



SHERPA

Shaping the ethical dimensions of smart information systems– a European perspective (SHERPA)



Deliverable No. 3.4

From Good Practices to Standard Practices

18 December 2020

**This project has received funding from the
European Union's Horizon 2020 Research and Innovation Programme
Under Grant Agreement no. 786641**



Document Control

Deliverable	From Good Practices to Standard Practices
WP/Task Related	3.4
Delivery Date	
Dissemination Level	
Lead Partner	NEN
Contributors	DMU, Trilateral, University Twente,
Reviewers	All activities in task 3.4 discussed with all SHERPA partners, on a regular basis in the SHERPA project, and in general assembly meetings
Abstract	<p>This SHERPA Deliverable on standardization asks whether a standard for ethical handling of Artificial Intelligence (AI) is an option to avoid major ethical issues arising from the technology. To this end, the authors of this Deliverable facilitated the exchange of interest and ideas between AI and big data stakeholders and SHERPA.</p> <p>AI and big data stakeholders were informed about SHERPA and its focus on ethical handling of AI, and SHERPA partners were taught about standardization and contributed to ongoing standardization projects on AI and big data. This exchange of interests, knowledge and experiences provided insight into the feasibility of applying SHERPA's results on ethics and human rights in AI to standardization processes.</p> <p>This SHERPA task revealed that many standardization activities on AI and big data were already ongoing. The SHERPA project developed knowledge in the form of case studies, scenarios and guidelines that were shared with these ongoing standardization activities. SHERPA partners provided expert input in the form of comments to ongoing standardization activities, in the field of AI and big data as well as related sectoral topics such as health care, sustainable development and energy grids.</p> <p>The task found limited interest in organising round tables for discussions or initiating new standardization work in light of a number of ongoing standardization activities. Other opportunities to embed ethics considerations into AI standardization were pursued. Most notably, a chapter and an annex on ethics was added to the European standard for health and wellness apps.</p>
Key Words	Standard, standardization, AI, ethics, big data, health care



Revision History

Version	Date	Author(s)	Reviewer(s)	Notes
0.1	Sept 2019 - March 2020	Marlou Bijlsma, Thamar Zijlstra (NEN)		First Draft , periodically updated
0.2	March 2020	Thamar Zijlstra, Marlou Bijlsma (NEN)	stakeholder board members	3.4 update for consultation with the Stakeholder Board
0.3	dec 8, 2020	Thamar Zijlstra, Marlou Bijlsma (NEN)		Second Draft
0.4	Dec 10, 2020	Bernd Stahl (DMU), Doris Schroeder (UCLAN)		Comments to the second draft
0.5	Dec 11, 2020	Marlou Bijlsma, Thamar Zijlstra (NEN)		Incorporate comments
0.6	Dec 14, 2020	Julie, SHERPA editor		Editorial review
0.7	Dec 17, 2020	Marlou Bijlsma, Thamar Zijlstra (NEN)		Incorporate comments editor



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Executive Summary

Standards are voluntary agreements that set harmonized ways of doing things which are better, efficient, safe and secure. Standards define quality criteria and requirements for processes, systems, products, services, persons, vocabulary or methodologies.

This SHERPA Deliverable on standardization asks whether a standard for ethical handling of Artificial Intelligence (AI) is an option to avoid major ethical issues arising from the technology. To this end, the authors of this Deliverable facilitated the exchange of interest and ideas between AI and big data stakeholders and SHERPA.

AI and big data stakeholders were informed about SHERPA and its focus on ethical handling of AI, and SHERPA partners were taught about standardization and contributed to ongoing standardization projects on AI and big data. This exchange of interests, knowledge and experiences provided insight into the feasibility of applying SHERPA's results on ethics and human rights in AI to standardization processes.

This SHERPA task revealed that many standardization activities on AI and big data were already ongoing. The SHERPA project developed knowledge in the form of case studies, scenarios and guidelines that were shared with these ongoing standardization activities. SHERPA partners provided expert input in the form of comments to ongoing standardization activities, in the field of AI and big data as well as related sectoral topics such as health care, sustainable development and energy grids.

The task found limited interest in organising round tables for discussions or initiating new standardization work in light of a number of ongoing standardization activities. Other opportunities to embed ethics considerations into AI standardization were pursued. Most notably, a subchapter and an annex on ethics was added to the European standard on quality and reliability criteria for health and wellness apps.



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List of acronyms/abbreviations

Abbreviation	Explanation
CEN	European Committee on Standardization
CEN/TC	CEN Technical Committee
CENELEC	European Committee for Electrotechnical Standardization
CWA	CEN Workshop Agreement (pre-standard)
GDPR	General Data Protection Regulation
ISO	International Standardization Organization
IEC	International Electrotechnical Standardization Organization
PAS	Publicly Available Specification



1. Introduction to standardization and SHERPA

A standard is a voluntary agreement between all parties concerned, based on consensus, and developed through a transparent process¹. Voluntary, consensus-based standards play a vital, though largely invisible role in national and international infrastructures, economies and trade. By providing agreed ways of naming, describing and specifying, measuring and testing, managing and reporting, standards provide:

- basic support for commercialisation, markets and market development;
- a recognised means for assuring quality, safety, interoperability and reliability of products, processes and services;
- a technical basis for procurement;
- technical support for regulation; and can lead to variety and cost reduction through optimization and best practice².

Standards are widely accepted, either on a national, European or international level. Standards can be used as a tool for collective action to tackle a societal issue³.

Standardization through the European Committee on Standardization (CEN/CENELEC)⁴ and the International Standardization Organization (ISO/IEC)⁵ is the process to develop formal standards, in Europe or worldwide respectively. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant international standards.

"National standardization bodies have the responsibility of ensuring that their technical standpoint is established taking account of all interests concerned at national level" (ISO directives, part 1⁶, ISO code of ethics⁷). Because all stakeholders are informed on how they can contribute to the standard, the application of a standard creates trust and understanding among stakeholders. National standardization bodies, such as NEN, facilitate the process of standardization. The experts in the standardization committee define the content.

Once a standard is implemented a conformity assessment can be done to see if a product, service, person, methodology or organization complies with a standard. Standardization is therefore a tool for self-regulation. A sector defines for itself how to tackle an issue.

Standards can also be a tool for the legislator. Legislation can refer to ISO, CEN or national standards. For example, a legislator sets the objective, the stakeholders agree on the state-of-the-art of acceptable measures to achieve the objective and then the agreement is published in the form of a standard.

¹ <https://www.iso.org/developing-standards.html>

² https://ec.europa.eu/research/industrial_technologies/pdf/practical-standardisation-guide-for-researchers_en.pdf

³ https://ec.europa.eu/research/industrial_technologies/pdf/practical-standardisation-guide-for-researchers_en.pdf

⁴ <https://www.cen.eu/about/Pages/default.aspx>

⁵ ISO is an independent, non-governmental international organization with a membership of 165 national standards bodies.

⁶ <https://www.iso.org/sites/directives/current/consolidated/index.xhtml>

⁷ ISO code of ethics, 2004. <https://www.iso.org/publication/PUB100011.html>



SHERPA task 3.4 aims to assess the feasibility of making use of the SHERPA results in standardization efforts on ethics and AI. Section 2 elaborates the approach, Section 3 discusses the opportunities for including AI ethics concerns in a standard, and Section 4 presents the results that were achieved by the team.

