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Designing an ethical framework for evaluating human monitoring algorithms

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Abstract:
In the age of golden data, there are many ways of gathering data from human users. The most valuable data currently is psychographic data about an individual, as companies use this information to provide the user with personal recommendations or advertisements, among others. This data is usually gathered through the use of small algorithms that monitor physical or online behaviour of human individuals. However, these small algorithms are never the ones that are blamed or investigated. The algorithms in question are defined in this work as Human Monitoring Algorithms as that accurately describes the behaviour of the algorithm. Since the data that is gathered is often sensitive, there is a need for the ethical evaluation of these small algorithms that function in the background. This work provides an ethical framework for the evaluation of these Human Monitoring Algorithms.
Keywords: Ethics, Monitoring, Algorithms, Tracking, Online behaviour.

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Chapter 1

Introduction

> "If you are not paying for it, you're not the customer; you're the product being sold. - Andrew Lewis[1]

The quote above is widely known and used in the technology industry. It originates from the famous *"There ain't no such thing as a free lunch."*, or alternatively *"There is no such thing as free lunch."*. This quote uncovers a, nowadays known, scary truth about the multi-billion companies that rule the internet [2]. The companies that got large by providing their services on the internet, like Google, Facebook, and other companies that *provide an online service to users of the internet* are not giving away their services for free. This is made painfully clear in the documentary */the social dilemma_* that was launched on Netflix in 2020 [3].The business plan of these companies is to sell user-specific advertisements to the highest bidder while the user is largely kept unaware of this happening. Instead of selling a product, these companies sell human attention to advertisers.

Worldwide, countries have started regulating the privacy aspect of the problem that arises when people and their behaviour is the product being sold. In Europe, the GDPR (General Data Protection Regulation) was introduced in 2018, which provides regulations specifically regarding data protection and privacy to protect users and provide them control over their personal data [1]. Almost all countries provide rules regarding data privacy through governmental law [2]. However, these regulations enforce *some* transparency, rather than making sure it is clear to the user what is being done with their data and why. In current times, privacy is one of the focus points that is deemed as an important right to the user that has to be protected, both by the user themselves and governmental institutes. The need for privacy is discussed in many different papers and it can be stated that the need for privacy is mostly an ethical need that, among others, has to do with the right for autonomy [4, 5, 6]. This is illustrated by the regulations, e.g. the GDPR, that aim to help the individual maintain, or in some cases re-gain, their

[1] https://gdpr-info.eu/

[2] A Practical Guide to Data Privacy Laws by Country (i-sight.com)

privacy. Though, as is being discussed thoroughly in *the social dilemma*, the fact is that there is a need for ethical design for these algorithms. This need does not only arise due to data privacy concerns, another large concern arises because these media are designed to be highly addictive. Media like Google or social media like Facebook and YouTube are designed to take up as much of the user's time as possible, to make them see as many advertisements as possible. To achieve this, they monitor human behaviour on their platform, which in turn allows for these concerns to arise [3]. After all;

> There are only two industries that call their customers 'users': illegal drugs and software -Edward Tufte [7].

To name another concern, the GDPR also explains that the so-called "playing field" is highly uneven [8]. This means that there is a lot of asymmetry between the user and the party providing the service. Due to a lack of knowledge on the side of the user and a large amount of power on the side of the party that monitors and gathers all the data of these users. This is a form of asymmetry in information and control power. Individuals do not have all available information, while the organisation does. Furthermore, the control power of the organisation is large while the individual has little to no power. The organisation could simply decline the use of their product to an individual that does not agree to the organisation's terms. This shows that there are indeed a lot of asymmetries, which makes for another ethical issue.

By laying out the facts, it can be seen that the statement that has been made by *the social dilemma* is highly relevant. There is a need for a standard of ethical design for technologies in general. This paper will specifically focus on the ethical design of technologies that are monitoring human behaviour online, as these algorithms are the first core technology of many of the systems that are used to gather human data [3, 9, 10, 11, 12, 13].

The algorithms that are used to gather the data about users are either referred to as monitoring algorithms or tracking algorithms. These terms are both used in such similar contexts that they could be used interchangeably. However, for this study, the term "monitoring" will be used, as this more accurately describes the behaviour of these algorithms. In this case, the term monitoring will be used as follows: "To keep track of systematically with a view to collecting information" and "To keep close watch over, supervise". These definitions are both dictionary definitions that closely resemble the main activities of the algorithms in question. More specifically, the focus will lie with Human Monitoring Algorithms, as the algorithms that are relevant to this study are created to monitor, or track, data from people.

1.1 Objective

The objective of this paper is to propose an ethical framework for the evaluation of Human Monitoring Algorithms. The ethical framework that is proposed may be used by individuals or organisations that either develop or aim to develop technologies that function as or through Human Monitoring Algorithms. This means that the ethical framework aims to evaluate technologies that are not yet in use in the first place. The use of the ethical framework should be a free choice, as this is the most ethical approach

to ethical evaluation. Additionally, the framework could be used on already existing technologies that are either new or seasoned in use. The use of this ethical framework is a way to ensure the adequate examination of possible ethical implications of Human Monitoring Algorithms by the stakeholders, both before and after deployment. There may be different contexts to the use of the ethical framework, as the main use of the framework is a perceived need of ethical considerations of stakeholders by the decision-maker regarding these technologies. By doing so, there is a utility for project managers, policy-makers and technology developers in performing an ethical evaluation with input from the stakeholders before, or even after, deployment. An objective of the ethical evaluation is to identify the stakeholders in the first place and additionally, to include them in the evaluation. This should help identify, discuss and find solutions to ethical issues that arise from the development of these Human Monitoring Algorithms. The stakeholder might identify cases that nobody on the team had thought of before that point.

1.2 Target Audience

This paper is aimed to reach a wide audience as Human Monitoring Algorithms are widely used and a lot of ethical issues can arise. Because of this, the first target group aims to reach those who are developing or seek to develop technologies such as Human Monitoring Algorithms. This group is the one target group of this paper that has some form of knowledge of technology and technological terms. Additionally, other groups with less or no technical knowledge will be involved. First of all, the project managers and policy-makers that work closely with the developers of the technology should be included. When talking on an organisational level, another group should include the industry players that are working with existing or new Human Monitoring Algorithms. In addition, this ethical framework should be of interest to businesses or organisations, to ensure their involvement in the decision-making process by using the framework. Other stakeholders that may find an interest in this ethical framework are academics. These stakeholders may be able to suggest points of interests or improvements for the framework or analyse the use of the said framework. Furthermore, the ethical framework may be of interest to the media and other commercial companies, as most media and commercial companies enjoy the use of these Human Monitoring Algorithms themselves. Lastly, the ethical framework can also be applied by governmental instances to evaluate the technologies they want to use or are using. For private users of the internet, this paper may help raise awareness regarding the associated ethical issues. Because of the widespread aim of this paper, it will be made sure that technological terms will be explained in more detail to ensure understanding throughout the different stakeholder groups.

On the first hand, the ethical evaluation framework of Human Monitoring Algorithms is to be used by stakeholders that are interested or affected by the outcome of the use of the algorithm. The group developers, and the group project managers and policy-makers should help in identifying these stakeholders. However, other interested stakeholders can also be encouraged to participate. The most important is to ensure that the stakeholder

group is truly representative of the real-life stakeholders.

1.3 Impact

An important part of this work is the impact the use of such a framework should have. This section discusses what the actual changes could be by implementing this ethical framework. An important note to make is that the enforcement and distribution of this framework is not part of this thesis paper, however, it is relevant to discuss what the impact would be of the use of an ethical framework for the evaluation of Human Monitoring Algorithms.

