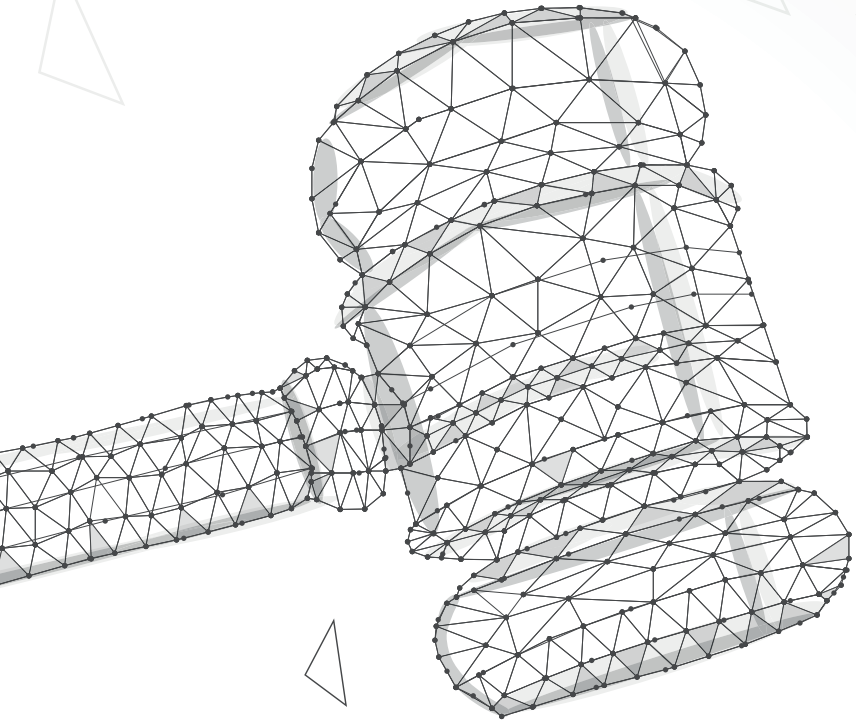
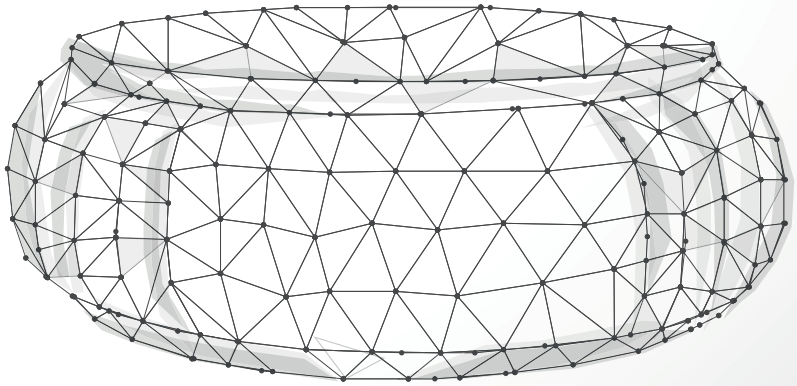
DS/PAS 2500-2:2020

Artificial Intelligence



Part 2: Decision Support Application in Public Case Management



DANISH STANDARDS

DS/PAS 2500-2:2020

Artificial Intelligence

Part 2:
Decision Support Application in Public Case Management

DANISH STANDARDS

DS/PAS 2500-2:2020,
Artificial Intelligence – Part 2: Decision Support
Application in Public Case Management

DS/PAS 2500-2:2020
Project number M393731
Graphic design: Jenni Søndergaard
Editor: Jenni Søndergaard
Printed by: Danish Standards, Published 2025
First edition

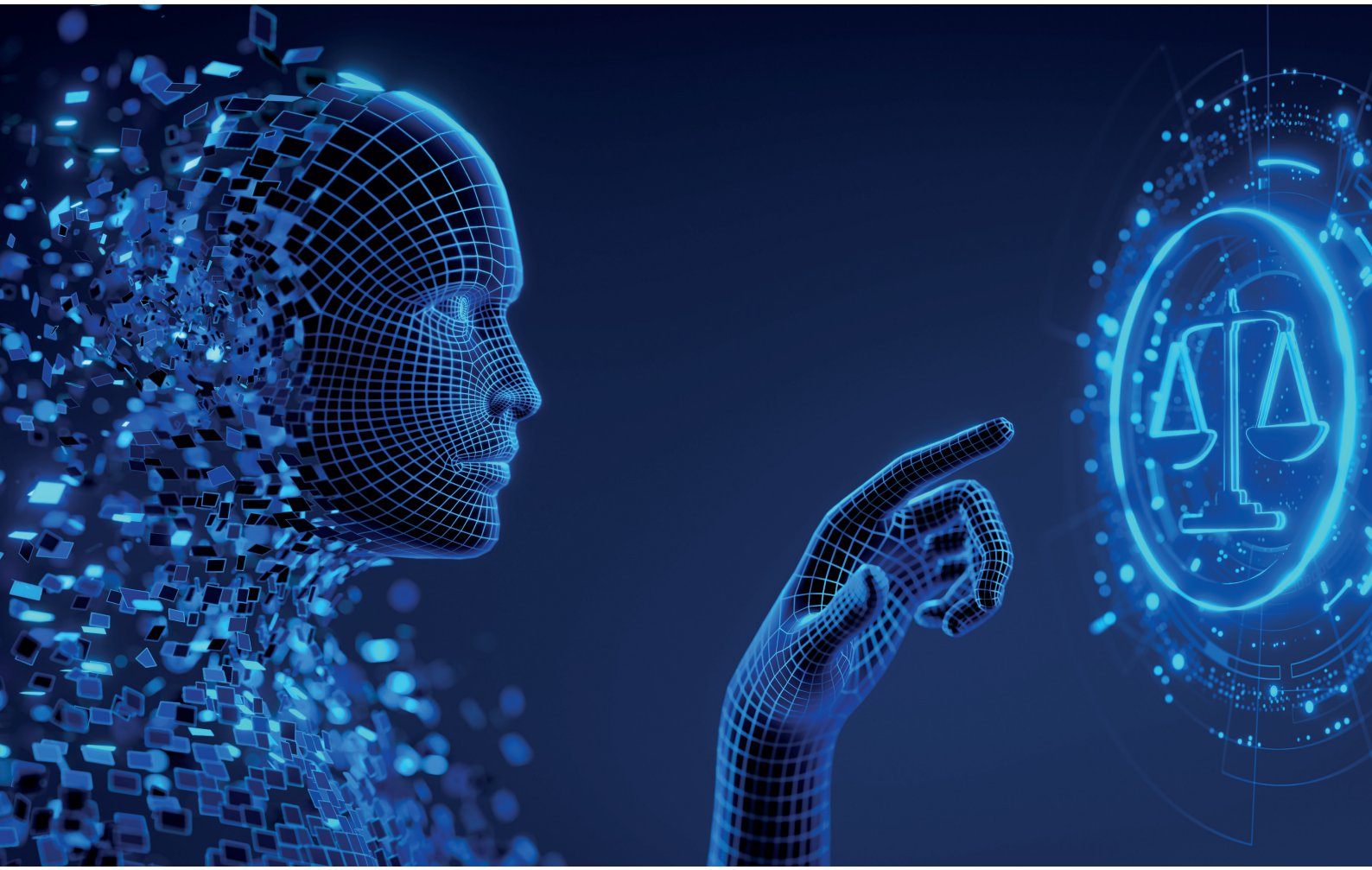
Published by Danish Standards,
Göteborg Plads 1
DK-2150 Nordhavn