2. The feasibility of standardizing approaches to ethical issues in AI

Standards are a voluntary agreement between all stakeholders. Transparent development processes involving all parties concerned and consensus are important principles of standardization. Formal standardization organisations, such as ISO/IEC, CEN/CENELEC and NEN are neutral facilitators of the formal standardization process. NEN, the organisation where the authors of this report are based, is one of the national members of the CEN/CENELEC network at European level, and of the ISO/IEC network at international level.

SHERPA task 3.4 explored the feasibility of standardization of good practices identified by SHERPA to standard practices. Following the principles of standardization, the strategy to assess the feasibility of standardization consisted of the following 4 steps, iteratively moving from one to the other where appropriate:

- 1) Map existing standards for AI and big data with the SHERPA results from with WP1;
- 2) Explore the feasibility of incorporating the SHERPA results into relevant sector standards;
- 3) Stakeholder analysis and needs assessment with a view to sustainably addressing ethical issues in the standardization of AI;
- 4) If feasible, contribute to ongoing standardization developments or develop standardization proposals and embed within the CEN structure.

The first three steps generate information to assess and define the most relevant strategy and the most feasible ongoing standardization projects to continue in step 4, embedding ethics in formal standardization for AI, possibly in different sectors. These four steps were intended to reach the following result: sustainable embedding of ethics for AI and big data in standardization, with societal acceptance of and trust in AI and big data.

Section 3 of this Deliverable provides an overview of the actions and results from steps 1 to 3.

Section 4 presents the SHERPA results and activities to embed ethics and human rights of AI issues into formal standardization activities (step 4).



3. Ongoing standardization; needs and stakeholders

3.1 Scope

The ethical and human rights challenges of AI and big data are our starting point. Conversations with stakeholders in and desk research into ongoing standardization activities further defined the scope.

The case study and scenario topics (from Work Package (WP) 1 of the SHERPA project) as well as stakeholder discussions (in WP1) highlighted the different sectors of relevance for AI and big data. This resulted in the following lists of topics, highlighting the sector-specific areas of standardization:

Cases from WP1: [Internet of Things \(IoT\)](#), [Agriculture](#), [Smart Cities](#), [Public use](#) (municipalities making use AI and big data), [Human Brain Research](#), [Predictive risk intelligence](#), [Insurance](#), [Customer relation management](#), [Cybersecurity](#), and [Smart Grids](#).

Scenarios from WP1: [Self driving cars](#), [Predictive policing](#), [Mimicking technologies](#) (in health care), [Warfare](#), and [Education](#).

Where relevant standardization committees existed, they were contacted starting at the Dutch national level, including⁸:

- NEN policy committee agrofood;
- NEN Standardization Advisory Group Smart Cities (SAG-SC);
- NEN mirror group of IEC/TC 57 Smart grid ;
- NEN mirror group of ISO/TC 215 and CEN/TC 251 Health informatics;
- NEN mirror group of ISO/JTC1 SC42 AI and big data.

For many of the fields of application covered by the SHERPA project, no standardization processes were occurring during the time of this study.

Additionally, horizontal (overarching) issues that are relevant for all sectors, were identified. Relevant topics in the horizontal issues are:

- Horizontal guidelines for addressing ethics in the development and implementation of AI and big data (task 3.2)
- Regulatory /self-regulation /certification (ISO/IEC 17029)
- Ethical competencies
- Ethics assessment: ethics committees and ethical impact assessment and IT
- Big data and AI

The scope thus includes horizontal (overarching) and vertical (sector specific) topics. Here too, the relevant (NEN) standardization committees were informed about the SHERPA project.

⁸ In standardization the international expert/stakeholder group is called the 'technical committee' or TC. The national group of experts that follows, comments and votes on the work of the international groups is called the 'national mirror group'.



Section 4 reports on the outcomes.

3.2 Mapping existing standards for AI and big data and ethics

With over 23.000 standards published within ISO⁹ and over 10,000 within IEC^{10,11}, many stakeholders from a wide variety of sectors are engaged in standardization: from construction to farming, from health care to corporate responsibility. Standards are currently being developed for AI and big data in general, but also for specific sectoral applications in, for instance, smart energy grids and health care.

NEN, the national standardization body of the Netherlands, is part of the network of CEN/CENELEC and ISO/IEC. The mapping of SHERPA results with standards and standardization efforts in this report is limited to the formal standards and ongoing standardization efforts within NEN, CEN and ISO networks. Within this network NEN has access to workplans, proposals, draft documents and opportunities to submit comments to draft standards.

In addition to formal standardization with CEN and ISO, international organizations, such as Organization for Economic Cooperation and Development (OECD) and the European Commission and its High Level Expert Group on AI¹², develop standards and guidelines on AI and big data. Additional industrial standardization organizations, such as the Institute of Electrical and Electronics Engineers (IEEE) (P7000 series of standards), W3C¹³, International Telecommunications Union (ITU), develop standards on AI and big data. Some of these initiatives might result in standards¹⁴. The work of these standardization organizations are not included in the mapping, nor has this task contributed to these standards.

Each of the subjects addressed in the 10 SHERPA case studies¹⁵ and 5 scenarios¹⁶ (from WP1) was mapped with existing standards and ongoing standardization efforts. Section 4 provides an overview of relevant standardization activities at a (Dutch) national, European or international level, and where and how SHERPA was able to contribute to these efforts.

3.3. Explore the feasibility of and need for standardization in the field of ethics for AI and big data

3.3.1 Strategy

The results from the SHERPA project, such as the 10 case studies¹⁷, 5 scenarios¹⁸ (from WP 1) and also the Guidelines for the Ethical Use of AI and Big Data Systems and Guidelines for the Ethical Development of AI and Big Data Systems: An Ethics by Design approach¹⁹ (from task 3.2) have potential to contribute to standardization. This SHERPA task 3.4 identified opportunities and interest in contributing to standardization. The assessment is based on the expertise of the NEN standardization consultants from the different sectors,

⁹ <https://www.iso.org/standards.html>

¹⁰ <https://www.iec.ch/homepage>.

¹¹ Note: there is overlap in standards from ISO and standards from IEC: these standards are published as ISO/IEC standards.

¹² <https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence>

¹³ <https://www.w3.org/standards/>

¹⁴ BSI White Paper – Overview of standardization landscape in artificial intelligence, 2019.

¹⁵ <https://www.project-sherpa.eu/category/case-studies/>

¹⁶ <https://www.project-sherpa.eu/category/scenarios/>

¹⁷ <https://www.project-sherpa.eu/category/case-studies/>

¹⁸ <https://www.project-sherpa.eu/category/scenarios/>

¹⁹ <https://www.project-sherpa.eu/guidelines/>



a mapping of ongoing standardization activities, and conversations that were held with stakeholders in and beyond the standardization community.

The contextual developments in the field are also important for this needs assessment. Standards can be used as a tool for practical implementation of legislation. Therefore developments in legislation and policy were also carefully monitored.

3.3.2 European Union

Privacy is an important ethical issue in relation to AI and big data. European legislation exists for privacy. The General Data Protection Regulation (GDPR) was published in 2016. This legislation is important for ethical AI and big data.

The European Commission has taken several initiatives around AI²⁰. The European Standardization Organisations' (CEN/CENELEC) work on the development of standards for AI is included in their communication, "The annual Union work programme for European standardisation for 2020."²¹ Within CEN/CENELEC, standardization for AI is discussed within the CEN/CENELEC Focus Group on AI.

