvantage when you can apply manually, as 35% of applicants already do (ibid.). If this stays true in a future where almost everyone receives this service proactively could be subject to further discussions.

H. Scholta and Lindgren (2019) argue that 'no-stop' e-services, i.e. proactive non-interactive e-services, need not care about usability, as there is no required interactivity on the part of the citizen. This would stay true in a perfect world with full proactivity, but it might not be very applicable to the real world. If there are duties to notify associated with the e-service, citizen interactivity will be needed when citizens notify the government about these changes. And unless we have perfect data quality and eligibility criteria, there will be a need to allow citizens to apply manually.

As the name 'invisible services' suggests, these services are easy to forget. And as shown in subsection 5.4, they do. It is not unreasonable that people forget that they are bound by some legal duties listed in a letter they received more than a decade ago. In order to help people to forget about these duties and thus saving the agency and citizens from extra hassle, the invisible services should be made more visible. We suggest that, as a first step, a view on the website of a public agency where all the active legal duties of the logged-in user are displayed. This would allow citizens browsing around on the website to find them, but unless this view is very prominently displayed, most people would probably not see these duties. This view would, therefore, not have much effect in itself, but we believe that it can be a useful first step that enables experimentation with further techniques. One such solution could be to notify users about these every now and then upon login; but this could bother users, as they probably want to do something specific whenever they log in to the public agency's web page. Another solution could be to list these in an annual letter sent out to those currently bound by such duties.

It is easier said than done to create a tailored user interface that makes individuals capable of 'autonomously understand[ing] the logic, the significance and the envisaged consequences of an algorithmic decision-making' (Malgieri and Comandé, 2017). And this becomes increasingly difficult with the increasingly complex logic behind ADM decisions. Allowing users to tinker with simulations prior to the decision taking place has been suggested by several scholars, and an Official Norwegian Report (see subsection 5.9), but this will only solve parts of the problem. We cannot comment on whether or not the digital legibility suggested by Malgieri and Comandé (ibid.) is impossible, but it will certainly be difficult.

E-services have the potential to reduce the human workload associated with a service. It could be worth discussing how this gain is realised. One possible outcome would be to scale back the workforce, harvesting the fruits of these new efficiency gains. Another solution could be to use these freed resources to provide more human counselling for those who will be at a disadvantage after the inclusion of e-services.

As shown in subsubsection 4.3.1, participatory strategies have been suggested by several scholars, and we support this sentiment. E-services, and especially the proactive kind, present many unknowns, and the only way to find out if an explanation is understandable is to test it on real people. Iterative participatory processes will allow fast development of new ideas on how to provide this digital legibility.

NAV has had obligations to conduct user participation since its inception, but it seems like user participation in NAVs e-services have only recently become front and centre, just as NAV has pivoted to make highly iterative development the standard for its e-services (see subsection 5.10). Late in 2018, they published a strategy for how user participation in NAV should be conducted in order to provide better services. The stated goals in the user participation strategy should be much easier to fulfil when the employees are already working iteratively (see subsubsection 4.3.1).

6.4 Limitations of this thesis

When performing a systematic literature review, there are always relevant articles that are missed by the researchers. There are many different possible reasons for this, including poor search criteria, language limitations, articles not indexed by Scopus, etc. Therefore, one must assume that there exist relevant articles out there that this study did not discover. Reproducing the search with variations in the search criteria, using other databases, etc., is encouraged. Therefore, a full history of how our search criteria, including full search strings and URLs, is available online (Øines and Farshchian, 2021).

In the same way, there are most likely relevant documents and industry knowledge that we did not uncover during the limited timeline of our thesis.

Many of the analysed articles were legal articles, and we have also read and interpreted several Norwegian law texts. We are not legal scholars, and there is a possibility that we have wrongfully interpreted some of this data. We suggest that multidisciplinary research is needed to further explore this issue, as it is highly complex.

7 Conclusion

Our thesis has shown that there are still many unknowns on e-services. E-services may bring both positive and negative implications, and governments must be actively aware of these when developing e-services.

The scholarly community mostly agrees that GDPR does provide a right to an explanation on many ADM decisions; however, what this right entails is still up for debate. Our structured literature review and document analysis further show us that the public sector has other obligations that lead to a requirement of digital legibility in many e-services.