Phone: 39 96 61 01
ds@ds.dk www.ds.dk

This is a POD publication, printed in Denmark

Images: Colourbox and IStockphoto.

Contents



Foreword

DS publication type

All designations for publications published by Danish Standards begin with DS followed by one or more prefixes and a number, e.g. DS 282, DS/EN 5414 etc. If the publication is part of a series, this will be indicated with a hyphen followed by the number in the series, e.g. DS/PAS 2500-1 and DS/PAS 2500-2. A series is a non-prioritised sequence of publications, each of which can be read individually but addresses the same topic.

DS/PAS

This document is a DS/PAS. PAS is an abbreviation for 'Publicly Available Specification', which is a publication developed at the national level, that does not have the same status as an international standard. A PAS differs from an international standard, for example, by not having the same requirements for the level of stakeholder involvement or layout. A DS/PAS also does not specify requirements that must be complied with, but instead offers recommendations, information, and advice.

Development of the publication

This publication has been developed together with the Alexandra Institute and with input from Danish stakeholders through workshops, interviews, and written comments in accordance with the procedure for developing PAS publications at Danish Standards.


OK
NO

Introduction

Artificial intelligence is increasingly being used by authorities for decision support in public case management. This raises the need for operational guidelines for developers, purchasers, and users.

The increasing availability of data, including data about citizens and previous decisions, creates new opportunities to apply artificial intelligence to support decision-making in public case management.

Before any use of an IT tool, questions should be raised about why and how it is being used in each situation. The use of artificial intelligence for decision support in public case management requires a series of questions to ensure ethical and responsible use.

Several principles and guidelines for the ethical use of artificial intelligence have been published, including by the EU and OECD (see Annex B), which expand on general guidelines for responsible development of IT systems and form the basis of this document.

1. Scope

This document provides a checklist for relevant considerations in the various phases of IT projects where artificial intelligence is used for decision support in public case management. It is important that these considerations are included in the basis for requirements and solutions, as well as in the decision to carry out activities and move on to the next phase of the IT system's lifecycle. It is the user's responsibility to determine whether the checklist is applicable for a given purpose.

The target group is designers, developers, providers, purchasers, supervisors, and users of artificial intelligence for decision support in public case management who want or are required to evaluate the use of the system.

A secondary target group is the stakeholders affected by the system, such as public authorities and citizens in general.

The document does not cover legislation and special requirements that may apply to the use of decision support in specific domains.

The document must be used in conjunction with the organization's existing guidelines to ensure compliance with regulations including, but not limited to, privacy, cyber security, robustness of IT solutions, data governance, complaint and appeal handling, and legislation.

This document does not explicitly address transparency in connection with artificial intelligence but may be used in conjunction with DS/PAS 2500-1:2020, *Artificial Intelligence – Part 1: Transparency* which specifies recommendations for an approach to achieve transparency in systems used for automated decisions or decision support.

2. Normative references

The "Normative References" in standards commonly specify the documents that are cited in the standard's text as required documents to comply with the standard.

This document has no normative references.

3. Terms and definitions

In this document, the following terms and definitions apply.

3.1
artificial intelligence
a system's ability to acquire, process and apply *knowledge* (3.2) and/or skills

Note 1 to term: Artificial intelligence is generally compared to human intelligence, although this is not an exhaustive definition.

Note 2 to term: Machine learning is a subcategory of artificial intelligence.

3.2
knowledge
data, information, and skills acquired through experience or training

3.3
public case
issue within a *public authority*'s (3.18) area of competence, which the public authority addresses with the aim of clarification, action, or achieving a specific outcome

EXAMPLE: The object of a public case can be a *citizen* (3.17) or a *public authority* (3.18).

3.4
management
administration of funds, legislation, or rights

3.5
public case management
management (3.4), which constitutes the handling of a *public case* (3.3)

3.6
decision
choice made between several options

3.7
decision support
automating a *decision* (3.6) or providing information that a human can use to decide

Note 1 to term: There are three degrees of human involvement in decisions.