3.3.3 Dutch national policy initiatives

With respect to Dutch national policy initiatives, we have focused on the Netherlands. The Netherlands are a leading country in terms of research, deployment, adoption and use of smart information technologies. NEN is based in the Netherlands and is the gateway to international standardization for Dutch stakeholders. In other countries there is also a national standardization institute that can facilitate participation by their respective stakeholders.

At different levels of government, initiatives are taken to deal with ethical issues in AI and big data. Dutch municipalities are dealing increasingly with new technologies in their city, either because they introduce them themselves, or because others install them, such as crowd monitoring applications as described in the use case on public use of data (WP1)²². Dutch local governments have limited scope for legislation, as this is often done at the national or European level. They can however decide whether they actually want to allow or use a new technology. Procurement is therefore an important means for them to steer new technologies, but they also develop technologies themselves.

At the national level three ministries have drafted a policy letter on AI to the Dutch Parliament, including policies with respect to the use of technologies. Governmental agencies are also developing policy with respect to how they want to handle the new technology. The Dutch government has developed the "Ethisch Verantwoord Innoveren Toolbox"²³ (ethically responsible innovation toolbox), with tools for developers of AI and those involved in public management who wish to develop or use new technologies.

²⁰ The High Level Expert Group is one of these initiatives. The group has published *Ethics Guidelines for Trustworthy AI and Policy* and *Investment Recommendations for Trustworthy AI*. The initiative is not linked to a standardization effort. <https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence>

²¹ https://eur-lex.europa.eu/resource.html?uri=cellar:641f4b7e-f96b-11e9-8c1f-01aa75ed71a1.0001.02/DOC_1&format=PDF pp 3-4

²² <https://www.project-sherpa.eu/885-2/>

²³ <https://www.digitaleoverheid.nl/dossiers/toolbox-ethisch-verantwoorde-innovatie/>



3.4. Stakeholder analysis and needs assessment

3.4.1 Strategy

Step 3 analysed stakeholders and assessed the need to sustainably embed ethics into standardization of AI and big data. Stakeholders invest their expertise, time and financial means to develop standards that address their needs. Standardization institutes provide the neutral platform to facilitate this activity but do not initiate any standards development. Therefore it is vital that we conduct a stakeholder needs assessment for standardization in this field to see whether SHERPA results might feed into standardization efforts. Depending on the status of a standard, it can take longer to develop than the 3.5 year duration of the SHERPA project (May 2018 to October 2021). This is another reason to engage broad stakeholder support.

In order to have the discussion on ethical AI and big data, stakeholders from different backgrounds need to come together, most notably requiring expertise from ethicists, philosophers, human rights experts and AI experts, AI developers and industries making use of AI, among other relevant stakeholders.

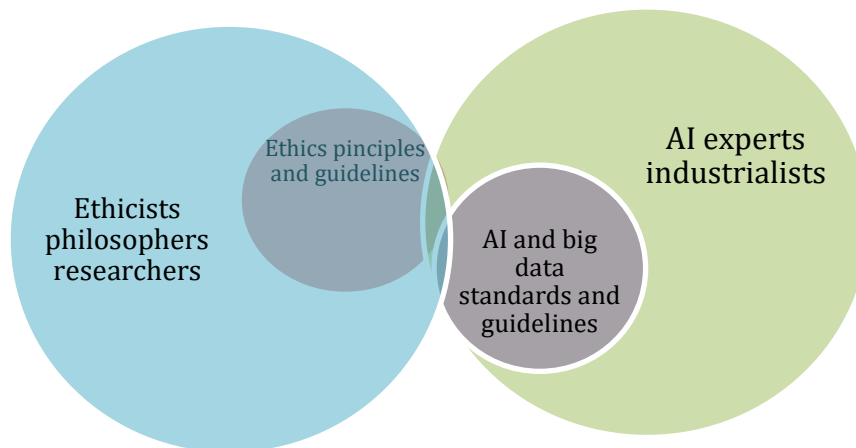


Figure 1 - Stakeholders collaborating on ethical AI

To systematically identify stakeholders NEN used a regular stakeholder analysis tool. This tool gives an overview of all stakeholder categories, see [Annex A](#).

The 10 case studies and 5 scenarios from WP1 were disseminated in the network of NEN. NEN emailed the case studies and scenarios to relevant national mirror groups²⁴ with an invitation to discuss the SHERPA results and meet with experts/stakeholders in the fields of health care, energy networks, agrofood and smart cities. The case studies and scenarios were a starting point for a discussion on addressing ethics in possible standardization work.

²⁴ In standardization the international expert/stakeholder group is called the 'technical committee' or TC. The national group of experts that follows, comments and votes on the work of the international groups is called the 'national mirror group'.



We also used the 10 cases²⁵ and 5 scenarios²⁶ from WP1 and the guidelines on the ethical development and use of AI from task 3.2²⁷ to start a conversation with stakeholders in different sectors on what they feel needs to be standardized.

3.4.2 Informing stakeholders

NEN is a member of the European standardization organization CEN/CENELEC and the international standardization organizations ISO and IEC. NEN has over 5,000 active national stakeholders in its network who work on standardization on a wide variety of topics. This is a good starting point for any stakeholder analysis. Additionally, stakeholders outside the network were identified.

From the start of SHERPA, much attention has been paid to informing stakeholders about the project. This also provided an opportunity to consult stakeholders about their standardization needs. Table 1 provides an overview of the number of stakeholders NEN personally met for the purpose of informing them about SHERPA. [Annex A](#) provides additional information on the stakeholder categories.

NEN had longer interactions (email, web meetings, physical meetings, telephone conversations) with 84 individuals from 69 organizations (sometimes with more than one person from an organisation).^{28,29}

Table 1 : Informative meetings with organisations representing different stakeholder groups

	Stakeholders	Number of organisations
1°	Direct users	16
1b	Trade associations of direct users	2
2°	Organisations that create conditions /Commissioning actor	
2b	Trade/representative associations of commissioning actors	1
3°	Advisory organisations	8
3b	Trade/Representative associations of advisory organisations	
4°	Implementing / Executive organisation, service providers	6
4b	Trade/Representative organisations of the Implementing / Executive organisation, service providers	
5°	Producers / suppliers of the main product	5
5b	Trade/Representative organisations of producers/suppliers of the main product	
6°	Producers/Suppliers of related products and services	
6b	Trade organisations of producers / suppliers of related products and services	
7	Research- and knowledge institutes	20
8	Supervisory institutions	2
9	Legislative organisations	3
10	Existing / New initiators	2
11	Context influencer	4

NB: This table does not include all presentations and workshops that are part of the communications and advocacy activities for SHERPA. The stakeholders and meetings with the standardization projects in section 4 are also not included in this table.

²⁵ <https://www.project-sherpa.eu/category/case-studies/>

²⁶ <https://www.project-sherpa.eu/category/scenarios/>

²⁷ <https://www.project-sherpa.eu/guidelines/>

²⁸ As stakeholders were not formally asked if we could share information on the meetings with third parties, only meta data is shared. For the benefit of the openness of the personal conversations this was a better way of working.

²⁹ The estimated gender distribution of the individuals we have spoken to: 54 men and 30 women.



