Guideline Ethical Deliberation

I. General introduction

For whom? This guideline is developed for companies active in smart farming and food processing.

When? The guideline is helpful in early stages of product design when issues arise, but can also be used when prototypes of digital products and services are being tested and social or ethical questions arise among first users or developers.

What kind of issues? Different issues may arise and they make you wonder what are the good things to do? For example: Who should be considered liable for harms caused by a system failure? What are benefits and harms associated with the product? Should everybody be able to have access to the product? Is the distribution of harms and benefits fair? How does the product have impact on the autonomy of users and is this impact acceptable/good?

For what purpose? The purpose of the deliberation is trying to come to an agreement about the best way to solve the issues. The final goal is make better products and services and improve their acceptability among users.

With whom? This guideline enhances reflection with relevant external stakeholders? If the product development team is uncomfortable to include external stakeholders, it could also do a deliberation with a mixed group from within the organizations represented in the product development team (e.g. from finance, legal, sales, production section etc.) that would play the role of stakeholders. In this case you can identify the external stakeholders' interest and concerns through written information or interviews.

By whom? Below we consider that the product development team is organizing the deliberation, or the tech service provider involved or the company that commissioned the development of the product.

How? In the setup of the deliberation it is assumed that there is a facilitator to guide the discussion. The deliberation lasts about 1.5 hour. There should also be someone present who takes notes. If you want to read more about the theoretical background of the set-up, see info: justification of the ethical deliberation - Annex 3.

II. Preparing for the deliberation

In the following the 'organizer' may refer to the product development team, the tech service provider involved or the company that commissioned the development of the product.

About **6 weeks in advance**, the organizer starts preparing the deliberation, by sending invitations.

- The organizer invites the relevant stakeholders for the deliberation explaining the issue(s) and that the aim is to find a common agreement about the best way to solve the issue(s).
- The organizer starts looking for a facilitator to do the deliberation and help in the preparation. Also think of inviting an expert/speaker that is independent to the organizer that may help clarify technical issues.
- Set a date for the deliberation based on responses and hire a venue if necessary. Or prepare for an online session (for example https://miro.com/signup/)

Three weeks before the deliberation:

- Possibly send (more) details of the concept of the product or service or the prototype, to give all participants the same information. If confidential information is shared, think about how to deal with this.
- Ask participants to reflect on the issue(s) that were raised and to prepare input for the deliberation. See instructions for this homework in Annex 1 and the example of an ethical matrix (Annex 2). The facilitator may have to assist stakeholders to prepare this homework for the deliberation.
- Make clear that it is important that everybody's has and will have a say in the discussion.

One week before the deliberation: send reminder.

On the **planned date:** Do the deliberation (the next section of this guide).

After the deliberation: the organizer sends minutes with to the participants.

Consider what to do when no agreement is not reached in the deliberation.

III. Ethical Deliberation

1. Opening and welcome (10 minutes)

During the opening the meeting is introduced and started. Its purpose is to:

- Welcome participants (by host company),
- Introduce the facilitator, who takes the lead over the rest of the meeting,
- Give an introduction to the of participants if necessary,
- Explain the aims of the deliberation: to explore and deliberate on ethical issue(s) related to a product or service and find a solution or direction for solution that is supported by all stakeholders.
- Make clear how results of this session will be used and shared,
- Present the rest of program of the meeting.

2. Presentation of product or service (10 minutes)

Part is to present the product or service and the issues as perceived by the organizer and have room for clarifying questions.

1) The product development team presents the concept for a product or prototype and its main features.

- Leading questions: What problems should it solve? How will it work or how is it intended to work? Who are the intended customers ? If known: what kind of hard and software would be needed and how interoperable is the product/service with exiting systems? what kind data or input will be needed?

2) Round for clarifying questions on the product or service by participants.

3. Stakeholders' values and impacts of the product (depending on number of stakeholders, 30 minutes)

This part consists of a round of presentations and questions to each other and a conclusion.

1) Each of the stakeholders presents their a) value descriptions, explaining why values are important to them and b) the perceived impacts (and scores) of the concept or product on these values. Issues will show

by their negative scored impacts. This input was prepared before the meeting. The aim is to produce an overview over stakeholders' values like in Table 1 and the anticipated impacts among which the issue(s) like in Table 2 (see below). See Table of ethical deliberation - Annex 2 for an example of a completed table.