One of the largest problems regarding ethical design of technology in general is already discussed in *The social dilemma*. The problem that they uncover is the fact that large companies like Google and Facebook are aware of the ethical issues that arise, yet choose not to act on these. This has been going on like this for multiple years, based on the documentary [3]. Because of this, it cannot be said that the impact of such an ethical framework can be enforced, as none of the tools that are currently available have changed the stance of companies like the ones mentioned before. However, the ethical framework is to be used by technology owners that are concerned with the ethical evaluation of their technology. This is also mentioned in the objective of the work, which states that it is the decision of the technology owners to use this tool.

When technology owners do feel concerned for the ethical design and functioning of their technology, they may use the ethical framework for evaluation. This will then allow for an evaluation of the options that could be implemented for change. Additionally, an implementation phase will allow for one or more of these evaluated options to be implemented and re-evaluated after implementation. Implementation may lead to a shift in the categorisation of the technology for one or multiple questions in one or multiple (sub-)sections. By doing so, the technology will be deemed to be more ethical. If it can in some way be endorsed to use this framework, which is recommended for future work, the use of this ethical framework can make a large impact through the use of ethical evaluation by the smaller technology owners. Even though large companies might not choose to use an ethical evaluation tool, there will still be a large impact if smaller technology owners choose to use such an ethical framework. Because of this, distribution through foundations would be a good addition to the recommendations for future work.

Besides this, the ethical framework addresses issues that are not per definition discussed by current regulations and laws. Therefore, newly addressed issues may be used in future work as a base for more elaborate regulations regarding ethical design of technology.

1.4 Structure paper

The paper consists mainly of six parts, the first part is this Introduction, followed by the research questions and methods. Then comes a section on the domain, a section on the construction of the ethical framework, a section on the collected data and analysis from the research that was performed, and the discussion and conclusions.

While the purpose of the introduction and the research questions and methods section is straight to the point, the other sections should receive some explanation. The section on the domain performs an extensive literature review to ensure the relevance of the project and the gap in the literature. Additionally, the boundaries of the project are illustrated and the base for the ethical framework is constructed from the literature.

After this section, the first version of the ethical framework is constructed, and the choices that were made are explained. This version of the ethical framework will be used in further sections to gather qualitative data and as a base for the construction of the final ethical framework.

The next section is regarding the data collection and analysis that was performed. This section will discuss the questionnaire that was constructed and the decisions that were made regarding the construction. Furthermore, this section will discuss and analyse the collected data from three different participant groups. Based on this section the final version of the ethical framework will be constructed and proposed.

The last section of this thesis project will conclude with the conclusions and discussion. These sections will discuss the outcomes of the project and the possible implications and risks that were encountered during the project. With this section, the paper will be wrapped up.

Chapter 2

Research Questions and Methods

The introduction of this paper proposed a problem statement for a need for ethical design for technology. This paper will aim for the construction of an ethical evaluation framework specifically for Human Monitoring Algorithms. In the section Domain, following this section, an extensive literature review is proposed. This literature review will answer the sub-questions below that are constructed to support the main research question. Furthermore, it will be made sure that ethical principles are selected that will be used as the base for this project. To ensure structure and a good outcome of the project, the following research question and sub-questions were proposed.

2.1 Research Questions

The research question aims to provide guidelines for this thesis project and set boundaries for what the project will and will not include. Therefore, the question was formulated carefully and was phrased as stated below.

> How can we design an ethical framework, in the form of a set of ethical questions, to evaluate Human Monitoring Algorithms concerning selected ethical principles?

The question illustrates that the end goal is to provide an ethical framework, specifically in the form of ethical questions. These ethical questions are regarding the ethical principles that were found in the literature review. Additionally, the term *evaluate* was chosen to illustrate the use of the ethical framework that will be constructed.

2.1.1 Sub-questions

Besides the main question of the research project, some sub-questions will help guide the process of the project. There are four main goals that each question helps clarify. These

goals are illustrated respectively by the following questions. The first goal is to gather the necessary information regarding ethical aspects that are relevant to Human Monitoring Algorithms. This goal is necessary to construct the base of the ethical framework. The second goal is to find similar work that has already been performed, to ensure a unique and valuable addition to the research base. Thirdly, it is important to make an ethical framework that is somewhat structured to ensure usability and accessibility. This means that the questions should be formulated understandably and that the format of the ethical framework should be understandable and easy to use. The accessibility issue should furthermore be a small issue since text formats can be changed in size. The fourth and final goal ensures the outcome of the ethical framework. The outcome of the framework should be clear, and the purpose of how the framework should be used will, therefore, be predetermined.

- What ethical aspects, or principles, are important to discuss regarding Human Monitoring Algorithms?
- Are there already existing ethical frameworks for evaluating technology?
- How can ethical questions best be structured or interlinked?
- What kind of outcome should the ethical framework produce?

The proposed questions will allow for the earlier described goals to be ensured. Besides this, the project will follow a clear structure and have a predetermined outcome for both the project to succeed as the ethical framework. The next section will describe the used research methods.

2.2 Research Methods

First of all, the main method of research to construct a base for this project will be a thorough literature review. In the introduction, the problem statement was proposed and the knowledge gap was located. The further part of the literature review can be found in the section Domain. The literature review will serve as a purpose to answer the sub-questions of the research, as briefly mentioned before.

The literature review will be an objective review of the found research. Though, ethics is still a grey area when it comes to facts. Ethics can be viewed from many different points of view and there are no objective truths. Hence, the research method for this project has to be an opinion-based format. Such a method is never as robust as an experimental method, but due to the nature of ethics, such a format is the best option. The goal of this research is to gain an insight into users' opinions and behaviours regarding ethics specifically for Human Monitoring Algorithms. To achieve this goal, a questionnaire will be constructed to gather qualitative data from private users of online services. The same questionnaire can also be used to acquire expert opinions when questions regarding the perceived knowledge of the user on the topic of ethics and the topic of Human Monitoring Algorithms are included. Since most individuals nowadays use the internet, and therefore online services, a random sample of internet users can be used to collect data. This can be said since most online services use at least some form of Human Monitoring Algorithms.

To ensure different groups of users have some form of technical knowledge, it was chosen to target three different user groups. The first group will be targeted through crowdsourcing on the social media platform Reddit. The subreddits, platforms on the social media site Reddit, that will be used to target an audience are */rEthics*, */rDataHoarder*, *SampleSize* and */rSurveyExchange*. These first two subreddits are connected to the fields of technology and ethics, while the latter two are subreddits made to gather participants for survey studies. Because of the use of the first two subreddits, the chance is higher to have knowledgeable individuals participate. Due to the inclusion of the participants' perceived knowledge regarding the fields of ethics, technology, and technology ethics, the other two subreddits may yield valuable answers as well. Additionally, student data will be collected from Utrecht University students of the MSc Business Informatics and the MSc Artificial Intelligence through the personal contacts of the author of this paper and LinkedIn. The spread of the questionnaire can happen through social media platforms like WhatsApp and Telegram. Expert opinions can be gathered through the third group of participants, through the personal connections of the author of the project. These experts work for a company that constructs technology healthcare ventures and have knowledge on both technology, healthcare technology, and the ethical implications that can arise. The coworkers of this company usually have at least a BSc or MSc degree and some even have a PhD in healthcare or technology fields. Because of this, it can be said that they have sufficient knowledge regarding the fields of ethics and technology ethics. Additionally, the company has shown an interest in the use of a tool for the ethical evaluation of technology. It was chosen to only use the questionnaire as a data collection tool, as the interview would be time-consuming to the experts while similar questions would be asked. To retrieve a significant amount of answers from the questionnaire, the goal is to receive at least 30 participant answers. However, for a significant amount of answers on this qualitative data that evaluates the ethical framework a number of participants of 15 or higher will also suffice.