E-services could allow governments to better comply with their obligations than they do today if the e-services are implemented carefully, while poor implementation could lead to a decrease in obligation compliance. Transparency is regarded as an important implication of e-services, as ADM has inherent opacity, with many fearing a black-box society. Good transparency measures are therefore necessary in order to ensure truly transparent e-services. We have further identified additional implications of proactive e-services, namely the information challenges they present and the discrimination that can arise when some are not covered by the proactivity. Additionally, our literature review showed that none of the articles in our search discussed both a right to explanation, i.e. digital legibility, and proactivity (see Figure 5 in Appendix and subsubsection 4.8.4). Therefore, the existing research tells us little about how the concept of digital legibility should be applied to proactive e-services. We think that this intersection between digital legibility and proactive e-services is fascinating, and more research on this is warranted.

Our thesis has shown that the Norwegian government is obliged to provide digital legibility in its e-services, and therefore need to develop new e-services with legibility in mind. We have further explored how this digital legibility could be ensured. We have concluded, based on both the structured literature review and document analysis, a participatory development process is necessary in order to develop legible e-services that comply with governmental obligations.

Overall, the subject area explored by this thesis is still fairly young and in development. As the usage of e-services increase, the scholarly community should pay close attention to this subject area. As this subject area covers several fields of study, we suggest that multidisciplinary research is required to further explore the unknowns and complexities it represents.

7.1 Contribution

We have provided an up-to-date summary of the status quo in the literature about legibility in governmental decision making. We believe in having, as we suspected before embarking on this

thesis, identified an under-researched area of concern, namely the intersection between digital legibility and e-services.

We have provided a Norwegian perspective to this specific area of research. To our knowledge, this has not been done before.

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Appendix

A Included in structured literature review after initial screening

After screening, we were left with n = 26 articles. Then n = 1 article were excluded due to fulltext unavailability. These n = 1 and n = 25 are listed below:

Excluded due to unavailable fulltext n = 1

Gul, J. and Z. Dauletbay (2019). 'Models of effective public administration in digitalization [Modelos de administración pública efectiva en digitalización]'. In: *Opcion* 35.Special Edition 24, pp. 1517–1531. URL: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85077564846&partnerID=40&md5=57b4d8ffddb7e39eac41d2cbdab3f9a5.

Final n = 25 included in structured literature review

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Kaminski, M.E. (2019). 'Binary governance: Lessons from the GDPR'S approach to algorithmic accountability'. In: *Southern California Law Review* 92.6, pp. 1529–1616. ISSN: 0038-3910. URL: https://scholar.law.colorado.edu/cgi/viewcontent.cgi?article=2374&context=articles.

Kuhn, P. and D. Balta (2020). 'Service Quality Through Government Proactivity: The Concept of Non-interaction'. In: *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* 12219 LNCS, pp. 82–95. DOI: 10.1007/978-3-030-57599-1_7.

Kuziemski, M. and G. Misuraca (2020). 'AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic settings'. In: *Telecommunications Policy* 44.6. DOI: 10.1016/j.telpol.2020.101976.

Langford, M. (2020). 'Symposium: How will artificial intelligence affect international law? Taming the digital Leviathan: Automated decision-making and international human rights'. In: *AJIL Unbound* 114, pp. 141–146. DOI: 10.1017/aju.2020.31.

Ranerup, A. and H.Z. Henriksen (2020). 'Digital Discretion: Unpacking Human and Technological Agency in Automated Decision Making in Sweden's Social Services'. In: *Social Science Computer Review*. DOI: 10.1177/0894439320980434.

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Scholta, H. and I. Lindgren (2019). 'The long and winding road of digital public services-one next step: Proactivity'. In: ISBN: 9780996683197. URL: https://aisel.aisnet.org/icis2019/digital_government/digital_government/7/.

Shadowen, N., T. Lodato and D. Loi (2020). 'Participatory Governance in Smart Cities: Future Scenarios and Opportunities'. In: *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* 12203 LNCS, pp. 443–463. DOI: 10.1007/978-3-030-50344-4_32.

Sirendi, R., A. Mendoza et al. (2018). 'A conceptual framework for effective appropriation of proactive public e-services'. In: vol. 2018-October, pp. 213–221. URL: https://www.proquest.com/docview/2204515097?accountid=12870.