3.5 Dynamics around standardization of ethics in AI

Standards are initiated and carried by stakeholders. Connecting the knowledge of the SHERPA project with stakeholders, and increasing the knowledge of stakeholders about standardization, was intended to provide clarity on whether there is support among stakeholders to standardize addressing ethical issues in AI. However, this support depends on the urgency felt by stakeholders to tackle the issue. There are several drivers for standardization, including a crisis and persistence of the issue, public pressure, and the realisation that adopting a product or service, e.g. a standard, is a competitive advantage due to societal concerns.

In the book “Changing the food game”, Lucas Simons³⁰ developed a collaboration progression model to understand the dynamics around collaboration between competitors to tackle common issues. Though the model was developed for sustainability in international food commodities, the model also applies to the dynamics around other societal and crossborder issues, such as addressing ethical issues in AI. The cooperation progression and the characteristics of the societal and crossborder issues are similar, as is the required collaboration between different types of stakeholders including competitors. Progress is facilitated by public pressure or other drivers and a willingness to collaborate.

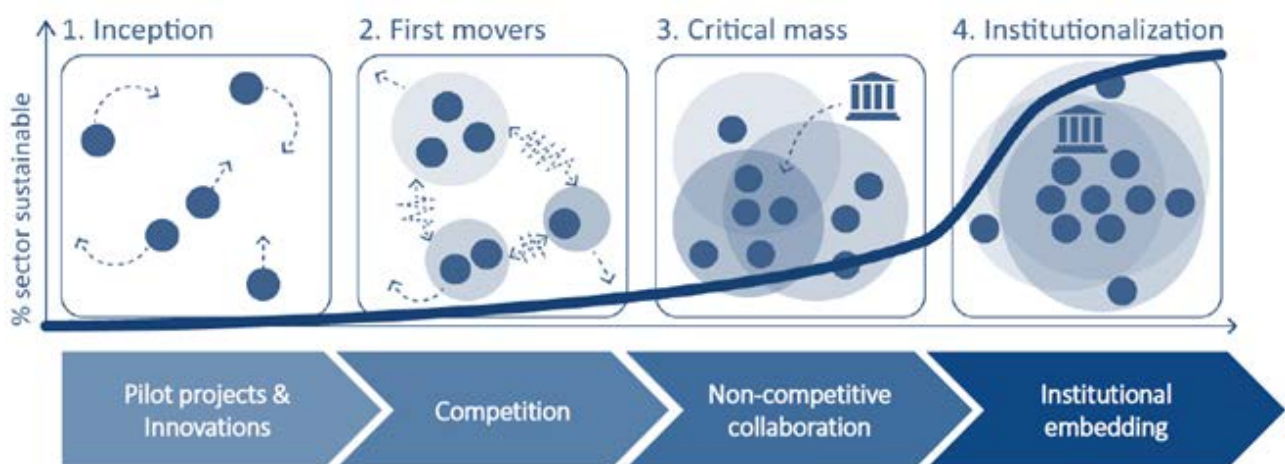


Figure 2 - Collaboration progression model (Source: Lucas Simons)

Lucas Simons distinguishes 4 phases in societal transition. Figure 2 shows a progression in collaboration between stakeholders (the dark blue dots) from phase 1 to phase 4. In the first two phases of this model innovators and pilot projects compete between each other highlighting their uniqueness and specific excellence. In due time, understanding between the competitors about their common goal and societal pressure can lead to strategies for collaboration. During this phase 3, represented by the blue dots moving closer together, alliances can emerge for non competitive collaboration. Eventually a common good practice emerges that could be standardized. The final phase is when the practice is institutionalised, via legislation or policy, or just commonly accepted practice.

The issue of ethics for AI can be placed in the first phase of this model. Eventhough there is legislation for privacy, discrimination and human rights and eventhough there are standards (under development) for

³⁰ Lucas Simons. Changing the food game. Market transformation strategies of sustainable agriculture. Greenleaf Publishing. 2014.



technical robustness and safety but also societal and environmental well being, the application for AI is still in the project phase.

The ethical principles and human rights issues are not new, but the application of these principles to AI and big data is and stakeholders are figuring out how to deal with this principles. Ethics-by-design is one methodology well described in the SHERPA Guidelines for the use and development of ethical AI.³¹ Ethical impact assessment for AI or ethical committees in governmental and commercial organisations are also instruments to embed ethics. The best approached will eventually emerge and crosssectoral collaboration will increase further up to the level where it can be standardized. Lucas Simons states that it is not possible to skip any of these phases to speed up the transition. Interestingly enough, governmental organisations have taken a very pro-active role when it comes to the ethics of AI. If this is effective it might prove that this model needs improvement and might provide new insights for other societal issues, such as the sustainability of the food chain. It might be an interesting case for further researchs.

The Simons progressive collaboration model guides to understand the context of and dynamics around standardization for ethical AI. This SHERPA task (3.4) identified several standardization activities in the area of AI and big data, as can be read below in chapter 4. The focus of international standardization work on AI and big data is dominated by interest in the technical aspects and interoperability. Ethics in AI is being addressed in one work item³² of the ISO committee on AI and big data.

Several additional opportunities to embed ethics in standardization were found in more sectoral standardization projects, for instance on health informatics and health apps.

This SHERPA task 3.4 on standardization found limited interest in organising round tables for discussions or initiating new standardization work, because of the vast amount of ongoing standardization activities with similar scope. There was no interest in developing a new standard (CEN Workshop Agreement).

4. Embedding SHERPA findings on ethical and human rights issues relevant for AI in standardization

4.1 Strategy

To assess the feasibility of embedding ethics in AI standards, within SHERPA task 3.4, four strategies were used:

- 1) Sharing SHERPA results with standardization efforts;**
- 2) Informing SHERPA partners about ongoing standardization activities;**
- 3) Facilitating SHERPA partners to participate in standardization efforts;**
- 4) Obtaining expert standardization input for SHERPA.**

³¹ <https://www.project-sherpa.eu/guidelines/>

³² [ISO/TR 24368](#) Information Technology - Artificial Intelligence - Overview of ethical and societal concerns, under development in 2020.



This section presents the results. The results are organized by standardization effort, each of them referring to the relevant strategy of the four different strategies used.

In line with the four strategies, NEN facilitated the exchange of information regarding current understanding of ethics of AI and big data (as from WP 1 and task 3.2³³) and ongoing standardization, so that stakeholders could assess the need for standardization.

Standardization is done in steps, and there are multiple opportunities to contribute. Possible outcomes of the standardization strategies are:

- submitting a proposal for the development of a new standard;
- submitting the SHERPA research results as a source document to inform ongoing standardization efforts;
- commenting on draft standards based on the Sherpa research results and expertise.

4.2 Guidelines for ethics and human rights in AI and big data

The SHERPA '[Guidelines for the Ethical Use of AI and Big Data Systems](#)' and [Guidelines for the Ethical Development of AI and Big Data Systems: An Ethics by Design approach](#) from task 3.2 are based on widely used approaches for the development and use of IT tools.

To assess the feasibility of using these guidelines as a source document for standardization efforts, it is important to assess whether there is interest and support among participants in standardization efforts. Standardization on AI takes place in the scope of ISO/IEC JTC 1/SC 42 'AI and Big data', so this would be the most appropriate committee to which to submit a new work item proposal.