The analysis of the questionnaire will consist of two parts since the questionnaire will consist of closed and open questions. The analysis of the closed questions can be achieved by creating simple graphs in the form of either bar graphs or pie charts. For the questionnaire, the tool Google Forms is used, since this tool allows for automatic extraction of these types of graphs. For the open questions, it is important to code the answers. Coding will be performed using colour coded labels that will be determined for each question after the question is analyzed. In the coding procedure, this is the first step of coding, called open coding. After this, axial coding is used, which analyzes the subjects in the same theme, or code. The last part of the coding procedure is selective coding in which the concepts are used to form a theory. For the questionnaire answers, the answers will be coded in broad themes and, therefore, grouped according to the themes found. After this is done, the data will be evaluated with regards to whether it would be possible to explore relations in the data. For this, a simple Chi-Squared test may suffice [14]. When the analysis of the data is performed, it is extremely important to evaluate the data. Because of this, it is relevant to include the respondent's perceived view of their knowledge in the field as well as their main occupation as this could identify their level of knowledge regarding this specific field.

As mentioned before, the construction of the questionnaire will be based largely

on the literature review, as well as the construction of the first version of the ethical framework. The ethical framework will be based on works that are discussed in more detail in the section Literature review and domain. The choices that were made regarding the first version of the ethical framework are explained in the chapter Method to the practical use of the Ethical Framework after that. More information on the questionnaire construction and the choices that were made can be found in the chapter Construction of the questionnaire. In the following chapter, Literature review and domain, the Literature review is performed and the boundaries are laid out.

Chapter 3

Literature review and domain

When talking about Human Monitoring Algorithms, it is important to note that there are many different ways of collecting data and different types of data that can be collected from individuals. A significant first distinction is that of Human Monitoring Algorithms that gather physical data off of human individuals. After this is laid out, the paper will talk about the collection of data on the online behaviour of individuals and the collection of meta-data.

3.1 Physical monitoring

First of all, there has been a lot of research towards vital sign monitoring in humans, which looked into the use of Human Monitoring Algorithms that worked with physical sensors [15, 16, 17, 18, 19, 20]. Most of this research has been performed towards clinical use of these monitoring algorithms, but the research of Yang, Yang and Zhang focused on in-car vital signs monitoring [19]. Furthermore, the implications associated with the use of these types of algorithms have already been explored in a study by Hravnak, Marilyn, and Chen, et. al. [21]. These implications are especially interesting since the mining of these large amounts of personal and sensitive data is currently being regulated by governmental laws regarding data processing, like the GDPR. It is important to note that this study talks about big data, where they refer to big data as a large amount of continuous data [21]. Another study, already before the 2000s, performed research towards human activity monitoring with the use of wearable sensors [22]. Besides this, there exist patents that describe a human activity monitoring device that has been updated over the years by Kahn [23]. On the same subject of human activity monitoring devices, a more extensive review was published in 2014 [24]. These last two studies and the patents are all towards the same type of device, a device that monitors human activity behaviour [22, 24, 23]. Nowadays, most people are aware of these human activity monitoring devices in the form of a wearable wristband like the FitBit or other brands that rely on the same concept

[25]. Also for these types of Human Monitoring Algorithms, there has been research towards the opportunities, limitations and possible legal implications [26]. A fairly recent project proposes a smart-phone based adaptive recognition and real-time monitoring system for the monitoring of human activities [27]. Though all of this new technology is promising and can provide humans with new ways to enhance their lives, the aspects that were introduced in the earlier chapter still allow for questionable ethics surrounding the data that is being monitored through these techniques. Physical data of a user can easily be used by other parties than the user to monitor or track the said user. Especially location-type data can tell a lot about an individual, which makes it valuable information to, for example, advertising parties. Therefore, these Human Monitoring Algorithms could be abused and because of this, be unethical.

3.2 Online monitoring and profiling

Besides the algorithms that focus on the monitoring of physical human aspects, many Human Monitoring Algorithms focus on the online behaviour of humans. Most often these algorithms focus on what is called *psychographic profiling* [28]. Psychographic data is information about a person's attitudes, values, personality traits and interests. This information is used to build a profile of how said individual views the world, the subjects and things that interest them, and most importantly what triggers motivate them to action. This data attempts to capture the psychological state of an individual, or in more specific cases, a particular combination of Activities, Interests and Opinions, also called AIOs. These AIOs can be used as an implication to a proclivity to a product, an advertisement or an opinion. Therefore, what is valuable to advertisers are these psychographic profiles of people or groups of people. By linking psychographic profiles to advertisements or products revenue is made. Psychographic profiling is, because of this, mostly used for online shopping and advertising [9, 10, 11].

On the other hand, there are a lot of parties that rely on the functioning of a recommender system to provide their services, like large media companies such as Spotify, YouTube and Netflix. These recommender systems can for example use ontological user profiling as a way to provide good recommendations to the user [12]. An ontology in the fields of computer and information science is a representation with a formal naming and definition of categories, properties and relations between concepts in the data and entities. That is, an ontology is a way of representing the properties and relations between the properties of a subject in data. These ontologies are constructed by the means of Human Monitoring Algorithms that gather data about the user to construct the ontologies. Newer recommender systems often even function in a cross-domain sense, which allows for the systems to generate more encompassing user models and provide better recommendations [13]. Again, these human algorithms also allow for an enhanced lifestyle for individuals. Meaning that the individual can navigate the programs they use with greater ease and has to input less data manually. Nonetheless, it is known that these companies often do not just use the user's data for the recommender system or user profile solely [29]. Because of this, there is again information and control asymmetry between the user and the organisation providing the product, which can make for a very

unethical environment.

3.3 Meta-data

Additionally, many smaller Human Monitoring Algorithms do not per se gather data about a physical or mental aspect of a user, as the algorithms described before do. These Human Monitoring Algorithms are mainly focused on gathering meta-data of the user. Meta-data is simply said, the data containing information about data, which allows a system to gather contextual data. These algorithms are focused on gathering data that *might* say something about a user. This data is not explicit, but *could* still be very useful. Meta-data could, for example, be used for topic classification by using meta-data from hyperlinked objects [30]. Another use of this type of Human Monitoring Algorithms is the use of location data gathered through public social media meta-data [31]. This specific case already brings up a concern regarding what data is and is not publicly available. Due to these algorithms functioning only in the background, it is very hard to say what data is being gathered and for what purposes it is used. Because of this, there is a higher chance of the algorithm not being transparent and other ethical issues arising.

3.4 Domain

All these Human Monitoring Algorithms are implemented in our lives and function silently in the background. Often people are not even aware that they are there. Still, these algorithms gather large amounts of data about us in our everyday lives. These algorithms know what we do, where we are, and who we are with. But also, they know what we like, what interests us, what our political view is and what they can do to trigger us to motivate some form of action. Because of this, these algorithms gathering all this information about us must be ethical. Hence, it is important to gain a common understanding of what it means to be ethical when it comes to Human Monitoring Algorithms. Ethics surrounding technology is not a new field, as Heidegger already talked about *Questioning* technology in 1954 [32]. Though, it is still important to determine how an algorithm can be ethical and what it means for technology to be ethical.