Sirendi, R. and K. Taveter (2016). 'Bringing service design thinking into the public sector to create proactive and user-friendly public services'. In: *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* 9752, pp. 221–230. DOI: 10.1007/978-3-319-39399-5_21.

Sovrano, F., F. Vitali and M. Palmirani (2020). 'Modelling GDPR-Compliant Explanations for Trustworthy AI'. In: *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* 12394 LNCS, pp. 219–233. DOI: 10.1007/978-3-030-58957-8_16.

Srivastava, S.C. and T.S.H. Teo (2005). 'Citizen trust development for e-Government adoption: Case of Singapore'. In: pp. 721–734. URL: https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1171&context=pacis2005.

Wang, R., F.M. Harper and H. Zhu (2020). 'Factors Influencing Perceived Fairness in Algorithmic Decision-Making: Algorithm Outcomes, Development Procedures, and Individual Differences'. In: DOI: 10.1145/3313831.3376813.

B Documents included in document review

Table 5: Table showing the different documents included in the document review. With translated titles. Legend: †: web page ‡: report/presentation §: law/regulation ¶: decision letter

Name	**Author**	**Obtained from**
European Union (2016). Regulation (EU) 2016/679 (GDPR) §	European Union	Own search
Legal obstacles for digitalisation ‡	Norwegian Computer Society (DND) and Norstella	Own search

Name	Author	Obtained from
Difi note 2014:05. The government needs to think differently to make us better users - motivation and barriers for digital communication in the public sector ‡	The Norwegian Agency for Public Management and eGovernment (Difi)	Own search
Work on the seven life events ‡	The Norwegian Digitalisation Agency (Digdir)	Own search
Fully automatic case processing in NAV §	The Norwegian Ministry of Labour and Social Affairs (ASD)	Own search
Temporary regulation on measures to streamline NAV's case work in connection with the COVID-19 pandemic §	ASD	Own search
LOV-2018-06-15-38 (GDPR) §	The Norwegian Ministry of Justice and Public Security (Justisdept)	Own search
Ny forvaltningslov - Lov om saksbehandlingen i offentlig forvaltning (forvaltningsloven) §	Justisdept	Own search
The Public Administration Act (Forvaltningsloven) §	Justisdept	Own search
One digital public sector. Digital strategy for the public sector 2019–2025 ‡	The Norwegian Ministry of Local Government and Modernisation	Own search
Strategi for brukermedvirkning i NAV ‡	The Norwegian Labour and Welfare Administration (NAV)	Own search
User participation †	NAV	Own search
NAV's Horizon Scan 2021 ‡	NAV	NAV
Child benefit †	NAV	NAV
Ot.prp. nr. 47 (1997-1998) ‡	NAV	NAV
Morning coffee - NAV's work on life events from the Government's digitalisation strategy ‡	Håkon Røstad and NAV	NAV
Example decision notice for approved child benefits ¶	NAV	NAV
You are required to provide correct information to NAV †	NAV	NAV
Transitional support to single mother or father - You must report changes †	NAV	NAV
Benefits for childcare for surviving spouse - Report changes †	NAV	NAV
Child benefit - Report changes †	NAV	NAV
Transformasjonen av NAV †	NAV	NAV
National resource centre for data sharing †	The Norwegian Digitalisation Agency (Digdir)	Digdir