3.7.1
human-centered decision support
decision support (3.7) that requires human involvement, e.g. by providing parts of the data basis for the decision or being responsible for executing the decision

3.7.2
human-monitored decision support
decision support (3.7) that operates independently of humans but under human monitoring with intervention when necessary

3.7.3
autonomous decision support
decision support (3.7) that operates without human involvement

3.8
bias
prejudice in decisions or methodologically flawed data basis for decisions

3.9
machine learning
statistical method or algorithm that, based on sample data, can find an algorithm capable of solving a given decision problem with a certain accuracy, specified by the ratio between *true positive* (3.10) and *false positive* (3.11) responses as well as the ratio between *true negative* (3.12) and *false negative* (3.13) responses to test data

3.10
true positive
examples in test data to which a machine-learned decision algorithm for a yes/no problem correctly answers yes

3.11
false positive
examples in test data to which a machine-learned decision algorithm for a yes/no problem incorrectly answers yes

3.12
true negative
examples in test data to which a machine-learned decision algorithm for a yes/no problem correctly answers no

3.13
false negative
examples in test data to which a machine-learned decision algorithm for a yes/no problem incorrectly answers no

3.14
interested party
stakeholder
individual, group, or organization that can affect, is affected by, or perceives itself to be affected by a decision or activity, including the development of *IT systems* (3.16)
[SOURCE: DS/EN ISO/IEC 27000:2020 (3.37), modified]

3.15

system

combination of interacting elements organized to achieve one or more specified purposes

3.16

IT system

system (3.15) based on information technology

3.17

citizen

an object, a possible object, or a relative of the object in a *public case management* (3.5)

3.18

public authority

social institution that manages and has power within a specific domain
[SOURCE: Den Danske Ordbog]

Note 1 to term: A public authority can be the object or potential object of case management, i.e. the authority for which another authority handles a situation, problem, or task in the context of *public case management* (3.5).

Note 2 to term: A public authority can be a *stakeholder* (3.14), i.e. the one who conceives, acquires, develops, or uses an *IT system* (3.16) that applies *artificial intelligence* (3.1) for decision support in connection with *public case management* (3.5).

3.19

caseworker

person responsible for specific case management supported by an *IT system* (3.16) that uses *artificial intelligence* (3.1) for *decision support* (3.7)

3.20

technical expert

person who designs, develops, tests, verifies, or audits the technical function of an *IT system* (3.16) or elements thereof

3.21

supervisor

person, public authority, or company that oversees that an IT project or the use of an *IT system* (3.16) complies with specified requirements

4. Use of artificial intelligence for decision support in public sector case management

It is necessary to consider whether it is ethically responsible to use an IT system that applies artificial intelligence for decision support in public case management. These considerations should be included in all phases of IT system development and involve all relevant stakeholders.

The considerations must be documented to a degree that allows those responsible for the project and the individual phases and activities to be held accountable for carrying out activities and initiating subsequent phases.

4.1 Lifecycle model

In this document, the overall phases in the Danish State IT project model[1] are used as a starting point: Idea, analysis, implementation, realisation, and completion. Each phase contains many activities, as shown in Figure 1.

The phases can be executed strictly sequentially, as in a so-called waterfall model that follows the order shown in the figure, or overlap and be repeated as in so-called iterative or agile models. The organization responsible for the project (or the organizations responsible for each phase) should appoint one or more people responsible for ensuring that the considerations in the checklist in 4.3 are included in the decision to initiate activities and subsequent phases.

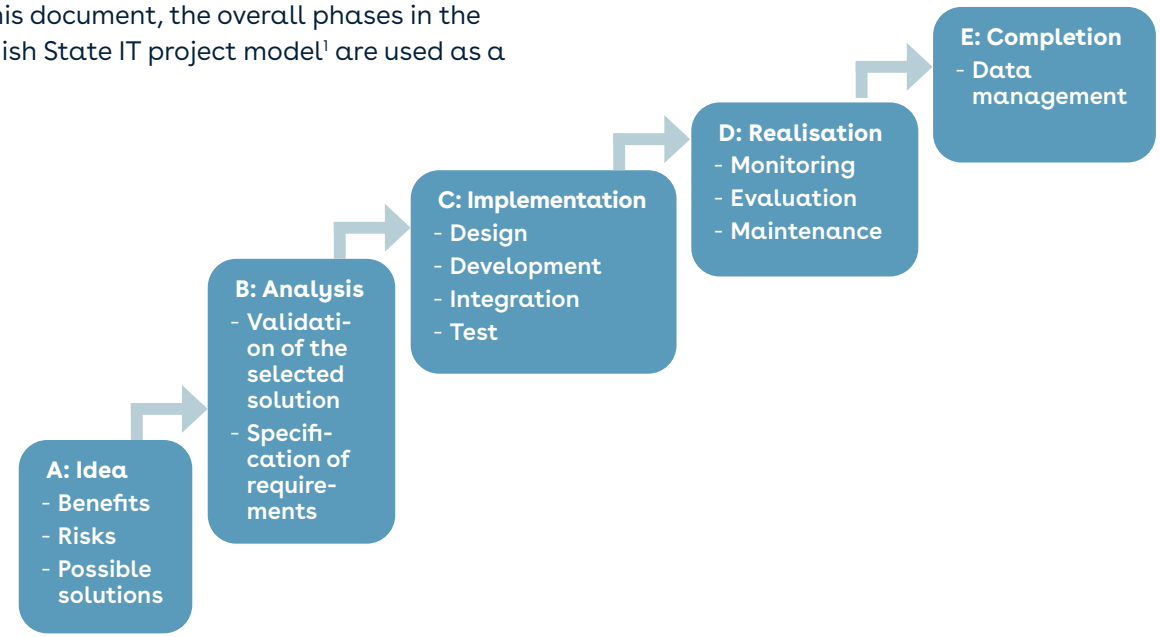


Figure 1: Phases in the Danish State IT project model and the activities they should include as a minimum.

1 https://digst.dk/styring/projektstyring/statens-it-projektmodel (in Danish)

4.1.1 A: The idea phase

As a minimum, this phase should include identifying desired benefits, possible solutions, and possible risks, as well as risk management.