The dictionary definition of ethics is quite simple, namely, ethics are moral beliefs and rules about right and wrong. In practice, however, ethics are way less straightforward and are, therefore, sometimes hard to grasp for people. One thing has been clear since the rise of technology, ethics should also be applied in this new field as all technology works for or with humans. Because of this, many books have been written about ethics and technology [33, 34, 35, 36]. Additionally, research has been performed towards the approach of technology ethics and ethics in technology design [37, 38]. Therefore, it can be said that there is a solid base of research towards ethics in technology.

Still, there is no standard for ethical development and ethical technology design. This could be explained by the steep rise of technology and the continuous development of new technologies and techniques. This does not take away that the problems discussed before still exist. Nevertheless, there might not be standards for ethics in technology per se, there have been different takes on ethics for individuals throughout the ages. As the

book *Making ethical decisions* by Josephson and Hanson implies, some pillars can help an individual make ethical decisions [39]. These pillars consist of six different categories, which are namely; trustworthiness, respect, responsibility, fairness, caring, and citizenship. Also, in business ethics, a seven pillar ethical framework was proposed by Wines that expanded on the use of moral psychology and Kohlberg's scale in organizational design [40]. Illustrated by these examples, it can be said that ethics in other fields have been explored in more detail, allowing for frameworks to be designed and constructed for use in these contexts. Though it can be argued that algorithms simply function as their creators have designed them to function, this does not mean that such an algorithm cannot have similar ethics as humans regarding their functioning when working with human data. Thus, existing frameworks could be used to construct an ethical framework that is suitable to evaluate Human Monitoring Algorithms. To further look into the construction of an ethical framework for technology, the ethical frameworks that exist in this specific field should be explored.

As stated in the previous paragraph, an algorithm can only function as its creators have designed them to function. Looking further, it can be said that technologies like Human Monitoring Algorithms are not the technologies that cause ethical friction [3]. Earlier mentioned were the recommender systems and the systems that constructed psychographic profiles. These technologies are the ones that cause ethical friction due to their end purpose of making money from the gathered data. Thus, while the Human Monitoring Algorithms might be acting innocently, the technology that they are feeding the data towards might be acting unethically. In the case of a human monitoring algorithm feeding data to a recommender system, the system could use the plain output of the algorithm in several different ways. This could cause ethical implications especially if not all ways are explained (clearly) to the user. In turn, this makes the ethical implications of the first algorithm larger.

3.5 Persuasive technologies

Another way the output of the data can be used is when the data from the algorithms are used to afterwards make the user perform a certain action. These types of technologies are called persuasive technologies. In his paper, Verbeek talks about how persuasive technologies can be assessed with an eye on moral responsibility and proposes an early version of an ethical framework [41]. In his work, he uses moral principles to assess the functioning of these technologies. The most relevant are, no harm, beneficence, justice, and respect for autonomy. Additionally, he proposes that users should be able to *trust* the technology they are using, which implies both *reliability* of the technology and *responsibility* of the designers.

3.6 How to ethically handle technology

In earlier works, Martin and Schinzinger have proposed *informed consent* as a main ethical principle to judge moral acceptability especially for social experiments with experimental

or new technology [42]. In his work they described a specification of informed consent for situations where individuals cannot be readily identified as the following:

> "Information that a rational person would need, stated in understandable form, has been widely disseminated.
> The subject's consent was offered in a proxy by a group that collectively represents many subjects of like interests, concerns, and exposure to risk" [42].

However, the application of this principle can be problematic, since it requires finding all the individuals that are potentially influenced by the technology and asking them to provide their informed consent. Even if this was possible and not extremely time-consuming, it can be deemed questionable to give each individual a veto power even though the benefits may be large to society [43]. In the field of clinical experiments, Beauchamp and Childress proposed four principles of non-maleficence, beneficence, respect for autonomy, and justice [44]. Important to note is that Verbeek also used almost identical principles in his work five years later [41]. The fact that these principles are used more often makes them a valuable addition to the base of this research. Therefore, these terms will be explained in more detail in a later paragraph. All these aspects are important to take into account when it comes to ethics for technology, especially when it comes to the new and evolving technology that is surrounding people in the current era. Additionally, it can be argued that Human Monitoring Algorithms, though not specifically new anymore, are still evolving, as can be seen by the use of user data for new technologies such as in-car vital signs monitoring [19].

These difficulties surrounding the ethical handling of new technologies all boils down to the control dilemma that was proposed by David Collingridge [45]. The dilemma states that technology in the early stages still has a social embedding that is malleable, however, there will be uncertainty regarding the social effects of said technology. Though in later stages the social effects may be clear, the technology will be so well established in society that it is difficult to overcome any negative social effects. Because of this dilemma, most works have focused on overcoming the first part of the dilemma by further anticipating what the consequences of new technology may be. This approach was used in, for example, Constructive Technology Assessment, Value Sensitive Design, and Responsible innovation [46, 47, 48]. There are similar emphasises on anticipation found in the Ethical, Legal and Social Implications (ESLI) programs in the USA and newer versions of Responsible Research and Innovation (RRI) initiatives from Horizon 2020 in Europe. Though this is a good initiative, anticipation will most likely not clarify all unknowns and, therefore, there will likely still occur errors [49].

Because of this problem, the work of Van de Poel introduces an attempt at making an ethical framework specifically for the evaluation of new technology [50]. This work proposes to use the principles of Beauchamp and Childress rather than the concept of informed consent as a more solid base for an ethical framework [42, 44, 50]. In their work, he describes how the four ethical principles were used for clinical experiments and also compared how these principles would in turn apply to new technology. From these principles, Van de Poel made a list of 16 statements that could be used to evaluate experimental technology. The framework that he made can be found in Appendix A.

The work of Van de Poel is very specifically focused on new technologies [50]. This

means that there is still a gap in the literature when it comes to evaluating existing and evolving technologies utilizing an ethical framework. Additionally, it is important to note that the most problematic technologies are the small, often innocently acting, Human Monitoring Algorithms. This, again, due to all the ethical implications that arise as explained in earlier paragraphs. In the current era, the most valuable product to sell is information on human individuals. Seeing this, it is important to make sure that this technology in specific can be evaluated to be or not be ethical. Hence, this work aims to solve that problem by proposing an ethical framework that can be used to evaluate Human Monitoring Algorithms. To make this ethical framework more accessible and usable, the framework will consist of a set of questions, to allow constructive discussion.

Besides the work of Van de Poel, other works proposed ethical frameworks regarding technology [50]. Some works that were found were specifically regarding health technology assessment [51, 52]. The work of Ten Have was an exploratory study, but the work of Burls, Caron, Langavant et. al. proposes an ethical framework in the form of questions that help structure consideration of ethical issues [52, 51]. Because of this, these two studies can help structure the questions that will be constructed for the ethical framework proposed by this work. More work has gone towards ethical technology assessment, or eTA as it is stated by Palm and Hansson [53]. In their work, an ethical checklist is proposed that intends to cover the critical issues that arise regarding new technologies. There are many more works that focus specifically on ethical assessment regarding ML and AI techniques [54, 55, 56]. However, since Human Monitoring Algorithms are not specifically ML or AI techniques, these frameworks will not be taken into consideration as they are very specifically focused on one field of expertise.