C Literature review classifications

Name	Authors	Own relevance rating	Right to explanation	Focus on proactivity?	Focus on e-services?	Main focus on AI?	Qualitative / Quantitative	Country/region of concern	Country of origin	Journal
Binary governance: Lessons from the GDPR'S approach to algorithmic accountability	Margot E. Kaminski	High	Yes	No	Yes		Qualitative	EU/EEA	USA	Southern California Law Review
A statutory right to explanation for decisions generated using artificial intelligence	Joshua Gacutan and Niloufer Selvadurai	High	Yes	No	Some	Yes	Qualitative	EU/EEA	Australia	International Journal of Law and Information Technology
Participatory Governance in Smart Cities: Future Scenarios and Opportunities	Nicole Shadowen, Thomas Lodato, and Daria Loi	High	Yes	No	Yes	Yes	Qualitative	USA	USA	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics †)
Understanding the impact of transparency on algorithmic decision making legitimacy	David Goad and Uri Gal	High	Yes	No	Some		Qualitative	Not specified	Australia	IFIP Advances in Information and Communication Technology
The long and winding road of digital public services-one next step: Proactivity	Hendrik Scholta and Ida Lindgren	High	No	Yes	Yes		Qualitative	Not specified	Germany + Sweden	40th International Conference on Information Systems, ICIS 2019
Identifying design principles for proactive services through systematically understanding the reactivity-proactivity spectrum	Regina Erlenheim, Dirk Draheim and Kuldar Taveter	High	No	Yes	Yes		Qualitative	Estonia + Australia (+ D5 (Estonia, Israel, Korea, New Zealand, UK))	Estonia	ACM International Conference Proceeding Series
Service Quality Through Government Proactivity: The Concept of Non-interaction	Peter Kuhn and Dian Balta	High	No	Yes	Yes		Qualitative	Not specified	Germany	Lecture Notes in Computer Science (†)
A conceptual framework for effective appropriation of proactive public e-services	Regina Sirendi, Antonette Mendoza, Mariane Barrier, Kuldar Taveter and Leon Sterling	Medium	No	Yes	Yes		Qualitative	D7 countries (Estonia, Israel, Korea, New Zealand, UK, Canada, Uruguay)	Estonia + Australia	Proceedings of the European Conference on e-Government, ECEG
Modelling GDPR-Compliant Explanations for Trustworthy AI	Francesco Sovrano, Fabio Vitali and Monica Palmirani	Medium	Yes	No	Some	Yes	Qualitative	EU/EAA	Italy	Lecture Notes in Computer Science (†)
Taming the digital Leviathan: Automated decision-making and international human rights	Malcolm Langford	Medium	No	No	Some	Yes	Qualitative	Not specified	Norway	AJIL Unbound
Bringing service design thinking into the public sector to create proactive and user-friendly public services	Regina Sirendi and Kuldar Taveter	Medium	No	Yes	Yes		Qualitative	Not specified	Estonia	Lecture Notes in Computer Science (†)
Citizen trust development for e-Government adoption: Case of Singapore	Shirish C. Srivastava and Thompson S. H. Teo	Medium	No	Yes	Yes		Qualitative	Singapore	Singapore	9th Pacific Asia Conference on Information Systems: I.T. and Value Creation, PACIS 2005
Trust, transparency, and openness: How inclusion of cultural values shapes Nordic national public policy strategies for artificial intelligence (AI)	Stephen Cory Robinson	Medium	No	No	Yes	Yes	Qualitative	Nordic countries	Sweden	Technology in Society
Improving public services using artificial intelligence: possibilities, pitfalls, governance	Paul Henman	Medium	Yes	No	Yes	Yes	Qualitative	Not specified	Australia	Asia Pacific Journal of Public Administration
Administrative law and the machines of government: Judicial review of automated public-sector decision-making	Jennifer Cobbe	Medium	Some	No	Yes		Qualitative	United Kingdom	United Kingdom	Legal Studies
AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic settings	Maciej Kuziemski, Gianluca Misuraca	Low	Some	Barely	Yes	Yes	Qualitative	Canada + Poland + Finland	USA + Spain	Telecommunications Policy
Factors Influencing Perceived Fairness in Algorithmic Decision-Making: Algorithm Outcomes, Development Procedures, and Individual Differences	Ruotong Wang, F. Maxwell Harper and Haiyi Zhu	Low	No	No	Some		Quantitative, own experiment	Not specified	USA	Conference on Human Factors in Computing Systems - Proceedings
Reviewable Automated Decision-Making	Jennifer Cobbe	Low	Some	No	Some	Yes	Qualitative	Not specified	United Kingdom	Computer Law and Security Review
Digital Discretion: Unpacking Human and Technological Agency in Automated Decision Making in Sweden's Social Services	Agneta Ranerup and Helle Zinner Henriksen	Low	No	No	Yes		Qualitative	Sweden	Sweden + Denmark	Social Science Computer Review
Identifying sources of discrimination risk in the life cycle of machine intelligence applications under new European union regulations	Syed Ali Asad Rizvi, Elmarie Van Heerden, Arnold Salas, Favour Nyikosa, Stephen J. Roberts, Michael A. Osborne and Elmer Rodriguez	Low	Some	No	Some		Qualitative	EU/EEA	United Kingdom + Spain	AAAI Spring Symposium - Technical Report
Responsible AI: A Primer for the Legal Community	Ilana Golbin, Anand S. Rao, Ali Hadjarian and Daniel Krittman	Low	No	No	Some	Yes	Qualitative	Not specified	USA	Proceedings - 2020 IEEE International Conference on Big Data, Big Data 2020
Paths to Digital Justice: Judicial Robots, Algorithmic Decision-Making, and Due Process	Pedro Rubim Borges Fortes	Low	Some	No	Yes (Justice system)	Yes	Qualitative	USA	Brazil	Asian Journal of Law and Society
Algorithmic decision making in public services: A CSCW-perspective	Asbjørn Ammitzbøll Flügge, Naja Holten Møller and Thomas Hildebrandt	Low	No	No	Yes		Qualitative	Not specified	Denmark	Proceedings of the International ACM SIGGROUP Conference on Supporting Group Work
Implementation of e-government in Kurdistan regional government (KRG): Political, social and economic constraints	Sabir Doski	Low	No	Barely	Yes		Qualitative	Kurdistan	United Kingdom	Proceedings of the European Conference on e-Government, ECEG
Algorithmic decision making and the cost of fairness	Sam Corbett-Davies, Emma Pierson, Avi Feller, Sharad Goel and Aziz Huq	Low	No	No	Yes (Justice system)		Qualitative	USA	USA	Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining

Figure 5: Classification of peer-reviewed documents in the structured literature review

D NAV Child benefits approval decision notice

Returadresse,
NAV Grünerløkka, Postboks 306, Alnabru, 0614 OSLO

BARNETRYGD - MELDING OM VEDTAK
Fødselsnummer (Oppgi f.nr. ved henvendelser til oss)

Vi har fått opplyst fra folkeregisteret at du har fått barn
19. På dette grunnlaget har vi vedtatt at du fra
1. juni 2019 får ordinær barnetrygd for ett barn.

Barnetrygden utgjør 1.054 kroner måneden.

Satsene for barnetrygd fastsettes årlig av Stortinget, og kan dermed endres. Se satsene nedenfor.

UTBETALING
Barnetrygden er skattefri og utbetales den siste virkedagen i hver måned. Du vil motta den første ordinære utbetalingen i juli 2019.

Barnetrygden vil bli sendt til kontonummer Dersom du ønsker å endre kontonummer må dette gjøres ved skriftlig melding til NAV eller registrere kontonummeret ditt på Ditt Nav. Det nye kontonummeret vil da gjelde for alle ytelser du eventuelt mottar fra NAV.

BEGRUNNELSE FOR VEDTAKET
Barnetrygd utbetales til foreldre (eller annen omsorgsperson) som har barn under 18 år boende fast hos seg i Norge. Dette følger av paragraf 2 i lov om barnetrygd.

Vi har lagt til grunn at den nyfødte vil bo fast hos deg.

MELDEPLIKT
Du må gi melding til oss innen tre uker dersom:
* Du bor alene med barna. Du kan da ha rett til utvidet barnetrygd (barnetrygd for ett barn mer enn det faktiske antall barn under 18 år). Dette må du i tilfelle søke om.
* det nyfødte barnet ikke bor eller skal bo fast hos deg
* navn eller adresse i vedtaket er feil
* antall barn du får barnetrygd for ikke stemmer med det antall barn (under 18 år) du har boende hos deg
* du og/eller barnet skal oppholde dere i Norge i kortere tid enn 12 måneder
* du og/eller barnet for tiden oppholder dere i utlandet
* du har søkt om asyl i Norge, og det foreløpig ikke er gitt vedtak om asyl eller oppholdstillatelse, eller slikt vedtak er gitt i løpet av de siste 12 måneder
* en av foreldrene arbeider ved utenlandsk representasjon eller annen administrativ tjenestegren her i Norge (for eksempel utenlandsk ambassadeansatt eller utenlandsk NATO-personell)
* en av foreldrene arbeider i et annet EØS-land eller mottar pensjon (eller annen trygdeytelse) fra et annet EØS-land

BESØKSADRESSE:	POSTADRESSE:	TELEFON:
NAV GRUNERLØKKA	NAV GRUNERLØKKA	55 55 33 33
MARSTRANDGATA 6	POSTBOKS 306 ALNABRU	TELEFAKS:
0566 OSLO	0614 OSLO	INTERNETTADR: WWW.NAV.NO

Figure 6: NAV Child benefits approval decision notice page 1

* opplysningene vedtaket bygger på ikke er riktige

VEILEDNING OG KLAGE
Dersom du har spørsmål til vedtaket, kan du ta kontakt med oss. Mer generelle opplysninger finner du på vår internettside www.nav.no.