4.1.2 B: The analysis phase

As a minimum, this phase should include validation of solutions against desired benefits and risks, and specification of requirements.

4.1.3 C: The implementation phase

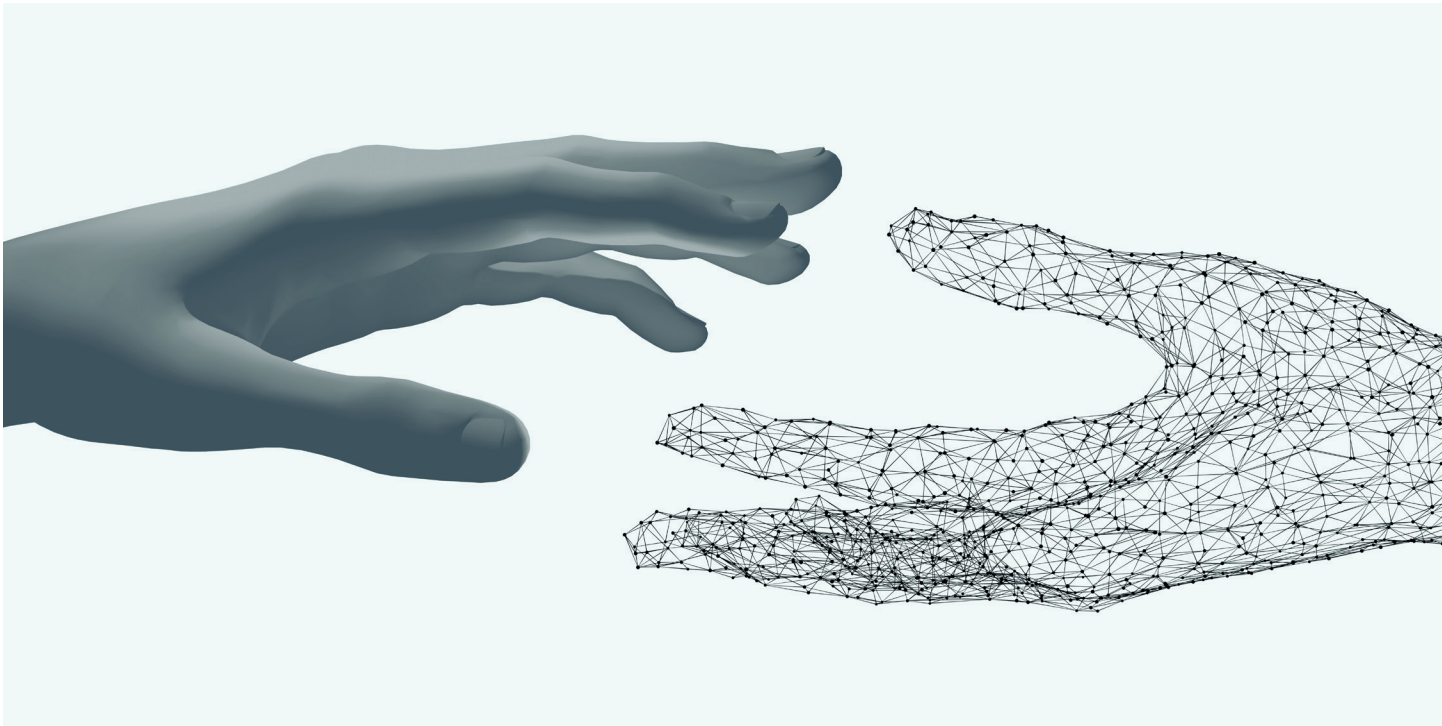
This phase includes design, development, integration, and testing.

4.1.4 D: The realisation phase

This phase includes monitoring, evaluation, and maintenance of the system or parts of the system, including personally identifiable information (PII) that is no longer needed.

4.1.5 E: The completion phase

When phasing out a system, there are certain requirements to be aware of. These requirements concern, for example, whether data is handled correctly (typically in relation to legislation). It can also involve retaining documentation of the algorithm used to decide.



4.2 Considerations for the different phases of the IT project

4.2.1 Phase A: The idea phase

The organization responsible for the idea phase should at least consider and document the answers to the questions in A1-A9 for each intended application of AI for decision support, with the involvement of relevant stakeholders and/or their representatives.

ID	RELEVANT STAKEHOLDERS AND THEIR INTERESTS IN THE IDEA PHASE	CHECK
A1	**What is the stakeholder's attitude towards decision support for the given decision?**	
A1-1: Citizen		
A1-2: Public authorities		
A1-3: Caseworker		
A1-4: Supplier		
A1-5: Technical expert		
A1-6: Supervisor		
A2	**What are the desired benefits of using IT support for these decisions? Specify for all stakeholders, to the extent possible. Is there an opportunity to streamline or improve the quality of the workflow for the citizen, caseworker, or public authority?**	
A2-1: Citizen		
A2-2: Public authorities		
A2-3: Caseworker		
A2-4: Supplier		
A2-5: Technical expert		
A2-6: Supervisor		

Table 1 continues on the following pages

A3	What are the possible solutions based on artificial intelligence? What types of artificial intelligence can and should be used and why?	
A3-1: Citizen	(Probably not applicable)	
A3-2: Public authorities	(Probably not applicable)	
A3-3: Caseworker	(Probably not applicable)	
A3-4: Supplier		
A3-5: Technical expert		
A3-6: Supervisor		
A4	**What are the possible solutions that are not based on artificial intelligence?**	
A4-1: Citizen		
A4-2: Public authorities		
A4-3: Caseworker		
A4-4: Supplier		
A4-5: Technical expert		
A4-6: Supervisor		
A5	**Which laws, human rights, democratic values, and diversity issues are relevant?** **Consider which issues of discrimination, dignity, invasion of privacy, or unreasonable restriction of freedom of action are relevant.**	
A5-1: Citizen		
A5-2: Public authorities		
A5-3: Caseworker		
A5-4: Supplier		
A5-5: Technical expert		
A5-6: Supervisor		
A6	**What are the risks of using the respective solutions?**	
A6-1: Citizen		
A6-2: Public authorities		
A6-3: Caseworker		
A6-4: Supplier		
A6-5: Technical expert		
A6-6: Supervisor		