Additionally, the work of Wright will be discussed in this paper [57]. Wright's work proposes a framework for the ethical impact assessment of technology. To do so, the work relies on various sources of which both Hofmann and Moor already indicated that there is no general way of assessing moral implications in (health) technology [1] [58, 59]. The work of Wright aims to solve this problem by introducing an ethical impact assessment framework that is based on the four principles proposed by Beauchamp and Childress with the addition of a section on privacy and data protection [44, 57]. The ethical impact assessment framework proposed by Wright consists of questions for the different sections that are based on the ethical principles that were chosen [57]. By structuring the questions per section, the ethical framework can already take shape. Additionally, the questions could be interlinked per section to add even more structure. In this work, the section privacy and data protection will also be added and is seen as an important addition to the principles constructed by Beauchamp and Childress [44, 57]. Because of the structure of both the framework of Van de Poel and Wright, these two works will be the main base for the construction of the ethical framework. Also, the work from Burls that considers structuring the consideration of ethical issues can be used [51].

Since the terms used by Beauchamp and Childress will also be used as a solid base for the questions of the ethical framework that is proposed by this paper, they are presented

[1] Wright already indicated in his work that Hofmann specifically mentions health technology, but it may be applicable to any technology.

below from the work from Van de Poel [44, 50].

- **Non-maleficence:** Obligations relating to doing no harm, including obligations to minimize risks, or to take precautions against possible risks or harms from the experiment,
- **Beneficence:** Obligations to do good, including obligations to take away existing harm, or to prevent harm or risks that do not originate in the experiment [2],
- **Respect for autonomy:** Obligations relating to protecting and guaranteeing the autonomy, including the autonomous choice, of individuals and groups,
- **Justice:** Obligations relating to issues of distributive justice, to special protection of vulnerable groups, to avoiding exploitation, but also to procedural justice (just procedures).

From these principles mentioned above, ethical questions that belong to one or more of the principles can be constructed. By doing so, an ethical framework consisting of structured, or even interlinked, questions can be proposed that will allow evaluating Human Monitoring Algorithms. Additionally, the sub-questions can be answered, which will be discussed in further paragraphs. The main research question now has a solid base towards an answer and can be further answered by conducting the research that is proposed and constructing the ethical framework. By doing so, a valuable contribution to the existing research will be provided by this paper in the form of a literature review and an, as of yet not existing, ethical framework to evaluate Human Monitoring Algorithms. This work aims to form a base for the ethical evaluation of existing technologies by providing such an ethical framework.

3.7 Answers to the sub-questions

To answer the sub-questions of the research, the ethical principles were explored. By exploring these ethical principles, both the first and second research question can be answered. The ethical principles that are important to explore regarding Human Monitoring Algorithms were chosen to be those first introduced by Beauchamp and Childress and further explored by additional studies by Van de Poel and Wright [44, 50, 57]. Furthermore, as proposed by Wright, an additional section on privacy and data protection will be added as this is highly relevant in the field of technology. The second research question was answered by exploring the research performed towards the construction of ethical frameworks in fields where technology is used. This has provided an insight into what different types of ethical frameworks are used concerning technology. Additionally, it has provided several works that can function as a base for the construction of the ethical framework that this work aims to construct.

As mentioned before, all sub-questions can be answered by an extensive literature review. The third question can be answered by looking into the work of Wright as well as the work of Burls [57, 51]. In the work of Wright, the questions that are used as

[2] to produce more good than harm, to create or increase benefits

an ethical impact assessment framework were structured within each of the principles [57]. By doing so, each principle had multiple questions that were attached to it, and these questions were then somewhat or fully interlinked due to belonging to the same principle. By constructing the ethical framework in this way, the questions will at least be structured by belonging to a particular principle. The questions could then be interlinked by allowing the following questions to build upon the questions that should be answered earlier in the evaluation. Furthermore, the work of Burls can be used to look into what ethical issues should be considered before others, allowing the order of the questions to be structured [51]. The work of Burls proposes a set of questions to motivate ethical reflection and analysis which can be found in Appendix B.

The works that were chosen to function as a base for the ethical framework both had a different outcome for the framework. The work of Van de Poel proposed a framework with statements that could be seen as categorisation statements, which was similar to the checklist type of ethical framework that was constructed by Palm and Hansson [53, 50]. The statements could be answered with only an affirmation or a negation, or with a more in-depth answer that explained how the technology functions for each category. The work of Wright, on the other hand, invited for evaluation in the form of discussion [57]. However, Wright also mentioned that the questions could be used as a checklist as well, though not formulated in a yes-no structure. For this work, it was chosen that the outcome of the ethical framework should be evaluation in the form of discussion. This was chosen as evaluation in ethics is a question of community, it is a group decision towards promoting and underpinning what acting ethically means and how one promotes the "right" practice [60]. Additionally to the discussion, the ethical framework should provide some method to guide practitioners towards a more ethical technology. By making these decisions, the fourth sub-question of the research is answered, which will allow for a solid base for the construction of an ethical framework.

Chapter 4

Towards the first version of the Ethical Framework

As was stated before, the first version of the ethical framework is based on the sources that were found and explored during the extensive literature review. The relevance and virtue of the construction of such a framework can be illustrated by different sources [58, 59]. The problem is the lack of a general way of assessing computer ethics as well as the fact that computer ethics is not a fixed set of rules [59]. This was also already made clear by the need for ethical frameworks in persuasive technologies, new technologies, and impact assessment [41, 50, 57]. The need for an ethical framework specifically for Human Monitoring Algorithms was laid out during the literature review and illustrated by the documentary *the social dilemma* [3].

Prescriptive ethical guidance can be seen as problematic, as contextual factors influence ethics. Because of this, a better approach is to ask questions, which is the approach this work adopts too. Others who took this approach of asking questions are, for example, the European Commission. Additionally, the works from Marx and van Gorp also formulate questions aimed at uncovering ethical issues [61, 62]. The resources provided by the European Commission named before can be used as a base for the construction of the ethical framework. The resources for ethical guidelines are not as prominently shown on the website, which is remarkable as the work of Wright builds directly upon information from the main website [57]. However, when following links forward through the articles, relevant publications and tools can still be found. First of all, a document called Internet Research: Ethical Guidelines 3.0 Association of Internet Researchers was found [63]. These ethical guidelines on internet research provided by the European Commission contained ethical questions on different ethical aspects that should be taken into consideration when performing research [63]. Another document that can be found through the resources provided by the European Commission is a Researcher Checklist of Ethics Applications on the website of the UK Research Integrity Office [1]. This checklist

[1] https://ukrio.org/publications/researcher-checklist-of-ethics-applications/

also consists of questions which can be marked *Fully Met*, *Partially Met*, or *Inadequate/ Missing*. This categorisation can also be used as a guideline for answering the questions of this ethical framework. Additionally, the work of Van de Poel and Wright will be used as a base for the construction of the questions, while the work of Burls will be used as a base for the structuring of the questions [50, 57, 51].

Equivalent to Wright's work, this work will be structured using the four principles as proposed by Beauchamp and Childress, with a separate section on privacy and data protection [44]. To ensure a general understanding of the principles, each section will receive an explanation of what some used terms mean in the context of the questions. Also, the choices regarding the sections that were used for the ethical framework are explained. For each section, it is possible that more questions could be added, or the phrasing could be different. However, the framework is not meant to be comprehensive. The goal of the framework is to spark discussion and be used indicatively. Additionally, a method regarding ethical steps to take when using this ethical framework is explained in a later section.