It is suggested that the stakeholder that raised the issue that was reason for this meeting will kick off. The facilitator makes sure that everybody has a say.

Leading questions for clarification for each of the stakeholders' presentations:
- Is it clear what each of the stakeholders has been putting forward? If not, what do you still want to know?
- On what information or assumptions do stakeholders base their impacts and scores? How do they know? Might their view be biased?
- Are there any negative impacts (issues) because laws, policies standards were not taken into consideration, social norms? how binding are they?
- Is information still missing to quantify the impacts of the product? What do you need to know? What are the uncertainties?
- Do any of the stakeholders want to change some of the impacts and scores after this round?

Table 1. Ethical Matrix: inventory of stakeholders' values

Respect for: Stakeholder:	Wellbeing/avoiding harm	Autonomy/rights	Fairness/ Justice	Data ownership (sovereignty) and privacy
Stakeholder 1				
Stakeholder 2				
Stakeholder 3				
Stakeholder 4				
.				
.				
Non-users				

Table 2. Impact Matrix: inventory of impacts (and issues) on inventory of stakeholders' values.

Impact on: **Stakeholder:**	Wellbeing/avoiding harm	Autonomy/rights	Fairness/Justice	Data ownership (sovereignty) and privacy
Company				
Stakeholder 1				
Stakeholder 2				
Stakeholder 3				
Stakeholder 4				
.				
.				
Non-users				

2) Discussion.

This part is to conclude on the moral analysis.

Leading questions:
- What are similarities/differences between the perspectives of stakeholders, looking at the results in Tables 1 and 2?
- Are there differences of opinion regarding the concretized values at stake and their prioritization (Table 1)? Is it clear why this value is important for the stakeholder?
- Are there differences in anticipated impacts (Table 2)? Or which impacts do stakeholders have in common? Do these differences of opinion raise issues that need to be resolved?
- What issues should be solved?
- Note for facilitator and all participants: Table 2 cannot be used to just aggregate scores and to find acceptability of the product. This is because scores can be based on facts but also on the weight stakeholders give to these facts. Additionally, scoring may done differently for each stakeholder.

3. Exploring solutions for ethical acceptability of the product (30 minutes)

This part is to reflect on solutions and their moral consequences.

Leading questions:
- What are ideas for possible solutions of the identified issues? If these solutions are applied, how would they possibly change the perceived impact? Would the solution change the impacts on other values?
- Would the solution be acceptable for the stakeholders concerned?
- Is that solution at hand or should it be developed? What needs to be found out about to realize that solution?
- What information is still needed to find out about some of these (new) impacts? Who could provide this information?
- If some of the issues cannot be solved, what will happen? Can the stakeholders concerned live with that? What will be the consequence? Could the product development team live with the consequence?

4. Conclusion (5 minutes)

This last part of the deliberation conclude on solution (ideally) and discuss next steps.

The facilitator

- gives a summary of issues that were identified and a directions for a solution that were agreed up on. If there is not yet such an agreement the facilitator suggests some next steps.
- explains that stakeholders will be consulted further in the development process of this product or service. Asks if stakeholders will be available.
- asks the product development team to propose how continue the design process and when this consultation might be expected OR when they can provide information about how they will proceed.
- checks if stakeholders were identified in this meeting who should still be consulted.
- asks participants if they are comfortable with outcome (so far).

The organizer

- will make clear when to send minutes of this meeting and thanks everybody for their participation.

Annex 1. Stakeholders preparation for ethical deliberation

Participants of the ethical deliberation on the issue of [..insert your issue..] for the development of [..name of your smart product, tool or service..] are requested to prepare for the deliberation. Participants receive the following questions and the glossary of values in de guideline for VSD.

Questions

1. Do you recognize the issue? Why is it an issue for you? In what way the service or product will generate this issue? How do you know?
2. What value is at stake here? See the Table below.
   The first three value (headings of the columns) are also sometimes referred to as 'principles' which underpin or justify moral rules or judgments, as they are encountered in many different contexts.