Du kan klage på dette vedtaket. Klagefristen er seks uker fra du mottok vedtaket. Klagen skal sendes til NAV eller du kan skrive inn klagen på Ditt Nav.

Du har sammen med dette vedtaket mottatt en orientering om dine rettigheter og plikter vedrørende barnetrygd. Det er viktig at du melder fra til oss om endringer som kan ha betydning for barnetrygden. Vi ber deg derfor lese den vedlagte orienteringen.

Vi gjør oppmerksom på at du etter forvaltningsloven paragraf 18 har rett til å se sakens dokumenter.

Med vennlig hilsen
NAV Familie- og pensjonsytelser Oslo 1

Saken har blitt automatisk saksbehandlet. Vedtaksbrevet er derfor ikke underskrevet av saksbehandler.

SATSENE FOR BARNETRYGD

Satsene fastsettes årlig av Stortinget, og kan dermed endres.

Fra 1. mars 2019 utbetales barnetrygd etter følgende satser:

Ordinær barnetrygd	1 054 kr. måneden pr. barn

I tillegg til ordinær barnetrygd kan det utbetales følgende:

Utvidet barnetrygd	1 054 kr. måneden
Småbarnstillegg til enslig mor eller far	660 kr. måneden

Til og med 28. februar 2019 blir barnetrygd utbetalt etter følgende satser:

Ordinær barnetrygd	970 kr. måneden pr. barn

I tillegg til ordinær barnetrygd kan det utbetales følgende:

Utvidet barnetrygd	970 kr. måneden
Småbarnstillegg til enslig mor eller far	660 kr. måneden

I den vedlagte orienteringen om stønadsmottakerens rettigheter og plikter finner du informasjon om vilkårene for rett til de forskjellige ytelsene.

Figure 7: NAV Child benefits approval decision notice page 2

BARNETRYGDEN

Vedlegg til melding om vedtak

STØNADSMOTTAKERENS RETTIGHETER OG PLIKTER

Du finner informasjon om barnetrygd på www.nav.no. Hvis du har spørsmål, så kan du kontakte oss på 55 55 33 33. Du må alltid oppgi fødselsnummeret ditt når du tar kontakt med NAV. Da kan vi lettere gi deg rask og god hjelp.

HVEM HAR RETT TIL BARNETRYGD?

Barnetrygden kan gis for barn under 18 år som er bosatt i Norge. Et barn blir vanligvis regnet som bosatt i Norge dersom det skal oppholde seg her i mer enn 12 måneder. Det er den som barnet bor fast hos, som har rett til stønaden. Annen omsorgsperson eller barnevernsinstitusjon som har barn boende fast hos seg, har rett til barnetrygd på samme måte som foreldre.

BARNET HAR DELT BOSTED

Hvis foreldrene skriftlig har avtalt delt bosted for barnet (etter barneloven § 36), kan hver av dem søke om å få utbetalt halvdelen av barnetrygden.

BARNETRYGD ETTER EØS

Etter EØS-reglene skal barnetrygden som hovedregel utbetales fra det EØS-landet der foreldrene (eller en av dem) er i arbeid uavhengig av hvilket EØS-land barnet bor i.

UTBETALING

Du får utbetalt barnetrygd fra og med kalendermåneden etter den måneden du fikk rett til stønaden. Stønaden utbetales etterskuddsvis for hver måned.

Barnetrygden er skattefri.

SMÅBARNSTILLEGG

Dersom du bor alene med barn under tre år og du mottar utvidet barnetrygd og samtidig uredusert overgangsstønad etter folketrygdloven, kan du få et småbarnstillegg.

UTVIDET BARNETRYGD

Dersom du bor alene med barn, kan du ha rett til stønad for ett barn mer enn det faktiske antall barn under 18 år (utvidet barnetrygd). Utvidet barnetrygd gis blant annet når:

- foreldrene er skilt eller separert
- foreldrene ikke er gift og ikke bor sammen
- samboere med bare særkullsbarn ikke har levd sammen i minst 12 av de siste 18 månedene
- en av foreldrene eller begge foreldrene er døde
- den ene ektefellen, samboeren eller partneren er i fengsel med en ubetinget dom på mer enn seks måneder, er idømt forvaring eller overført til tvungen psykisk helsevern eller omsorg, eller har sittet i varetekt i mer enn seks måneder.