A7	What are the risks of not using the respective solutions?	
A7-1: Citizen		
A7-2: Public authorities		
A7-3: Caseworker		
A7-4: Supplier		
A7-5: Technical expert		
A7-6: Supervisor		
A8	**What data and knowledge base is needed, and what is required to access it?**	
A8-1: Citizen		
A8-2: Public authorities		
A8-3: Caseworker		
A8-4: Supplier		
A8-5: Technical expert		
A8-6: Supervisor		
A9	**Is human involvement or monitoring with the possibility of intervention necessary, unnecessary, or undesirable? Provide justification.**	
A9-1: Citizen		
A9-2: Public authorities		
A9-3: Caseworker		
A9-4: Supplier	(Probably not applicable)	
A9-5: Technical expert	(Probably not applicable)	
A9-6: Supervisor		

Table 1: Relevant stakeholders and their interests in the idea phase

4.2.2 Phase B: The analysis phase

The organization responsible for the analysis phase should at least consider and document the answers to questions B1-B7, with the involvement of relevant stakeholders and/or their representatives.

ID	RELEVANT STAKEHOLDERS AND THEIR INTERESTS IN THE ANALYSIS PHASE	CHECK
B1	**Is it possible to use IT support in connection with the given decision? As a minimum, it should be considered whether the rules for the decisions, with known technology and within budget, can either be described in an algorithm by domain experts, such as caseworkers and lawyers, learned using machine learning with satisfactory accuracy, or by a combination of rules described by experts and rules learned using machine learning.**	
B1-1: Citizen	(Probably not applicable)	
B1-2: Public authorities	(Probably not applicable)	
B1-3: Caseworker		
B1-4: Supplier		
B1-5: Technical expert		
B1-6: Supervisor	(Probably not applicable)	
B2	**Is it possible to achieve the desired benefits, and how and at what frequency should they be measured? As a minimum, consider how the current and subsequent status of efficiency and quality is measured and compared, and describe how the IT support is expected to lead to the desired improvement.**	
B2-1: Citizen		
B2-2: Public authorities		
B2-3: Caseworker		
B2-4: Supplier		
B2-5: Technical expert		
B2-6: Supervisor		

Table 2 continues on the following pages

B3	Can the system be developed to be robust, reliable, and secure, and can this be monitored and audited?	
B3-1: Citizen	(Probably not applicable)	
B3-2: Public authorities	(Probably not applicable)	
B3-3: Caseworker	(Probably not applicable)	
B3-4: Supplier		
B3-5: Technical expert		
B3-6: Supervisor		
B4	**Can the system be developed with respect for relevant laws, human rights, democratic values, and diversity issues, and so that this can be monitored and audited?**	
B4-1: Citizen		
B4-2: Public authorities		
B4-3: Caseworker		
B4-4: Supplier		
B4-5: Technical expert		
B4-6: Supervisor		
B5	**Are the identified risks acceptable to the stakeholders involved? Provide justification.**	
B5-1: Citizen		
B5-2: Public authorities		
B5-3: Caseworker		
B5-4: Supplier		
B5-5: Technical expert		
B5-6: Supervisor		

B6	Is it possible to access the necessary data and knowledge base, and what does it require to maintain, protect from unauthorised access, and dispose of when no longer needed?	
B6-1: Citizen		
B6-2: Public authorities		
B6-3: Caseworker		
B6-4: Supplier		
B6-5: Technical expert		
B6-6: Supervisor		
B7	**Is it possible for the relevant stakeholders to understand and challenge decisions supported by the IT system where desired? It should also be considered whether the IT system has a sufficient level of transparency in accordance with DS/PAS 2500-1.**	
B7-1: Citizen		
B7-2: Public authorities		
B7-3: Caseworker		
B7-4: Supplier		
B7-5: Technical expert		
B7-6: Supervisor		

Table 2: Relevant stakeholders and their interests in the analysis phase

4.2.3 Phase C: The implementation phase

The organization responsible for the analysis phase should at least consider and document the answers to questions C1-C6, with the involvement of relevant stakeholders and/or their representatives.

ID	RELEVANT STAKEHOLDERS AND THEIR INTERESTS IN THE IMPLEMENTATION PHASE	CHECK
C1	**Does the design of the system ensure that benefits can be measured? Provide justification.**	
C1-1: Citizen	(Probably not applicable)	
C1-2: Public authorities		
C1-3: Caseworker		
C1-4: Supplier		
C1-5: Technical expert		
C1-6: Supervisor		
C2	**Does the design, development, integration, and testing of the system ensure robustness, reliability, and security and the ability for this to be monitored and audited? Provide justification.**	
C2-1: Citizen	(Probably not applicable)	
C2-2: Public authorities		
C2-3: Caseworker		
C2-4: Supplier		
C2-5: Technical expert		
C2-6: Supervisor		
C3	**Does the design, development, integration, and testing of the system ensure respect for relevant laws, human rights, democratic values, and diversity issues and allow for this to be monitored and audited? Provide justification.**	
C3-1: Citizen		
C3-2: Public authorities		
C3-3: Caseworker		
C3-4: Supplier		
C3-5: Technical expert		
C3-6: Supervisor		