For the acceptance of proposals it can be helpful to base the work on existing standards. The guidelines for the use and development of ethical AI from task 3.2 are based on the IT service management frameworks ITIL/COBIT and CRISP-DM respectively. ITIL is very closely linked to the international standard ISO 20000, which is likely to be valuable information for people already working on standards. This is a language they understand. An ISO guide³⁴ explains the link between COBIT/ITIL and ISO 20000. However, the link between CRISP-DM and ISO or IEC standards is less clear.

As standardization is initiated and carried out by stakeholders, it was firstly explored whether there was enough enthusiasm in ISO/IEC/JTC 1/SC 42 on AI and big data. One of the stakeholder board members of SHERPA participates in the Dutch mirror group. Exchanges between the SHERPA partners and participants in ISO/IEC/JTC 1/SC 42, confirmed that there was no support at the international level for a standard based on the SHERPA guidelines^{35,36} developed in task 3.2. For ethics ISO/IEC/JTC 1/SC42 refer to the work in [ISO/TR 24368](#) 'Information Technology - Artificial Intelligence - Overview of ethical and societal concerns', thereby creating the impression of isolating the discussion on ethical principles and human rights to this standard and avoiding mainstreaming ethics in the other standardization efforts of the Sub Committee 42. The subchapter on ISO/IEC/JTC 1/SC 42 (4.5.1) provides additional information.

³³ For the results of the SHERPA project see <https://www.project-sherpa.eu/>

³⁴ ISO, *ISO/IEC 20000 Service management. A practical guide*. 2019 <https://www.iso.org/publication/PUB100441.html>

³⁵ [Guidelines for the Ethical Use of AI and Big Data Systems](#)

³⁶ [Guidelines for the Ethical Development of AI and Big Data Systems: An Ethics by Design approach](#)



4.3 Sharing SHERPA results

The results from SHERPA WP1 were a great opportunity to apply strategy **1) Sharing SHERPA results with standardization efforts**. The 10 case studies and 5 scenarios from SHERPA WP1 were disseminated to the standardization community. Three standardization efforts, the CEN Focus Group on AI, the ISO committee on AI and big data (ISO/IEC JTC 1/SC 42) as well as the ISO committee on health informatics (ISO/TC 215), organized calls to collect use cases³⁷ for AI. The SHERPA case studies and scenarios (from WP1) were submitted for incorporation in the respective standards on use cases. Section 4.4 provides additional information.

Additionally, NEN actively shared the results of WP 1 with different committees, including the Dutch standardization policy committee on agrofood, and the national mirror committee of ISO/IEC 57 on energy. The SHERPA cases and scenarios were also an opportunity to reach out to stakeholders directly to discuss their need for standardization, as was explained in 3.4.1.

4.4 Ongoing standardization work at European level

The European Commission emphasized the importance of standards for AI in the Communication on annual work programme for European standardization 2020³⁸. Standards can be a means to support European legislation³⁹. The EC can also submit a standardization request to CEN/CENELEC. Several relevant standardization activities are ongoing.

4.4.1 Health and wellness apps

The working group on health and wellness apps (a working group under CEN/TC 251/WG 2 – Healthcare technology – technology and applications⁴⁰) is developing a new EN-ISO Technical Specification on quality and reliability criteria for health and wellness apps (EN-ISO/IEC TS 82304-2⁴¹), an assignment from the European Commission to CEN/CENELEC (the European Standardization Organization).

Inspired by the success of the European energy label for washing machines and refrigerators, the Technical Specification (TS) sets a label to better enable consumers of health apps, including health professionals, to make informed decisions about technical performance, clinical assurance, usability, safety and security. Behind the label is a list of 100 questions and a scoring system for the quality requirements. The health and wellness apps project started as a CEN project, but ISO and IEC opted in during the development of the Technical Specification. EN-ISO/IEC TS 82304-2 is envisaged to be published in the first half of 2021.

In line with strategy **1) Sharing SHERPA results with standardization efforts**, the Dutch mirror group of the health apps project used the [SHERPA guideline](#), on the Ethical Development of AI and Big Data Systems: An Ethics by Design approach, to formulate suggestions for the ethics questions in the quality requirements questions. The Dutch mirror group suggested and drafted an ethics annex, comparing the focus of the standardization committee on technical performance clinical assurance, usability safety and security with the overview of ethical issues that is provided in the SHERPA guideline. Missing ethics principles were picked up

³⁷ The call asked for use cases; examples of how AI was used in products or services. The SHERPA case studies and scenarios were rewritten/reorganized to match the requirements for the use case format.

³⁸ [Communication on annual work programme for European standardization 2020](#).

³⁹ CEN Guide 30 *European Guide on Standards and Regulation - Better regulation through the use of voluntary standards - Guidance for policy makers*, <https://www.cenelec.eu/standards/Guides/Pages/default.aspx>

⁴⁰ [CEN/TC 251/WG 2 – Healthcare technology – technology and applications](#)

⁴¹ The Standard is still in development when writing this report. The public comments round and vote is envisaged for early 2021 and publication in mid 2021.



and resulted in adaption of the ethics related questions in the assessment questionnaire. The suggested amendments from the Dutch mirror group for the quality questions and annex were adopted by the (ISO/TC 215 WG2) project team. This resulted in better embedding the principles of “human agency, liberty and dignity” and “non-discrimination and fairness” in ISO/IEC DTS 82304-2

The collaboration between SHERPA partners and the health app expert group was mutual. NEN facilitated a SHERPA focus group discussion with the health app standardization experts (strategy 4 **Obtaining expert standardization input for SHERPA**). Moreover two SHERPA partners participated in the 3 round Delphy study of the Health app project team to prioritize the quality requirement questions and related scoring system that the standards sets (strategy 3: **dissemination of SHERPA results among the standardization communities**).

4.4.2 European AI standardization needs - CEN Focus Group on AI

Challenges identified in the European Commission’s Communication ‘Artificial Intelligence for Europe’, [COM\(2018\) 237](#), refer to the deployment, interoperability, scalability, societal acceptability/concerns, safety and liability of AI, thus creating a need for standardization. The CEN/CENELEC Focus Group on AI⁴² is the starting point to support the identification of specific European Standardization needs.

Strategy 1) Sharing SHERPA results with standardization efforts: In September 2019 the CEN Focus Group on AI sent out a request to submit the SHERPA cases to them. All SHERPA cases and 1 scenario were summarized into the required template and submitted, 11 in total. The SHERPA guidelines from task 3.2 were also mentioned. The CEN Focus Group has received a total of 29 cases which were discussed in a brainstorming session. The brainstorm report will include recommendations for standardization.

SHERPA consortium partner University Twente (Philip Brey) was a member of the NEN mirror committee.

SHERPA partners were invited to propose a speaker for a CEN meeting on health care and AI on May 14 2020 in Brussels. Although this meeting was initially cancelled due to the Covid-19 pandemic, NEN nominated David Wright to participate as a speaker and represent SHERPA in the AI in Health - CEN CENELEC stakeholder workshop (27 october 2020). The work of the CEN Focus Group on AI is still in early stages. The work of the CEN Focus Group on AI is expected to develop a European standardization roadmap.

4.4.3 ICT Professionalism and digital competence – CEN/TC 428

Strategy 2) Informing SHERPA partners about pathways to ongoing standardization was applied here: CEN/TC 428 ICT Professionalism and Digital Competencies⁴³. This standardization effort, as per request from the EC, included a 'code of ethics'. In 2018 SHERPA partners were informed of this work, and how they could contribute. The SHERPA project however did not directly have expertise on ICT competencies. SHERPA stakeholder board member Bramjan Mulder is an active participant in this standardization effort on digital competencies.