The work of Wright is also based on the work of Beauchamp and Childress, but additionally introduces several more related to one of the main principles that are deemed as important in the field of ethics [57]. The sections that will be used for the structuring of this framework are based on those used by Wright as the subsections for each principle will ensure a structured outcome for the ethical framework to be [57]. Questions from the work of Wright and categories from the work Van de Poel will be used as a base for the questions in this ethical framework [57, 50]. Additionally, the various resources that were stated before will be used to construct questions by the author of this paper. The term technology will be used in the ethical framework to ensure broadness and to avoid the constant use of the term Human Monitoring Algorithms. It was chosen by the author to propose the sections of the ethical framework in the order that Beauchamp and Childress proposed their principles, ending with the section on Privacy and Data protection as proposed by Wright [44, 57]. Each section will start with an explanation of the principle and the choices made regarding the subsections. Furthermore, the subsections will contain a clarification on why these specific questions are included and the choices that were made. The last section of this Chapter will explain the method in which the ethical framework should be used.

4.1 Non-maleficence

In their work, Beauchamp and Childress state that *"The principle of non-maleficence asserts an obligation not to inflict harm on others"* and *"Non-maleficence only requires intentionally refraining from actions that cause harm. Rules of non-maleficence, therefore, take the form of 'Do not do X'."* [44]. Wright made sure that the principle of Non-maleficence included the subsections Safety, Social solidarity, inclusion and exclusion, Isolation and substitution of human contact, and Discrimination and social sorting [57]. The subsections that will be used for this ethical framework are Personal safety and Social safety, as these sections accurately represent the dimensions that were mentioned. Safety is a right that is stated in the governmental laws regarding human rights and is

discussed by the European Commission and the GDPR as well [63, 8].

4.1.1 Personal safety

The section Personal safety talks about the general safety of the user of the technology. Since the user is a consumer of the technology its services, consumer protection is an important aspect. The United Nations guidelines on consumer protection first declared these rights on an international basis [64]. Europe also implemented Article 38 in the Charter of Fundamental Rights on consumer protection which states that: "Union policies shall ensure a high level of consumer protection." [2]. Additionally, The Universal declaration of human rights talks about the general right to protection against interference with privacy or correspondence in Article 12 [65]. To address the laws surrounding consumer protection and consumer legislation, the first two questions of the ethical framework are introduced. The first question addresses the most important subject of legislation, after which the next question will follow up with the subject of consumer protection. These questions were chosen to be addressed first as these subjects will be highly relevant to it being ethical or not have the technology used by real users. As a follow-up question to consumer protection, it is important to ensure that the user is aware of the technology.

After these foundational issues are addressed, the questions will continue by asking what physical or psychological harm could be caused to the user. The technology must not harm the user in any way, which is why the reduction of this risk and the adoption of measures to avoid this risk have to be discussed. Additionally, a follow-up question would be to address whether the risks are already studied and whether these studies will be made public to the users. This, as this information specifies what harm could occur to the user and keeping information from the user can be deemed highly unethical. Another follow-up question to the third question is the inclusion of the fifth question that allows to discuss measures that avoid harm to the user. This subject is important to discuss due to the right of consumer protection.

The last question that will be included in the section about general safety is a question regarding the safety of the user in case of error. The right to consumer protection also applies in case of error, which is why this subject should be discussed before error occurs. The possible harms will be explored by including this question which will allow for measures to mitigate these risks.

1. Does the technology comply with consumer legislation?
2. Does the technology influence consumer protection?
   (a) Are there measures in place to make the user aware of the technology?
3. Is there a possibility of the technology causing either physical or psychological harm to the user? If so, is there a way to reduce this risk and what measures can be adopted to avoid the risk?

[2] https://ec.europa.eu/info/aid-development-cooperation-fundamental-rights/your-rights-eu/eu-charter-fundamental-rights_en

(a) Have the risks already been studied to address the safety of the technology, or are there plans to study these risks? Will the study be made public?

(b) Are there measures in place for the technology to ensure that users will be protected from harm? i.e. the user will not be exposed to risks that might not occur in everyday life?

4. What unanticipated breaches can occur during or after data collection and storage by the technology and in what harm could this result?

4.1.2 Social Safety

The Universal Declaration of Human Rights declares in Article 7 that all are equal for the protection of the law without discrimination [65]. The need for equality is an important aspect of human rights. Because of this, the European Council's Lisbon Strategy talks about the notion of e-inclusion [3]. This means that they strive for an inclusive information society, meaning that information society should be available to all. Additionally, the Charter of Fundamental Rights also includes Article 21 on non-discrimination. This Article states that any discrimination based on "any ground such as sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation shall be prohibited" [4]. By exploring these regulations it is clear that equality and exclusion form large and relevant problems.

The questions for the section Social Safety will start by ensuring the protection of the users in their social environment. The user's social safety depends on the social contacts they can nurture. To ensure that the user will not be harmed psychologically due to isolation, the first question is introduced. Another aspect of the social safety of the user is the risk of the user being excluded. One of the ways that a user could be excluded could be based on the user profile of said user. Because of this, a question is introduced regarding the use of profiling technologies. A follow-up to this question would be regarding the possibility of stigmatisation of the user.

After this first question, the questions will be focused highly on equality and inclusion of all members. To ensure that the equality of users will be enforced, the first question will introduce the concept of social sorting, as this technique could be used to discriminate against certain groups. Below this question, several questions are added that address grouping in several ways. The first question also includes the targeting of groups by specific parties, as this would be the purpose of grouping in many instances. After this question, it was chosen to directly address discrimination of groups, as this is a highly important ethical aspect that should be avoided at all costs. Another aspect that is related to social grouping is often that certain groups pay more for the same services than other groups. For example, when the technology decides that men will be more

[3] https://portal.cor.europa.eu/europe2020/Profiles/Pages/TheLisbonStrategyinshort.as

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12012P/TXT

likely to pay for premium dating app services than women. This is an important aspect that will be addressed with that question.

The following question is not addressed under the grouping section, as this question does not only address groups but also addresses the harm of users. This question is included as it is both an important aspect of safety as well as of social safety. The different formulation of the question, with the inclusion of the term "disadvantage", will allow recording different answers by stakeholders. Furthermore, the term disadvantage may be used more broadly than the term harm as causing a disadvantage to a user or group of users can happen in more delicate manners than causing harm to someone.

The last question that will be addressed by this section is regarding the concerns users or stakeholders might have towards the technology. This question is included due to the importance of user input towards technologies. The social safety of a user is not the responsibility of the user only, it is the responsibility of the group. Because of this, it is relevant to have an included measure where users and other groups can bring up any concerns regarding the technology.

1. Is there a possibility that the technology may lead to greater social isolation of users? Are there measures that could be adopted to avoid that risk?
2. Is the technology connected to profiling technologies?
   (a) Is there a possibility that the technology could stigmatise the user?
3. Does the technology enable social sorting?
   (a) Has there been grouping of users using the technology? And if so, are these groups targeted by certain parties?
   (b) Could the technology be used to discriminate against any groups? What measures could be applied to avoid this?
   (c) Will any of the groups have to pay more for services the technology is connected to than other groups?
4. Can the information gathered by the technology be used to harm or disadvantage a user or group of users?
5. Are there possibilities for stakeholders and users of the technology to bring up concerns regarding the technology?

4.2 Beneficence

Beauchamp and Childress state that *"Morality requires not only that we treat persons autonomously and refrain from harming them, but also that we contribute to their welfare. Such beneficial actions fall under the heading of 'beneficence'... principles of beneficence potentially demand more than the principle of nonmaleficence because agents must take positive steps to help others, not merely refrain from harmful acts."* Additionally, there are two principles of beneficence they name: *Positive beneficence requires the agents to provide benefits. Utility requires that agents balance benefits and*

drawbacks to produce the best overall results. [44]. Wright made the section Beneficence have various subsections, starting with Universal service, Accessibility, Value sensitive design, and lastly, Sustainability [57]. This work will use the sections Personal beneficence and Societal beneficence since it can be argued that these sections overlap with the sections as proposed by Wright.