Table 3 continues on the following page

C4	**Does the design, development, integration, and testing of the system ensure that only relevant data is processed and that data and knowledge bases are maintained, protected from unauthorised access and disposed of when no longer needed? Provide justification.**	
C4-1: Citizen		
C4-2: Public authorities		
C4-3: Caseworker		
C4-4: Supplier		
C4-5: Technical expert		
C4-6: Supervisor		
C5	**Does the design, development, integration, and testing of the system ensure that only relevant data is processed and that data and knowledge bases are maintained, protected from unauthorised access and disposed of when no longer needed? Provide justification.**	
C5-1: Citizen		
C5-2: Public authorities		
C5-3: Caseworker		
C5-4: Supplier		
C5-5: Technical expert		
C5-6: Supervisor		
C6	**Does the design ensure that it is possible for the relevant stakeholders to understand, challenge, and reverse decisions supported by the IT system where desired?** **Provide justification. This should include an explanation of how the IT system ensures a sufficient level of transparency in accordance with DS/PAS 2500-1.**	
C6-1: Citizen		
C6-2: Public authorities		
C6-3: Caseworker		
C6-4: Supplier		
C6-5: Technical expert		
C6-6: Supervisor		

Table 3: Relevant stakeholders and their interests in the implementation phase

4.2.4 Phase D: The realisation phase

The organization responsible for the analysis phase should at least consider and document the answers to questions D1-D7, with the involvement of relevant stakeholders and/or their representatives.

ID	RELEVANT STAKEHOLDERS AND THEIR INTERESTS IN THE REALISATION PHASE	CHECK
D1	**Is there continuous monitoring and measuring of benefits? If so, describe how?**	
D1-1: Citizen		
D1-2: Public authorities		
D1-3: Caseworker		
D1-4: Supplier		
D1-5: Technical expert		
D1-6: Supervisor		
D2	**Is there monitoring and continuous control of the system's robustness, reliability, and security? If so, describe how.**	
D2-1: Citizen		
D2-2: Public authorities		
D2-3: Caseworker		
D2-4: Supplier		
D2-5: Technical expert		
D2-6: Supervisor		
D3	**Is there monitoring and continuous control of the system's compliance with relevant laws, human rights, democratic values, and diversity issues? If so, describe how.**	
D3-1: Citizen		
D3-2: Public authorities		
D3-3: Caseworker		
D3-4: Supplier		
D3-5: Technical expert		
D3-6: Supervisor		

Table 4 continues on the following pages

D4	Is there monitoring and continuous control of the system's compliance with relevant laws, human rights, democratic values, and diversity issues? If so, describe how.	
D4-1: Citizen		
D4-2: Public authorities		
D4-3: Caseworker		
D4-4: Supplier		
D4-5: Technical expert		
D4-6: Supervisor		
D5	**Is there monitoring and continuous control of identified risks? If so, describe how.**	
D5-1: Citizen		
D5-2: Public authorities		
D5-3: Caseworker		
D5-4: Supplier		
D5-5: Technical expert		
D5-6: Supervisor		
D6	**Is there monitoring and continuous control to ensure that the system's data and knowledge base is kept up to date, protected from unauthorised access, disposed of when no longer necessary, and that only relevant data is processed or that only data necessary to decide is processed? If so, describe how.**	
D6-1: Citizen		
D6-2: Public authorities		
D6-3: Caseworker		
D6-4: Supplier		
D6-5: Technical expert		
D6-6: Supervisor		

D7	Is the use of the system monitored, and is there a process in place to ensure proper handling of data if the system is modified or completely or partially discarded, and the system no longer meets the requirements and prerequisites for its use, as described in the considerations above?	
D7-1: Citizen		
D7-2: Public authorities		
D7-3: Caseworker		
D7-4: Supplier		
D7-5: Technical expert		
D7-6: Supervisor		

Table 4: Relevant stakeholders and their interests in the realisation phase

4.2.5 Phase E: The completion phase

This section does not include an explicit checklist, however, question D8 in Table 4 can be applied. Consumers and recipients are encouraged to create suitable checklists already in the idea phase and to comply with applicable legislation.

Annex A
Example of considerations of relevant stakeholders

A

(Informative)

Below are examples of summaries of responses to considerations in the idea phase for the use of artificial intelligence to improve efficiency and increase legal compliance and equal treatment, thus reducing the number of complaints upheld by the Danish Appeals Permission Board in relation to municipalities' allocation of compensation for lost earnings under Section 42 of the Danish Social Services Act.

Section 42, Subsection 1 states: "The municipal council must provide assistance for the coverage of lost earnings for individuals who care for a child under the age of 18 at home with significant and permanent physical or mental disabilities, or severe chronic or long-term illnesses. The service is conditional upon the fact that it is a necessary consequence of the reduced functionality that the child is cared for at home, and that it is most appropriate for the mother or father to care for the child."

The example is taken from the research projects EcoKnow and PACTA and is also used in the study "The Legal Requirement of Explainability in Computationally Aided Decision-Making in Public Administration," but the responses to the individual considerations should be viewed as examples and do not necessarily reflect real answers from actual stakeholders.

ID	RELEVANT STAKEHOLDERS AND THEIR INTERESTS IN THE IDEA PHASE	CHECK
A1	**What is the stakeholder's attitude towards decision support for the given decision?**	
A1-1: Citizen	It is positive if the support can contribute to more equal treatment under the law and fewer reasons to complain. It is negative if the support results in decisions that are less able to take the citizen's specific situation into account, or if the solution provides public authorities with information about the citizen, such as profiling, that may risk being used in other contexts without the citizen's consent.	
A1-2: Public authorities	The same as for the citizen. Also, there is a desire for the support to be used to streamline case processing in terms of the average time spent on each individual case.	
A1-3: Caseworker	The same as for the public authorities. However, there are concerns that the support could take control and reduce the caseworker's ability to exercise discretion, and that it may lead to layoffs of caseworkers.	