4.5 Ongoing standardization at international level

4.5.1 AI and big data – ISO/IEC JTC 1/SC 42

The joint [ISO/IEC technical committee on AI and big data](#) (ISO/IEC JTC1 SC 42) addresses standardization for Artificial Intelligence and big data.

⁴² [CEN/CENELEC Focus Group on AI](#)

⁴³ [CEN/TC 428 ICT Professionalism and Digital Competencies](#)



Strategy 1) **Sharing SHERPA results with standardization efforts** was applied: In February 2020, The ISO committee on AI and big data (ISO/IEC JTC1 SC42) requested stakeholders in several ISO Technical Committees to submit cases to contribute to [ISO/IEC TR 24030](#) 'Information technology - Artificial intelligence - Use cases'. The early draft already included 148 use cases. NEN summarized the SHERPA case studies and scenarios, into the required template and submitted the use cases for including on the ISO deliverable. The final list of use cases and subsequent analysis is not yet published at the time of this report.

Strategy 3) **Facilitating SHERPA partners to participate in standardization efforts** was applied: Whether ethical, societal or human rights issues are selected for embedding in standardization is decided by the experts in the standardization committees. NEN has highlighted the importance of SHERPA partners joining the Standardization committee of ISO/IEC JTC1 SC42.

Trilateral, a partner in SHERPA, played an active role in SC 42 as a BSI⁴⁴ expert in the working group responsible for the development of [ISO/TR 24368](#) Information Technology - Artificial Intelligence - Overview of ethical and societal concerns. In February 2020 Trilateral submitted comments inspired by the SHERPA project results. David Wright from Trilateral is also exploring to submit task 3.2 Guidelines via UK and French mirror committees. Prof Philip Brey from University Twente is a member of the Dutch mirror committee AI. NEN supported these efforts by advising on procedures and politics. The ISO working group did not support standardizing the SHERPA guidelines, as the ongoing standardization work (of [ISO/IEC AWI TR 24368](#) Information technology - Artificial intelligence - Overview of ethical and societal concerns) sufficiently addressed the ethical concerns in AI.

The other working groups in SC42 referred to ? in ISO/TR 24368 to address the ethical issues.

4) Experts in standardization contribute to SHERPA: SHERPA stakeholder board member Prof. Dr. Martijn Scheltema is chair of the Dutch national mirror committee. Bram de Wit is a member of the Dutch national mirror committee and participated in the workshop of task 3.2 for the development of the guidelines.

4.5.2 Health informatics - ISO/TC 215

ISO/TC 215 has established an ad hoc group that focuses specifically on AI for healthcare. While submitting the SHERPA cases from WP1 (similar as reported regarding the contribution to ISO/IEC JTC 1/SC 42), the existence of the ethics guidelines was highlighted and offered for their consideration as a relevant document for their standardization work.

4.6 Contributions to complementary EU-funded projects

CEN Workshop Agreements (CWA) are developed for novel and innovative topics that are not yet addressed in existing standardization committees. A CEN Workshop Agreement is a type of standard that is developed in about one year by a group of experts. A CWA has a lifespan of 6 years. It is also called a “pre-standard.” Numerous EU-funded projects with the ambition to standardize their results opt for developing a CEN Workshop Agreement. SHERPA contributed to several of these CWAs.

4.6.1 Stakeholders Acting Together on the ethical impact Assessment of Research and Innovation - CWA SATORI

SATORI is an FP7 project that concluded its work in 2017. The project resulted, among other things, in a CEN Workshop Agreement (CWA) on ethics assessment of research and innovation. This CWA consists of two parts: CWA 17145-1 - Ethics assessment for research and innovation - Part 1: Ethics committee (SATORI), and

⁴⁴ Bundesamt für Sicherheit in der Informationstechnik (BSI) is the German Federal Office for Information Security.



CWA 17145-2 - Ethics assessment for research and innovation - Part 2: Ethical impact assessment framework (SATORI)⁴⁵.

As the standard is related to ethics for all types of research and innovation, it came up during many of the personal meetings NEN had with stakeholders. From an organisational level too, ethics assessment can be embedded. Therefore the CWA was considered a relevant standard for the field of ethics for AI and big data.

A CWA has a maximum lifespan of six years, as noted above, but 3 years after publication a first review assesses the future of the document. During this evaluation, stakeholders are asked whether the document needs to be revised, upgraded to a full standard, withdrawn or left as is.

This revision process is part of strategy **3) Facilitating SHERPA partners to participate in standardization efforts**. During the first 3 year review of CWA 17145 'Ethics assessment for research and innovation' a questionnaire was also shared with SHERPA partners. This review consultation highlighted that CWA 17145 might be relevant to address the organisational level of embedding ethics and human rights in AI and big data. In a possible revision, an update specific to ethics for AI and big data may be warranted. The SHERPA project adopted the preparations for the revision of the and this to be part of SHERPA activities.

The above review identified a new stakeholder group: Dutch municipalities. Several municipalities need ethics assessment for their smart city innovations. In the last year almost ten Dutch municipalities have established an ethics committee for their smart innovations. The first part of the CWA 17145 Ethics assessment for research and innovation is developed for ethics committees for research and innovation. The municipalities did not consider all elements of the CWA on ethics committees relevant for assessing innovation in municipalities. The elements that provide guidance for the establishment of ethics committees, such as competencies and procedures were considered relevant. The principles for ethics assessment were not all applicable as they are targetted at researchers. Additionally the municipalities identified the need for a good template for ethics impact assessment, and part 2 of the CWA might be useful for developing a specific framework for municipalities.

To inform Dutch municipalities about 17145 Ethics assessment for research and innovation NEN pitched the idea to organise a webinar to the Dutch VNG (Vereniging Nederlandse Gemeenten, representative organisation for municipalities) and on December 2 2020 Philip Brey (University Twente) presented his research on ethics committees. This is part of the strategy of **1) Sharing SHERPA results with standardization efforts**.

Interestingly, the establishment of ethics committees for smart cities seems to be a typically Dutch phenomenon. NEN consulted several stakeholders, including the SHERPA partners on whether they had ever come across an ethics committee in a municipality in their country, but none were found.

4.6.2 Responsible Research and Innovation (RRI) in industrial strategies - CWA PRISMA

CWA PRISMA provides guidelines to develop long-term strategies (roadmaps) to innovate responsibly, integrating technical, ethical, social, environmental, and economic issues into research and innovation practices, to improve the ethical and social impacts of final marketable outcomes. The document addresses all organisations and agents involved in planning and performing research and innovation and technological development. The focus is on transformative and enabling technologies. As part of the EU funded project PRISMA on the ethics of R&I, the Italian Standardization Institute, UNE, facilitated the development of a CEN Workshop Agreement (CWA).

⁴⁵ The CWA can be downloaded here: <https://www.cencenelec.eu/research/CWA/Pages/default.aspx>



3) Facilitating SHERPA partners to participate in standardization efforts: In September and October 2019 NEN requested SHERPA partners to participate in the development of CEN/WS PRISMA Guidelines so that this CWA could benefit by addressing ethical and human rights principles that were worked on by SHERPA. NEN shared the draft CWA PRISMA for comments among the SHERPA project partners in January 2020. SHERPA comments were submitted based on the results from the SHERPA and SATORI projects.