4.2.1 Personal beneficence

First of all, the basic term of beneficence is important to address when it comes to the section Personal Beneficence. Because of this, the first question of this section will introduce the benefits that the user will enjoy from the use of the technology. Based on this question, more questions will be introduced to discuss the benefits the user might enjoy from the use of the technology. Essential questions to ask are whether the technology will have a positive influence on the dignity, personal safety, independence or sense of freedom of the user. These aspects are all highly beneficial categories to the user. Additionally, a question should be included regarding the facilitation of self-expression as this could help benefit the user. Another question is included regarding the empowerment of the user and the way of achieving this empowerment. The empowerment of the user is an important aspect of beneficence as this influences both the mental well-being of the user as well as the physical well-being. Lastly grouped under this question will be a question addressing the expected knowledge level of the user of the technology. This is an important question to address as the user their knowledge should not influence their use of the technology. When a user with a lower knowledge level cannot properly use the technology anymore, an ethical issue arises.

For the personal beneficence of the user, a question should be included regarding their privacy in this section already. It would be of benefit to the user to discuss what options are available regarding less privacy intrusive options. The included question will allow for discussion regarding the options as well as the current way of functioning.

The last question of this section will introduce the benefits of stakeholders from the technology, as the stakeholders of the technology can also be deemed to fall under personal beneficence. The benefits for stakeholders determine an aspect of the functioning of the technology, which makes them a relevant subject to discuss.

1. Will the technology provide one or more benefits from the use of the technology to the user? If so, in what way can users benefit from the use of the technology?
   (a) Will the technology have a positive influence on dignity, personal safety, independence or sense of freedom?
   (b) Does the use of the technology facilitate the self-expression of users?
   (c) Does the technology empower users? If so, in what way is this achieved?
   (d) Does the use of the technology expect a certain level of knowledge that some users may not have?
2. Are there alternative ways of providing the same service with the technology that are less privacy intrusive?
3. What stakeholders benefit from the technology and in what way?

4.2.2 Social beneficence

The section Social Beneficence is regarding the benefits society might receive from the existence of the technology. Because of this, the first question immediately addresses whether society receives one or more benefits from the technology. Additionally, this question addresses the goals of the data collector. This ensures that the goals of the data collector are discussed quite early on in the process of evaluating the technology. The next question is grouped below this first question to address the use of scientific or objective evidence for the use of the technology. In this question, the important aspect is what party benefits from the information that is used as this could uncover ethical issues when specific information is used only for the benefit of a certain party. Especially important is to note what scientific or objective evidence is or is not used as a base for the decision-making regarding the technology. The available information should be explored to fully answer this question. Also, the following question is regarding who receives what benefits from the outcome from the technology. Because of this, this question is also grouped under the first question. It is critical to address how the outcome of the technology will be used and thus to who it will be available. The communication about this information is addressed by the GDPR [8]. Note that the party that benefits from the outcome of this technology should be discussed by this question as this aspect is what could make for an ethical issue.

The technology should function in a manner that considers the rights of a human individual. Because of this, a question is included that discusses the values of human well-being, justice, dignity, trust, human rights, welfare, privacy and autonomy. The technology should take these values into account to be deemed ethical as these are all human rights.

Additionally, a question was added towards the value-sensitive design of the technology. Flanagan, Howe and Nissenbaum state that the design of technologies takes directly on the realisation, or suppression, of certain configurations of social, ethical and political values [66]. In their work, they note that the values of members of the design team often shape a project when it moves through the design process [66]. Because of this, value-sensitive design should be discussed when it comes to the beneficence of users and stakeholders.

The last aspect that will be discussed regarding beneficence by this ethical framework is the subject of built-in obsolescence. Built-in obsolescence regarding the technology should be discussed as this is an ethical grey area. The concept of built-in obsolescence in this technology could be reduced functioning after a certain amount of time. Such functionality is questionable ethically speaking and should therefore be discussed with this framework.

1. Does the technology serve society or only the goals of the data collector? Additionally, what are the goals of the data collector and how are they served?
    (a) To what extent is scientific or other objective evidence used in decision-making regarding the use of this technology? If this information is used, what party benefits from this information, i.e. the user or the data collector?
    (b) Will the outcome of the technology be available to everyone, the user in

particular, or only to the data collector? What benefits does the data collector gain from the outcome of the technology?

2. Does the technology take values such as human well-being, justice, dignity, trust, human rights, welfare, privacy and autonomy into account?
3. Have technologists and developers discussed the technology with ethicists to ensure value-sensitive design?
4. Does the technology have obsolescence built-in? If so, is this or can this be justified?

4.3 Respect for Autonomy

Beauchamp and Childress talk about the term autonomy as the following:

> Personal autonomy is, at a minimum, self-rule that is free from both controlling interference by others and from limitations, such as inadequate understanding, that prevent meaningful choice. The autonomous individual acts freely in accordance with a self-chosen plan... A person of diminished autonomy, by contrast, is in some respects controlled by others or incapable of deliberating or acting on the basis of his or her desire and plans... Virtually all theories of autonomy agree that two conditions are essential for autonomy (1) liberty (independence from controlling influences) and (2) agency (capacity for intentional action)

[44]. Liberty is directly stated with the Right for autonomy by Wright, but additional subsections are Dignity and Informed consent [57]. For this work, the sections Liberty and Dignity will be stated under the section Right for Autonomy, while Informed consent will still receive its subsection. Important to note regarding informed consent is that the person should have a meaningful choice. As stated by Goldberg is that *"Give us your data or we won't serve you"* is not meaningful consent [67].

4.3.1 Right for autonomy

Besides the right to autonomy as was introduced in the paragraph above, the term Dignity is highly relevant when it comes to human rights. Dignity is discussed in the Charter of Fundamental Rights in Article 1 as well as in Article 25. Article 1 states that "Human dignity is inviolable. It must be respected and protected." [5].

First of all, the right to autonomy will be addressed by this section of the ethical framework. To ensure that the rights of a user will not be violated, the first question introduces the right to security and liberty. The decrease of this right should not be violated, which is why it should be discussed how this risk can be avoided. Additionally, the freedom of association of a user should not decline, which is why another question is introduced that addresses this right and discusses justification.

[5]https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12012P/TXT

After the right to autonomy is discussed, this section will discuss the dignity of the person in more detail. The first question on dignity introduces the implementation of the technology that allows users to live a life of dignity. Follow-up questions will introduce the crucial subject of compromising human dignity and with that, the measures that could be taken to avoid this risk if declining the use of the technology is not a possibility. Another follow-up question will address the dignity of cognitively or physically disabled users. This question should be discussed to ensure that these users do not have their dignity compromised by standing out in a certain way.

1. Does the technology decrease an individual's right to security and liberty? If so, what could be done to avoid this?
    (a) Will the technology decrease a user's freedom of association? If so, what is the justification?
2. Will the technology be implemented in a way that allows users to live a life of dignity and independence and also to participate in their preferred social and cultural life?
    (a) Does the technology compromise or violate human dignity? Can users decline to use the technology or, if not, what measures can be taken to minimise or avoid compromising dignity?
    (b) Does the technology mark users as cognitively or physically disabled in some way? If so, are there measures to ensure these users do not stand out among other users?