Table A.1 continues on the following pages

A1-4: Supplier	Sees the opportunity to increase the value of their IT system for case management by addressing the interests and concerns of the citizen, the authority, and the caseworker.	
A1-5: Technical expert	The same as for the supplier, as well as their interest in exciting applications of technology.	
A1-6: Supervisor	They look positively at the possibility of improving the quality of case management, thus reducing the number of complaints to the Appeals Permission Board that are upheld.	
A2	**What are the desired benefits of using IT support for these decisions? Specify for all stakeholders, to the extent possible. Is there an opportunity to streamline or improve the quality of the workflow for the citizen, caseworker, or public authority?**	
A2-1: Citizen	More equal treatment under the law and fewer reasons to complain.	
A2-2: Public authorities	The same as for the citizen. Also, there is a desire for support to be used to streamline case processing in terms of the average time spent on each individual case.	
A2-3: Caseworker	The same as for the citizen. Also, to spend less time remembering legislation and performing routine tasks.	
A2-4: Supplier	More value from IT solution and the opportunity to develop and test the technology to be used within other regulated workflows in general.	
A2-5: Technical expert	To gain expertise in the successful application of artificial intelligence for decision support.	
A2-6: Supervisor	To receive fewer legitimate complaints and possibly have better documentation for the cases that require monitoring and where complaints need to be processed.	
A3	**What are the possible solutions based on artificial intelligence? What types of artificial intelligence can and should be used and why?**	
A3-1: Citizen	(Not applicable).	
A3-2: Public authorities	(Not applicable).	
A3-3: Caseworker	(Not applicable).	
A3-4: Supplier	Integration of solutions for transparent digitisation of legislation in the ESDH system.	
A3-5: Technical expert	Comprehensible digital models of legislation that can be created and maintained by experts, possibly combined with machine learning algorithms to recognise patterns in the sub-decisions made at different stages of case management.	
A3-6: Supervisor	(Not applicable).	

A4	What are the possible solutions that are not based on artificial intelligence?	
A4-1: Citizen	To better educate caseworkers on legislation, give caseworkers more time for each individual case, and use the system for more systematic documentation of case management as well as knowledge sharing among caseworkers.	
A4-2: Public authorities	The same as for the citizen.	
A4-3: Caseworker	To better educate caseworkers on legislation, give caseworkers more time for each individual case, and use the system for knowledge sharing among caseworkers.	
A4-4: Supplier	To create a system that helps the caseworker navigate legislation, make more systematic documentation of case management and systematise knowledge sharing among caseworkers.	
A4-5: Technical expert	The same as for the supplier.	
A4-6: Supervisor	The same as for the citizen.	
A5	**Which laws, human rights, democratic values, and diversity issues are relevant?** **Consider which issues of discrimination, dignity, invasion of privacy, or unreasonable restriction of freedom of action are relevant.**	
A5-1: Citizen	GDPR and discrimination, e.g. in relation to gender and ethnicity. Equal treatment under the law.	
A5-2: Public authorities	The same as for the citizen. In addition, section 42 of the Danish Social Services Act and related sections.	
A5-3: Caseworker	The same as for the public authorities.	
A5-4: Supplier	(Not applicable).	
A5-5: Technical expert	(Not applicable).	
A5-6: Supervisor	The same as for the public authorities.	

A6	What are the risks of using the respective solutions?	
A6-1: Citizen	It could lead to decisions that take less account of the citizen's specific situation, or the solution may provide the public authorities with knowledge about the citizen, such as profiling, which could risk being used in other contexts without the citizen's consent.	
A6-2: Public authorities	The same as for the citizen. There is also a risk that the caseworker may be monitored without consent or feel monitored by the system and may not critically engage with the system's recommendations when relevant.	
A6-3: Caseworker	The same as for the public authorities.	
A6-4: Supplier	Legislation or the context of case management may change without the models underlying the decisions being updated, resulting in the recommended decisions becoming more imprecise or outright incorrect. If the system is retrained based on its own decisions, there is a risk of reinforcing any biases in the data over time.	
A6-5: Technical expert	The same as for the supplier. Additionally, recommendations based on machine learning are only correct to a certain extent, and it can be difficult to make transparent and explain what the basis for the recommendation is.	
A6-6: Supervisor	The same as for the public authorities and the supplier.	
A7	What are the risks of not using the respective solutions?	
A7-1: Citizen	That there are still too many cases of inadequate documentation for decisions, and that unequal treatment of the law and discrimination occur, which go undetected, and that the citizen lacks the resources or time to complain about.	
A7-2: Public authorities	The same as for the citizen. Additionally, the public authorities may not have the resources to process cases quickly enough, leading to extended case management times.	
A7-3: Caseworker	The same as for the public authorities.	
A7-4: Supplier	The same as for the citizen.	
A7-5: Technical expert	The same as for the citizen.	
A7-6: Supervisor	The same as for the public authorities.	

A8	What data and knowledge base is needed, and what is required to access it?	
A8-1: Citizen	The citizen's case process, but not necessarily PII, if only activities described in the legislation are recorded. This requires access to the activities performed in relation to the law in a case. Access to relevant legislation is also required.	
A8-2: Public authorities	The same as for the citizen. Additionally, information on how much time is spent on and between activities is required if measurement of efficiency is desired.	
A8-3: Caseworker	The same as for the public authorities.	
A8-4: Supplier	The same as for the public authorities. Additionally, a digital model of legislation and accurate recording of the case process in relation to this model.	
A8-5: Technical expert	The same as for the public authorities. Additionally, a digital model of legislation and accurate recording of the case process in relation to this model.	
A8-6: Supervisor	The same as for the public authorities.	
A9	**Is human involvement or monitoring with the possibility of intervention necessary, unnecessary, or undesirable? Provide justification.**	
A9-1: Citizen	If a standard case is defined as a case with many precedents, where there is a desire to follow the practice statistically derived from these, it is desirable that a human makes the final decision in cases that are not standard cases, and undesirable that a human makes the decision in standard cases. It is always desirable to be able to get an explanation of which data, paragraphs, and rules in the legislation have been used in the decision, how they have been applied, and to be able to challenge a decision and potentially correct data and legislation that is believed to have been applied incorrectly.	
A9-2: Public authorities	The same as for the citizen. Additionally, there is a desire to monitor changes in decision-making practices in order to identify potential bias.	
A9-3: Caseworker	The same as for the citizen.	
A9-4: Supplier	(Not applicable).	
A9-5: Technical expert	(Not applicable).	
A9-6: Supervisor	The same as for the public authorities.	