   Wellbeing/benefits/reduction of harm: are vulnerable groups (users, non-users) affected by this product? To what extend could the product or service provide benefits (net result, yield)? And who will benefit less, or not at all? Is there a risk that the product or service is not safe (for human or animals)? What is the likelihood that this risk will in fact occur? What harms will it involve? Who will be responsible for these harms/bad effects?

   Autonomy: (How) does the product empower users' autonomy? Is the user's freedom of choice somehow constrained applying the product? Are users gently steered (nudged) toward making choices? What is the justification?
   Justice (or fairness): Who will this product benefit? Will it benefit some more than others? Are some groups excluded from the benefits of this product? For whom will the product be developed, will some farmers be excluded (unintendedly)? What is the justification for this uneven distribution of benefits?
   Privacy/data protection: is personal data being processed which fall under the GDPR? what other data used could be considered private? how is this data being dealt with? Would data be collected in ways the user is not aware?
   See glossary for further explanation on these principles and values that relate to them if you need inspiration. Why is this value important to you?

3. For each stakeholder a value may have a different meaning. Also this meaning can be different in different contexts. What do you think it requires (you and others) to do when respecting this value? How should the product or service contribute to this value? under the heading of that value or related value, fill out how the product or service should contribute in row '1. How the product should contribute?' See Annex 2 for a completed table with stakeholders values (value matrix), table 1.

4. In the row '2. Present impact/ issue?' fill out in short what the present perceived impact is, in other words, where the product or service is perceived to fail to realize the value. See Annex 2 for a completed table with stakeholders view on impacts (impact matrix), table 2.

5. Try to fill out the other columns containing the other values by answering how the product should contribute to these values (row 1) and how you perceive present impact is (row 2). Consider again the questions above or get inspired by the questions in the glossary.

6. Then, if you have completed the text completed in row 1 and row 2. Try to score the impacts of the product or service on this particular value. Each impact gets a score from -2 to 2, meaning that the product or service or some of its features:

    -2: strongly infringe that value

    -1: infringe that value

    0: have no impact

    1: respect that value

    2: very much support that value

Issues will show as negative valued impacts.

7. Could you prioritize the values (columns) by ascribing a relative weight in your evaluation of a product or service? How much weight would you give each of the columns? Why?

8. Now your preparation is completed. In the deliberation your views are shared with other stakeholders and issues are discussed to reach a common agreement on the best solution. All participants will be asked to present their values, why they are important to them and their present perceived impacts plus scores in the meeting, particularly putting attention to the issue(s) at stake.

Stakeholder's view on the values and impacts.

Impact on: Stakeholder:	Wellbeing/avoiding harm	Autonomy/rights	Fairness/ Justice	Data ownership (sovereignty) and privacy
1. How product should contribute?				
2. Perceived impact/ issue? 3. Score:				

Annex 2. Example of a value matrix and an impact matrix

This example of a product idea of 'livestock precision farming' is inspired by the Use Cases in IOF2020, but the concretized values and impacts in the tables are made up by the authors for instruction purposes.

Product and its purpose

The new product idea is to integrate slaughterhouse data with farm data to improve the pig feeding algorithm of a feeding machine. The purpose is to produce pigs that better fit the requirements of the meat concepts. The algorithm and feeding machine was developed in an earlier stage and is in the demonstration phase of development, so not widely used yet at pig farms. This algorithm optimizes the individual growth and meat quality (like weight, fat layer and muscle thickness) of finishing pigs for the different meat concepts that the slaughterhouse company sells on the national and international markets, using data on the individual farms. The slaughterhouse expects that the combined data of different farms can increase profits for the company and as well as farmers, because farmers deliver pigs that even better fit to their concepts.

Data gathering

At the farm a chip in the ear tag of a pig will identify the pig at a feeding machine. In front of this machine the pig is weighted and the accompanying camera images surveil the growth of the pigs. Feed supply is adjusted to the individual need and growth capacity of the finishing pig, considering its race and targeted concept. Data on growth and weight gain are gathered throughout the production phase, together with other data collected per pig: race, targeted concept, feed quantity and composition, feeding and drinking behavior, camera images, illnesses, medicine use and contextual information on temperature and season. A dashboard will show the individual pig growth and feed consumption to the farmers, detects possible illnesses in an early stage and generates advice to make optimal use the growth potential of the individual pig, possibly reallocating the finishing pig to a more suitable concept.