OPPHØR AV ORDINÆR OG UTVIDET BARNETRYGD

Barnetrygden faller bort uten forhåndsvarsel ved utgangen av kalendermåneden før barnet fyller 18 år. For øvrig faller barnetrygden bort:

- ved utgangen av den kalendermåneden barnet dør
- ved utgangen av den kalendermåneden barnet inngår ekteskap eller registrert partnerskap
- ved utgangen av den kalendermåneden barnet tar opphold i utlandet. Etter søknad kan du på visse vilkår få barnetrygd fortsatt dersom barnet tar opphold i utlandet.

Retten til **utvidet barnetrygd opphører** ved utgangen av den kalendermåneden da

- stønadsmottakeren gifter seg
- barnets foreldre flytter sammen
- samboere med særkullsbarn også får fellesbarn eller
- det skjer endringer i eventuelle andre forhold som har gitt grunnlag for utbetaling av utvidet barnetrygd
- samboere med særkullsbarn (ingen fellesbarn) har levd sammen i minst 12 av de siste 18 månedene.

UTENLANDSOPPHOLD

Dersom barnet skal ha bare ett utenlandsopphold som ikke varer mer enn 3

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Figure 8: NAV Child benefits approval decision notice page 3

måneder, vil utbetalingen av barnetrygd som regel ikke bli stanset. Utbetalingen skal likevel stanses når barnet skal oppholde seg i utlandet i til sammen mer enn seks måneder per kalenderår i to eller flere år etter hverandre, regnet fra første utreise. Du må derfor underrette NAV om alle utenlandsopphold, selv om hvert enkelt opphold varer mindre enn 3 måneder. Hvis barnet og foreldrene er medlemmer i folketrygden under utenlandsopphold, kan dere søke om å få beholde barnetrygden.

STØNADSMOTTAKERENS PLIKTER

Som mottaker av barnetrygd plikter du snarest å melde fra til NAV hvis:

- du inngår ekteskap, selv om dette ikke er med barnets far eller mor
- du flytter sammen med den andre av barnets foreldre
- du inngår et ekteskapslignende samboerforhold med en person du ikke har fellesbarn med
- du får fellesbarn med samboeren din
- du blir separert eller skilt
- ditt samboerforhold opphører
- du flytter innen kommunen eller til en annen kommune
- barnet tar opphold i utlandet. (Kortere ferieopphold (tre-fire uker) i utlandet skal det ikke gis melding om, men utenlandsopphold utover dette skal NAV underrettes om.)
- en av barnets foreldre har/tar arbeid i et annet EØS-land
- barnet ikke lengre bor fast hos deg
- barnet inngår ekteskap eller registrert partnerskap
- barnet dør
- du mottar utvidet barnetrygd fordi ektefellen, samboeren eller partneren din har vært i fengsel, forvaring eller tvungen psykisk helsevern eller omsorg, og denne situasjonen er opphørt
- det skjer endringer i eventuelle andre forhold som har gitt grunnlag for utbetaling av utvidet barnetrygd

ANSVAR FOR OPPLYSNINGER MV.

Barnetrygden kan inndras eller holdes tilbake hvis det ikke blir meldt fra til NAV om endringer i de forholdene som er nevnt foran. Det samme gjelder hvis

- stønadsmottakeren ikke gir de opplysningene Arbeids- og velferdsetaten ber om med hjemmel i lov
- det gis uriktige opplysninger
- stønadsmottakeren holder tilbake opplysninger som har betydning for retten til stønad eller for størrelsen av den

Slike forhold kan medføre at feilaktig utbetalt stønad kreves tilbake og/eller også straffansvar.

KLAGE

Hvis du ikke er enig i vedtaket, kan du klage over det. Klagen må settes fram for NAV lokalt innen seks uker fra den dagen du mottok vedtaket. På www.nav.no finner du skjema for klagen.

ETATEN TAR FORBEHOLD OM RETT TIL Å ENDRE VEDTAK SOM FØLGE AV ENDRINGER I LOV OG FORSKRIFTER, LIKEDAN VEDTAK SOM MÅTTE VÆRE URIKTIGE.