Table A.1: Example of considerations of relevant stakeholders in the idea phase for the use of artificial intelligence for decision support in municipalities' allocation of compensation for lost earnings under Section 42 of the Danish Social Services Act.

Annex B
Principles and guidelines for the ethical use of artificial intelligence

B

(Informative)

B.1 OECD Principles for Artificial Intelligence

In May 2019, the OECD adopted a set of principles for artificial intelligence to promote innovation and trustworthy artificial intelligence that respects human rights and democratic values. The OECD principles are generally as follows:

1. AI should benefit people and the planet by invigorating inclusive growth, sustainable development and well-being.
2. Systems using AI should be designed to respect the rules of law, human rights, democratic values, and diversity, and should implement appropriate safeguards - such as enabling human agency when necessary - to ensure a fair and equal society.
3. There should be transparency and responsible disclosure of systems using AI to ensure that it is possible to understand and challenge decisions based on AI.
4. AI systems should be robust, secure, and safe throughout their lifecycle, and potential risks should be continuously assessed and managed.
5. Organizations and individuals who develop, deploy, and use systems that use artificial intelligence should be accountable for ensuring that the systems operate in accordance with the above principles.

B.2 EU Expert Group on Artificial Intelligence

In June 2018, the European Commission established an expert group on artificial intelligence, representing a broad range of stakeholders, which developed the following ethical guidelines for artificial intelligence:

- Develop, deploy, and use AI systems in a way that adheres to ethical principles, consider technical and non-technical methods.
- Pay particular attention to situations involving more vulnerable groups.
- Adopt adequate measures to mitigate these risks when appropriate, and proportionately to the magnitude of the risk.
- Foster research and innovation to help assess AI systems.
- Communicate, in a clear and proactive manner, information to stakeholders about the AI system's capabilities and limitations.
- Facilitate the traceability and auditability of AI systems.
- Involve stakeholders throughout the AI system's life cycle. Foster training and education so that all stakeholders are aware of and trained in trustworthy AI.
- Be mindful that there might be fundamental tensions between different principles and requirements. Continuously identify, evaluate, document and communicate these trade-offs and their solutions.
- Adopt a Trustworthy AI assessment list when developing, deploying, or using AI systems, and adapt it to the specific use case in which the system is being applied.

- Keep in mind that such an assessment list will never be exhaustive. Ensuring Trustworthy AI is not about ticking boxes, but about continuously identifying and implementing requirements, evaluating solutions, ensuring improved outcomes throughout the AI system's lifecycle, and involving stakeholders in this.

In addition to the guidelines, the expert group has also developed an assessment list. The assessment list is expected to be revised in early 2020. The pilot version of this checklist can be downloaded here: https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines/2

Bibliography

ISO/IEC 2382-28 *Information technology – Vocabulary – Part 28: Artificial intelligence – Basic concept and expert systems*

DS/EN ISO/IEC 27000:2020 *Information technology – Security techniques – Information security management systems – Overview and vocabulary*

DS/ISO/IEC 27701:2019 *Security techniques – Extension to ISO/IEC 27001 and ISO/IEC 27002 for privacy information management – Requirements and guidelines*

Manuel Fernández-Delgado and others *Do We Need Hundreds of Classifiers to Solve Real World Classification Problems?* (2014) 15 J. Mach. Learn. Res. 3133.

http://www.oecd.org/going-digital/ai/principles/

EU HLEG ON AI: ETHICS GUIDELINES FOR TRUSTWORTHY AI

CAN/CIOSC 101:2019 NATIONAL STANDARD OF CANADA. *Ethical design and use of automated decision systems*, 03.100.02; 35.020; 35.240.01

https://www.retsinformation.dk/ Forms/R0710.aspx?id=209925

Effective, co-created and compliant adaptive case management for knowledge workers (EcoKnow) Grand Solutions Project. Funded by Innovation Fund Denmark 2017-2021. PI: Thomas Hildebrandt. https://EcoKnow.org

Public Administration and Computational Transparency in Algorithms (PACTA) research project. Funded by Independent Research Fund Denmark 2019-2022. PI: Henrik Palmer Olsen, co-PI Thomas Hildebrandt. https://jura.ku.dk/icourts/research/pacta/

What's in the Box? The Legal Requirement of Explainability in Computationally Aided Decision-Making in Public Administration. Henrik Palmer Olsen, Jacob Livingston Slosser, Thomas Troels Hildebrandt & Cornelius Wiesener, University of Copenhagen Faculty of Law, Legal Studies Research Paper Series, paper no. 2019-84, https://ssrn.com/ abstract=3402974

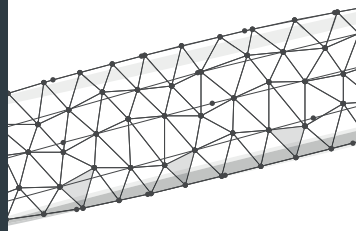
The DCR Graphs Process Portal. Søren Debois, Thomas T. Hildebrandt, Morten Marquard, Tijs Slaats. BPM (Demos) 2016: 7-11

DSL. *Den Danske Ordbog* [retrieved 15th of March 2020]. https://ordnet.dk/ddo

This DS/PAS provides a checklist for relevant considerations in the various phases of IT projects where artificial intelligence is used for decision support in public case management. It is important that these considerations are included in the basis for requirements and solutions, as well as in the decision to carry out activities and move on to the next phase of the IT system's lifecycle. It is the user's responsibility to determine whether the checklist is applicable for a given purpose.

The target group is designers, developers, providers, purchasers, supervisors, and users of artificial intelligence for decision support in public case management who want or are required to evaluate the use of the system.

A secondary target group is the stakeholders affected by the system, such as public authorities and citizens in general.



NORDIC SWAN ECOLABEL
Printed matter
5041 0968