At the slaughter line data is being gathered (carcass weight, fat and muscle thickness, diseases/deviations etc). This is existing procedure already. Based on this data farmers get paid for their pigs. Also there is feedback already to individual farmer on performance relative to other farms. In this new product idea the data from the slaughterhouse is combined with farm data from different farms through a data platform.

(Data) governance

The slaughterhouse company is commissioner of the development of the new idea product/service. It is convinced that a better targeted quality of meat will generate can increase profits. They seem to be the most suitable stakeholder to host the data platform (they assume). It is attractive for them to update the present system for exchange of information with the farms. Also - in the future - the planning of the logistics for collecting the pigs could be based on the live stream exchange of data with the farms.

Issues and deliberation

When mentioning the idea of this product the slaughterhouse company received mixed reactions. Pig producer organization 1 welcomed the feeding algorithm as it is supposed to give advice on feed and treatment. They underline, however, that the system should leave room to the farmers' own decision making. They wonder however who will have access to all the farm data and fear that this data platform governed by the slaughterhouse will finally lead to a situation in which the slaughterhouse could control them and then will prescribe what kind of feed should be used an how to take care of the pigs. Also they heard that a competing slaughterhouse to which some or their member farmers they also deliver, will use another data platform for exchange of data between farm and slaughterhouse. Part of their members are reluctant to do investments, because they decided to stop farming. Pig producer organization 2 that produces organic pigs supports the idea to monitor growth of the individual pig as well, but does not like the idea of an automated feeding machine, as it could interfere with the natural feeding behavior of pigs. Also they would like to know how the feeding algorithm will work for their organic pigs. It shares the worries of pig producer organization 1 on the access to the data and also fear that the system might develop over time into an instrument to control them. The slaughterhouse and the product development team decided to organize an ethical deliberation with all stakeholders. In the meeting values (Table 1) and perceived impacts (Table 2) were shared and were starting point for the deliberation.

Table 1. Stakeholder's view on the values and impacts.

Respect for: **Stakeholder:**	Wellbeing/avoiding harm	Autonomy/rights	Fairness/ Justice	Data ownership (sovereignty) and privacy
Slaughter house	Increase of profits by getting supplied and delivering the right quality. (highest priority)	Make farm production more transparent	Balance inputs and development (costs) with the fairly distributed revenues in the chain.	Ensure that data sharing is safe.

Pig producer organization 1	Increase of profit through efficient production and right quality. (Priority 2)	Be based on voluntary participation. Allow free trading possibilities with other slaughterhouses. Recognize that pig farmer is decision maker on farm (highest priority)	Balance inputs (costs) with the fairly distributed revenues in the chain.	Ensure that data sharing is safe, privacy is respected.
Pig producer organization 2	Support sustainable production and welfare for animals (while still producing profitably) (highest priority)	Free movement of animals Not induce control farm management.	Balance inputs (costs) with the fairly distributed revenues in the chain.	Data sharing is safe and on the condition that used for purpose of feeding optimization
Consumers organization	Provide right quality of meat for the occasion, not harming pigs	Reveal information on production methods at farms	Justify higher prices	n.a.
Animal welfare organization	Increase welfare for animal. Assure freedom of movement for animals	Respect integrity of the body Reveal pig production at farm level	n.a.	Produce data on pig welfare
Non-using farms (some members of pig producer organisation)	n.a.	Be based on voluntary participation, not restricting delivering to the slaughterhouse (highest priority)	Not create cost to non-users	Ensure that data sharing is safe, privacy is respected.

Table 2. Impact Matrix: inventory of perceived impacts on stakeholders' values and scores (-2 till 2): the perceived impact is.