4.6.3 Monitoring technologies for healthcare- CWA REACH

REACH, the project on Responsive Engagement of the Elderly promoting Activity and Customized Healthcare, seeks to prevent elderly citizens from loss of function and a decline in ability to perform Activities of Daily Living (ADLs) independently. However, the General Data Protection Regulation (GDPR) and European national legislations impose limitations on introducing technologies that enable professional and informal care providers to monitor continuous information on a person's activities and actions, even when such monitoring is conducted for the purpose of care. The aim of a CEN Workshop undertaken on the topic is to develop guidelines for introducing, implementing and operating sensor monitoring technologies into the private homes of citizens who are in need of care and for the purpose of detecting critical events and trends.

1) Sharing SHERPA results with standardization efforts: On behalf of the SHERPA project, NEN submitted comments from the SHERPA [monitoring technologies scenario](#) from WP1 and the CWA 17145 parts 1 Ethics committee and part 2 Ethical Impact Assessment.

The result is published in CWA 17502:2020 – Privacy of monitoring technology – Guidelines for introducing ambient and wearable monitoring technologies balancing privacy protection against the need for oversight and care. CWA 17502 is available on the CWA download area⁴⁶.

4.6.4 BRIDGIT 2

BRIDGIT2 seeks to bridge the worlds of R&I and standardization. The uptake of innovations can benefit from standardization in a number of ways. It can embed new knowledge in standards so that innovations become common practices. Innovations themselves can also benefit from using standards so that their innovation becomes more easily trusted or otherwise accepted⁴⁷.

Strategy **1) Sharing SHERPA results with standardization efforts** was applied; During the event 'Onderzoek, innovatie en normalisatie: een gouden combinatie?' (Research, Innovation and standardization: a golden combination?, 25 June 2019, Delft) flyers were disseminated on the SHERPA project and on the results of the SATORI project to inform stakeholders in R&I about these projects.

4.6.5 i-LEAD

[i-LEAD](#) works on the uptake of innovation by Law Enforcement Agencies (LEA)⁴⁸. Concern for ethics and human rights when working with AI and big data is critically important for LEA. These agencies have a very large (potential) impact on individuals' human rights. In WP4 the project will formulate recommendations for standardization and procurement. In the deliverable "WP4 Reports – Recommendations on Standardization and Procurement" SHERPA is mentioned as an initiative to follow as part of "Recommendations on standardization and procurement in the field of Financial Investigation, Online

⁴⁶ [CWA download area](#)

⁴⁷ Additional information is available on <https://www.din.de/en/innovation-and-research/research-projects/innovation-and-education/bridgit2-276692>

⁴⁸ Additional information is available on <http://i-lead.eu/>



Payment Fraud, concentrating on the ‘THOR’ dimensions (technical, human, organisational and regulatory).” (p. 5)⁴⁹.

4.7 National standardization

4.7.1 National mirror committee IEC/TC 57 Power systems management and associated information exchange

[IEC/TC 57](#) addresses Power systems management and associated information exchange. It prepares international standards for planning, operation and maintenance of power systems.

Strategy 1) **Sharing SHERPA results with standardization efforts** was applied: NEN discussed the SHERPA smart grid case study with the Dutch members of the standardization committee.

The smart grid experts were well aware of the ethical issues and challenges in their work.

4.7.2 Responsible innovation - PAS 440

In 2019 the British Standardization Institute (BSI) developed a PAS (Publicly Available Specification) on Responsible innovation. Companies working with innovative technologies are increasingly facing demands that their products, processes, services and business models are developed responsibly. However, these demands are likely to vary depending on the nature of the innovations involved and the perceived benefits and risks that they are expected to face. This PAS provides a framework to help innovators to work through the demands of innovating in a responsible manner and demonstrating how this has been done. The PAS type of standard is developed within one year by a selected group of experts and has one commenting round during its development.

Strategy 3) **Facilitating SHERPA partners to participate in standardization efforts** was applied: The SHERPA partners jointly commented on PAS 440 during the public comments round in October 2019.

Not all comments were adopted in the final publication. The comments to include the recommendation to establish an ethics committee is now part of this standard.

4.8 Contributions to National (Dutch) policy initiatives

4.8.1 Dutch AI policy strategy

NEN participated in a brainstorming session organised by Dutch ministries involved in the national AI strategy, on November 4 2019⁵⁰. The preliminary insights into relevant standards for ethics for AI and big data were shared, such as the CWA 17145 and the standards in ISO/IEC JTC 1/SC 42.

4.8.2 Dutch AI healthcare policy

The Dutch Ministry of Health Welfare and Sports organized a call for instruments for a toolbox on ‘[data for health](#)’ and [AI and corona](#). NEN contributed the SHERPA guidelines on development and implementation of ethical AI (Task 3.2).

⁴⁹ <https://i-lead.eu/publications-reports/>

⁵⁰ <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/04/20/tk-conceptreactie-op-initiatiefnota-menselijke-grip-op-algoritme>



4.9 Embedding SHERPA results in standardization efforts

SHERPA task 3.4 made use of four strategies to embed ethics in AI and big data standards.

Table 2 summarizes the results from each of the four strategies.

Table 2: Results in standardization efforts according to four strategies

1) Sharing SHERPA results with standardization efforts		
Who/what acted	Who/what was acted upon	Outcome
SHERPA case studies and scenarios (WP1),	<ul style="list-style-type: none"> ISO/IEC JTC1 SC42 on AI and big data CEN Focus Group on AI ISO/TC 215 WG2 Health informatics 	Use cases in ISO/IEC CD TR 24030 Information technology - Artificial intelligence - Use cases
Sherpa Guidelines (WP3.2)	<ul style="list-style-type: none"> CEN/TC 251/WG 2 – Healthcare technology – technology and applications 	Ethics subchapter and ethics annex in EN-ISO/IEC DTS 82304-2 Health software – part 2 Health and wellness apps
Smart Grid case study	<ul style="list-style-type: none"> NL mirror group of IEC/TC 57 Power systems management and associated information exchange 	
Agriculture case study	<ul style="list-style-type: none"> NEN policy committee on agrofood 	
Mimicking technologies case study	<ul style="list-style-type: none"> REACH project developing a CWA 	CWA 17502:2020 – Privacy of monitoring technology – Guidelines for introducing ambient and wearable monitoring technologies balancing privacy protection against the need for oversight and care
SHERPA guidelines (WP3.2)	<ul style="list-style-type: none"> i-LEAD - uptake of innovation by Law Enforcement Agencies 	Interest in SHERPA ethics results
2) Informing SHERPA partners about ongoing standardization activities		
Who/what acted	Who/what was acted upon	Outcome
SHERPA Stakeholder Board member is member of the NL mirror group	CEN/TC 428 ICT Professionalism and Digital Competencies	Ethics code



3) Facilitating SHERPA partners to participate in standardization efforts		
Who/what acted	Who/what was acted upon	Outcome
2 SHERPA partners participated in a Delphi study	EN-ISO/IEC DTS 82304-2 – Health software — Part 2: Quality and reliability criteria for health and wellness apps	Ethics criteria in quality requirements questionnaire and assessment scoring system
2 SHERPA partners participate in the national mirror committees (University Twente, Trilateral)	ISO/TR 24368 Information Technology - Artificial Intelligence - Overview of ethical and societal concerns	Comments on draft
SHERPA partners participated in the review of the SATORI CWA	CWA 17145-1 - Ethics assessment for research and innovation - Part 1: Ethics committee (SATORI) CWA 17145-2 - Ethics assessment for research and innovation - Part 2: Ethical impact assessment framework (SATORI)	SHERPA partners expressed interest in the revision of the SATORI CWA
SHERPA partners commented on the draft CWA	CWA Responsible Research and Innovation (RRI) in industrial strategies	Comments on draft
SHERPA partners commented on the draft PAS	PAS 440 responsible innovation	Comments on draft
4) Obtaining expert standardization input for SHERPA		
Who/what acted	Who/what was acted upon	Outcome
SHERPA focus group discussion	NL mirror group Health and Wellness apps	F
SHERPA workshop for the development of guidelines (WP3.2)		2 standardization experts participated

5 Conclusions

Ethics and AI is a widely debated public issue. Since 2018, when the SHERPA project started, a vast number of organisations and research efforts have begun to address the ethical and human rights issues of AI. Numerous guidelines, papers and publications are discussing principles, opportunities and risks.