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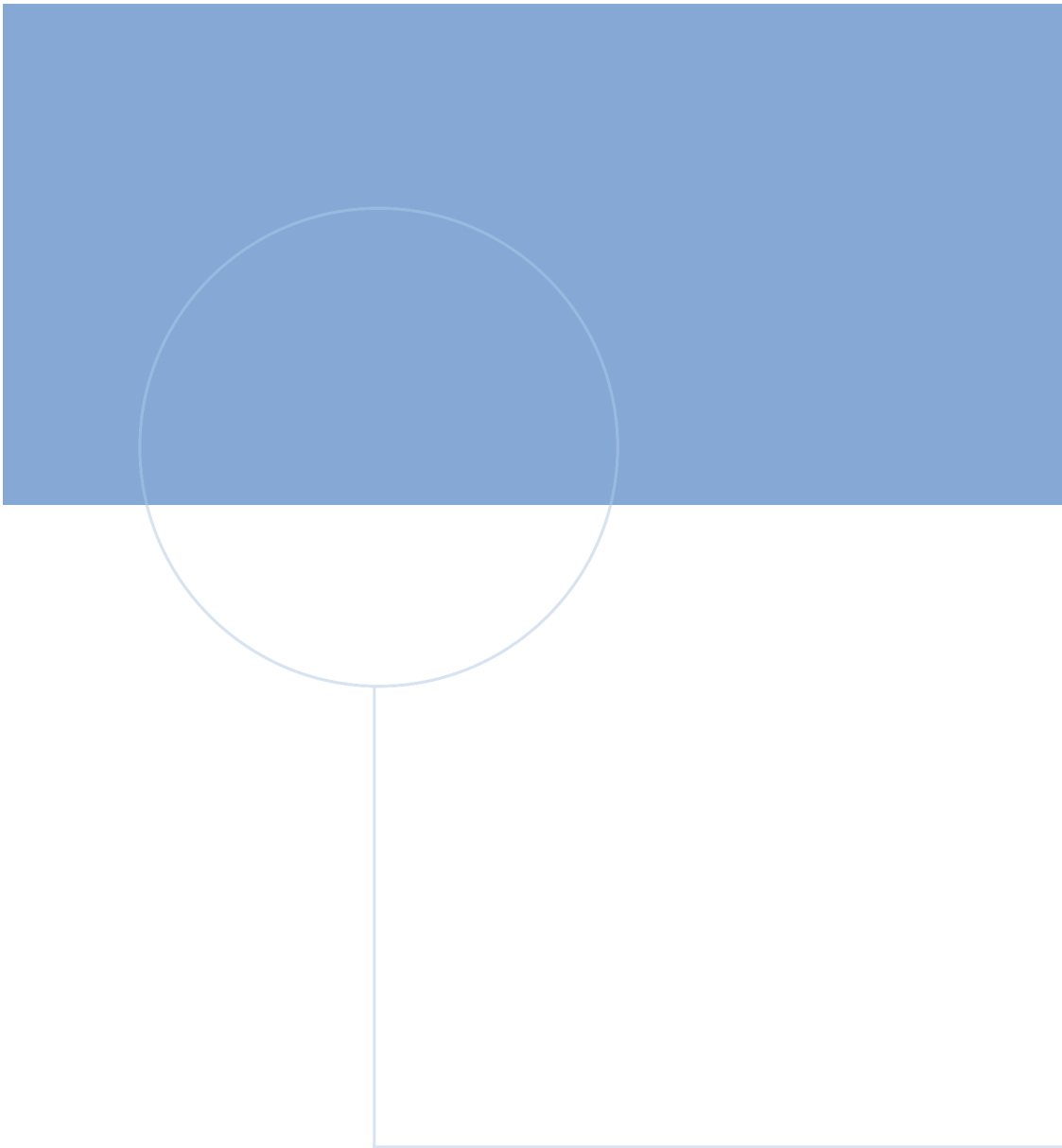
Figure 9: NAV Child benefits approval decision notice page 4. This page includes duties to notify NAV in case of changes in 13 specified conditions, and one more general condition: 'there are changes in other relevant conditions that made you eligible for extended child benefits'



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Kunnskap for en bedre verden