Impact on: Stakeholder:	Wellbeing/avoiding harm	Autonomy/rights	Fairness/ Justice	Data ownership (sovereignty) and privacy
Slaughter house	(2) an increases of profit by delivering the right quality.	(1) more transparency on feed intake.	(2) higher prices that will be passed on in the farmer (after compensation for development for slaughterhouse)	(2) that data sharing is safe.
Pig producer organization 1	(1) additional costs and some positive expected price effect. (Priority 2nd)	(?) that participation is voluntary and not limiting trading to other Slaughterhouses (-2) that farmers could be controlled. (highest priority)	(-2) that risks are put at farm level.	(2) that data sharing is technically safe, but (-2) that slaughterhouse has access to private farm data.
Pig producer organization 2	(1) additional cost, some positive expected price effect; impact on pig health? (highest priority)	(-2) product interferers with feeding behavior (-1) that farmers could be controlled potentially.	(-2) that risks are put at farm level.	(2) that data sharing is technically safe.
Consumers organization	_	(0) depends on information on label	(0) for consumer?	n.a.
Animal welfare organization	(0) no welfare increase (-2) pig feeding machine interferes too much with natural feeding behavior.	(-1) implanted sensors? (?) depends on information that will be shared.	_	(1) that potentially farm data is available.
Non-using farms (some members of pig producer organisation)	(0) price scheme is the same.	(?) voluntary and not limiting trading to other Slaughterhouses? (highest priority)	_	(2) that data sharing is safe.

Annex 3. Justification of the ethical deliberation guideline

This guideline was developed in the IOF2020 project. Our team looked for an ethical deliberation method that fits ethical deliberation in early stages of product development and that assists to solve issues that the product raises. These issues could be raised by stakeholders after introducing the concepts or prototypes of the product, but could also be put forward by someone from within the company.

In trying to solve a specific case or issue the deliberation proposed here, resembles the prospective ethical deliberation described in very different contexts where ethical issues can arise, such as in a clinical context. It is described as clinical pragmatism by Steinkamp en Gordijn (2003). Their related protocol of clinical pragmatism is summarized in four steps: 1. Assessment of the clinical situation, 2. Moral diagnosis, 3. Goal setting, decision making, and implementation and 4. Evaluation. In our guideline the ethical impact of the of the product is evaluated against the values of the stakeholders (reflecting step 1 and 2) and based on this overview solutions are being discussed (step 3). The evaluation (step 4) needs a next phase, as the deliberation is assumed to be part of the value sensitive design process in which designers are continually looking for feedback. From the Ethical Decision-Making Framework (WRHA, 2015) that provides a completely elaborated protocol we took the advice to ask questions of clarification and take time to understand each other.

For our purpose to support ethical design, we adopted the use of a list of values from Brey (2012), in which he presents the approach anticipatory technology ethics (ATE), intended to assess impacts of future technologies and their artifacts. Our list however is based on the issues we came across in the IOF2020 project as described in Van der Burg et al. (2019a, 2019b and 2020) and 'user control' and 'reliability of the system' that were uses in Ballard (2019). We do not regard this list as a fixed normative frame work, but it should inspire for the ethical analysis and stakeholders can add values to the list. Also, a list will never be complete or fixed because the context may change in time. This idea that a list of values is just a starting point for reflection, which can be enriched in the future. In the glossary we give a definition of all values included in the list and give related questions to examine the issue, projects of cases. These questions are also based on Van der Burg et al. (2019b) and supplemented questions in Wright (2011). See glossary for their source.

The use of tables to order these values and their perceived impacts assessments per stakeholder we based on the ethical matrix approach (Mepham et al., 2006). The ethical matrix applies prima facie principles and explores impacts on a set of specified stakeholders. To keep overview the values in the list are grouped under the 'prima facie principles' (wellbeing/ avoiding doing harm, autonomy/ rights and fairness/ justice), values that are considered the more basic ones. Next to the prima facie principles we added a category of values referring to data governance issues, following our own experience in IOF2020 (Burg et al., 2019b)

By creating the tables like in the ethical matrix a 360° overview is created not only showing the issues that were the reason to start the deliberation, but also areas where stakeholders have common values. This matrix is the basis for discussion and evaluation.

The aim of the deliberation is to reach a decision that is acceptable for all stakeholders. The ethical matrix does however not prescribe any particular decision. That will depend on the stakeholders and the conclusion they reach together.

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