Standardization follows innovations and pilot projects only at a stage when collaborative efforts start. Several committees at the national, European and international level have started standardization efforts for ethics and AI. By sector, but also by ethical issue, a range of developments are in process:

- Privacy is embedded in legislation. Several standards address the organisational and technical measures to address privacy in standardization efforts. Several sectors have made or are in the process of making sector-specific standards to address privacy;
- Security and focus on risk analyses and management is a well-established field in standardization.
- Social impact and corporate social responsibility are addressed in the CSO (Civil Society Organizations) standards⁵¹. These standards are not specifically related to AI.
- Standards for ethics for AI at a global and European level are still to be explored. The international ISO committee AI and big data has developed and is in the process of developing a vast group of mostly technical standards to address bias, trustworthiness and interoperability of big data. One standardization effort in this ISO committee addresses societal and ethical issues of AI.
- The development of ISO standards on the governance of AI is considered relevant to address ethical and human rights issues.
- Next to the general committee on AI, health care and health informatics specialists have started specifically to address artificial intelligence for their sector.

SHERPA extensively shared the results from case studies and scenarios as widely as possible within the standardization community. If and how these will be adopted depends on the stakeholders in standardization. For a lasting impact it would be advisable for the SHERPA partners to continue their membership of the standardization committees after the end of the SHERPA project. At a European level the CEN activities of the CEN Focus Group on AI and future standardization activities is considered valuable and promising for the development of a European, more people-centred approach to trustworthy and transparent AI.

For successful embedding of ethics in AI, SHERPA has shown that there are ample standardization opportunities to share results. Whereas commenting on draft standards is a good strategy, more adoption of ideas can be achieved by participating in the standardization working groups and committees. This requires a longer commitment than is possible within the timeframe of a EC-funded research project.

Standardization is an ongoing issue. Many standardization activities are still ongoing at the time of writing of this Deliverable. The results and ethics guidance in AI standards will be finalized in the coming years. Most of the standards SHERPA has contributed to are still awaiting publication. Standardization efforts will continue beyond the reporting of this SHERPA Deliverable.

Membership of Trilateral and University Twente, and the standardization committee on 'AI and big data' is not necessarily linked to the SHERPA project. SHERPA has expressed interest in the revision of the SATORI CWA on Ethics impact assessment framework.

While this deliverable shows that it is possible to embed ethical issues and human rights into international standardization, it also shows it is a continuous effort that requires attention and involvement from those concerned.

⁵¹ <https://www.csostandard.org/>





Annex A. Overview of stakeholder categories

Within the SHERPA project the following stakeholder categories were distinguished:

- Companies
- Industry associations
- Civil society organisations
- Policy
- Professional bodies
- Researchers
- Media

Task 3.4 followed the NEN methodology for stakeholder analysis. This methodology is part of any standardization project so it seems the logical process to follow in this task. The methodology was reviewed by several SHERPA project partners and found less suitable for their own work, as it includes many subcategories that are related to the sphere of companies and the market. However, we can identify the overlap in the categories of the SHERPA project and NEN methodology. The overview of stakeholders can be found below.



Table 3: Overview of stakeholder categories

	Stakeholders	Description	for ethics of SIS
1a	Direct users	End user of a service, process or product	Consumers, citizens, business, government that uses big data, AI and/or SIS, or is affected by the outcome of big data, AI and/or SIS SHERPA stakeholder category: companies
1b	Trade associations of direct users	As a group, in the form of an interest organisation	Representatives of end users SHERPA stakeholder category: industry association
2a	Organisations that create conditions /Commissioning actor	Organisations that determine the conditions as to the criteria for a product or service. E.g. clients, consumers. N.b: Legal conditions are set by governmental organisations (cf 9).	Buyers (business, governmental), funds, consumers SHERPA stakeholder category: companies
2b	Trade/representative associations of commissioning actors		associations of buyers or funds or consumers SHERPA stakeholder category: industry association
3a	Advisory organisations	Organisations that provide advice to interested parties (e.g. engineering companies, advisory companies, consultancy).	IT advisory services, CSR (ethics) advisory services SHERPA stakeholder category: companies
3b	Trade/representative associations of advisory organisations		associations of IT services, CSR (ethics) advisory services SHERPA stakeholder category: industry association
4a	Implementing / executive organisation, service providers	RE Product standardization: organisations that use the end product in their service for end users (e.g. building contractor, electrician). RE: standardization for services: organisations that provide a service or process to the end user (e.g. debt counselling).	Governmental, non-profit or commercial organisations that use applications for big data, AI and/or SIS SHERPA stakeholder category: companies
4b	Trade/representative organisations of the Implementing / executive organisation, service providers		Associations of Governmental, non-profit or commercial organisations that use applications for big data, AI and/or SIS SHERPA stakeholder category: industry association
5a	Producers / suppliers of the main product	For product standardization this would normally be the main supplier or producer For service standardization this category is not used. The role of producer/supplier for standards for services is fulfilled by an executive, services providing organisation.	Producers / suppliers of big data, AI or a combination of both (SIS) SHERPA stakeholder category: companies
5b	Trade/representative organisations of producers/suppliers of the main product		SHERPA stakeholder category: industry association



6a	Producers/Suppliers of related products and services	For product standardization this refers to producers/ suppliers of product that are a source, semi-finished product or waste in the production chain. For standardization for services this refers to suppliers of related services	Producers / suppliers of big data, AI or a combination of both (SIS) SHERPA stakeholder category: business
6b	Trade organisations of producers / suppliers of related products and services		SHERPA stakeholder category: industry association, professional bodies
7	Research- and knowledge institutes	Institutes that provide knowledge or conduct research without a direct commercial interest, e.g. educational institutes, laboratories, universities.	Universities, research institutions SHERPA stakeholder category: researchers
8	Supervisory institutions	E.g. inspections, certifying organisations.	Data protection authorities SHERPA stakeholder category: policy
9	Legislative organisations	Governments .	National, local or international institutions that determine the rules for ethical SIS (AI, Big Data, combination) or influence via policy SHERPA stakeholder category: policy
10	Existing / new initiators	Actors that conduct similar activities as compared to NEN/CEN/ISO (standards, certification scheme's, guidelines, etc).	IEEE, EU, individual organisations SHERPA stakeholder category : ?
11	Context influencer	Organisations (e.g. foundations, platforms) that are involved in a generic sense.	Banks, investors, media, NGOs SHERPA stakeholder category: Media, NGOs