4.3.2 Informed consent

As found during the extensive literature review, informed consent is a way of improving the technology with regards to how ethical it is [42]. Informed consent is an important aspect of the rights of users as it introduces a way of communication about the technology. Because of this, the first question of this section introduces the need for technology to obtain free and informed consent. This is the fundamental base of informed consent, which means most of the following questions can be used as a follow-up question. Firstly, it is important to determine whether the user has an actual meaningful choice, as this would compromise the informed consent if this is not the case. This question will also aim to uncover measures that could be taken to provide a meaningful choice to the user. After this, it is meaningful to ascertain that informed consent is truly freely provided. The user should provide their informed consent freely as it is otherwise not valuable. Additionally, it is important to discuss whether the informed consent is complete regarding the legislation. This also includes the withdrawal of informed consent which will be discussed by another follow-up question.

Another aspect that is highly relevant to discuss when it comes to informed consent is the use of informed consent from users that are not able to provide their freely given informed consent. These users can, for example, be elderly that suffer from mental illnesses or intellectually impaired users. It should be discussed how it can be ensured that everyone who gives their informed consent is viable to do so.

A different group that cannot fully give informed consent is children. Children are not allowed to be targeted by certain parties, which is discussed in the legislation. The rights of children are different from those of adults and should be protected. Therefore, this subject is very sensitive and should be addressed when technology is evaluated.

The last subject that will be discussed in this section does not belong to any of the earlier stated categories and is therefore discussed last. This subject is regarding the effort a user has to make to not use the so-called service that the technology provides. The user should have a free choice to not use the service of the technology, rather than having to make an effort to not do so.

1. Does the technology obtain the free and informed consent of the users of the technology?
   (a) Does the user of the technology have a meaningful choice, i.e. are there viable alternatives of not using the technology? If not, what measures could be taken to provide a meaningful choice?
   (b) Is the informed consent truly freely provided? i.e. does the person have to give consent to use a service that can otherwise not be used or is not replaceable by a service that does not gather the same types of data?
   (c) Is the informed consent that is asked of the user complete concerning the inclusion of the necessary information as is stated in the GDPR?
   (d) Will the user be allowed, and informed of their right, to withdraw their informed consent?
2. How is it ensured that the user can give informed consent when users that cannot give informed consent (i.e. children or elderly with dementia) can also use the technology?
3. Does the technology gather data from children and how are their rights protected?
4. Does the user have to make an extra effort to not use the 'service' the technology provides?

4.4 Justice

By Beauchamp and Childress the principle of Justice can be explained in two distinct ways [44]. They use the term *justice* and the term *distributive justice*. The term justice refers to fair, equitable and appropriate treatment as what a person deserves in the way of what is due or owed to them. Distributive justice is a term that refers to the same fair, equitable, and appropriate distributions but then in terms of social cooperation. Distributive justice is a term that represents the distribution of all rights and responsibilities in a society [44]. The principle of Justice comes with the subsection Equality and fairness, or social justice in the work of Wright [57]. In this work, the subsections of Personal justice and Social justice will be adopted.

4.4.1 Personal justice

The principle of justice as explained above aims to provide every user with treatment in the way of what is owed to them. To ensure that every group is treated with justice the first question in this section introduces the identification of all affected and vulnerable groups. This ensures that every group that is affected will be discussed so that they can be treated with justice. Following up on this question it is relevant to discuss whether the technology can be used by all the groups in society. The technology should be available to all to be just. The same goes for the providence of benefits to some, but not all, groups. This subject should be discussed as this could be unjust. In the case of this happening, it is also relevant to discuss how this choice can be justified. Furthermore, another question that can be addressed that relates to the same subject is the inequality in payment between groups.

Another subject that should be discussed when it comes to justice is the addressing of technology failures. When technology fails and stakeholders are affected, there should be appropriate communication and, if necessary, compensation. This discussion adds value since it helps structure the plan of action when error occurs. In turn, this helps ensure ethical behaviour of the technology and technology owner.

1. Are all the (vulnerable) groups that may be affected by the technology identified?
   (a) Can the technology be used for or by all groups in society?
   (b) Does the technology provide benefits to some, but not all groups? If so, how is this justified?
   (c) Are there groups that have to pay more for the same service than others?
2. Is there a just system for the addressing of technology failures with appropriate communication and compensation to affected stakeholders?

4.4.2 Social justice

The section Social justice will talk about justice when it comes to unequal treatment of users or groups of users. Therefore, the first question will be regarding whom the technology will be available. Ethically speaking, there should be no exclusion of users or groups of users based on their wealth, power, or technological sophistication. Because of this, the subject of availability is an important first question towards social justice.

Another question that should be asked is regarding the application of the technology policy. This technology policy should apply to everyone the same way if the technology is ethical. An additional question that can be asked is whether there are ways to resist the use of the technology. This question will then also get back to the subject of the first question by discussing whether these means, if available, are equally distributed.

Finally, the subject of justice regarding harm or disadvantage to a user will be introduced in this section. It is important to get back to this subject in another section to allow for a different context for a similar question. By doing so, different answers might be collected. Additionally, it can be argued that it would be unjust for a technology to harm or disadvantage a user by the information that is gained.

1. Will the technology be available to everyone or only to those that can afford it in terms of wealth, power, or technological sophistication?
2. Does the technology policy apply to everyone equally or only to those who cannot resist it? i.e. can someone pay to not have their data collected?
   (a) Are there ways available to resist the use of the technology? If so, are these equally distributed?
3. Is there a possibility of information that was gained being used in a way that could harm or disadvantage the user it relates to?

4.5 Privacy and Data protection

Due to the project relating closely to technology and the collection of data, in particular, the concerns regarding privacy and data protection must be taken into consideration for this ethical framework as well. The work of Wright adds a large number of subsections regarding Privacy and Data protection [57]. These sections are namely on Data quality, Purpose specification, Use limitation, Confidentiality, security and protection of data, Transparency (openness), Individual participation and access to data, Anonymity, Privacy of personal communications: monitoring and location tracking, Privacy of the person, and Privacy of personal behaviour. To ensure the work stays coherent, it was chosen to simply use two subsections Privacy and Data protection for this section. This was chosen since too many subsections can cause confusion and all the subsections are covered by one of these two terms.

4.5.1 Privacy

By the Charter of Fundamental Rights, privacy is a guaranteed right. Additionally, the European Convention of Human Rights, as well as the UN's Universal Declaration of Rights and the e-Privacy Directive talk about privacy as a human right. As mentioned earlier, Article 12 of the Universal Declaration of Human rights states that "No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence." Additionally, the OECD Guidelines and EU's Data Protection Directive (95/46/EC) identify fair information practices or principles to consider ethical issues that might arise regarding privacy and data protection [6] [7]. The need for privacy was also discussed during the extensive literature review.

The first aspect that is important to discuss regarding privacy is whether users are aware that information is collected from them and for what purpose this information is collected. Following up on this question it is important to discuss whether there is any information collected of the user that they are not aware of and whether data is

[6] https://www.oecdguidelines.nl/

[7] https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=celex:31995L0046

collected against the wishes of the user. These aspects could all be highly unethical and even illegal when not according to the legislation.

The next aspect that should be discussed regarding privacy is the accessing of personal data by the user. Additionally to this question it should be discussed whether there is a charge to access this personal data and whether this is publicly available. Also relevant to discuss in the light of this subject is the time it should take before a user will have access to their personal data once requested. Furthermore, it should be discussed whether anonymization is applied to the personal data of the user. These aspects are all highly relevant to the subject of privacy and can cause a scala of ethical issues when not discussed.

Lastly, for this section, it is vital to discuss what data the technology gathers. Starting with the gathering of data that is not necessary for the stated functioning of the technology. When this data is gathered it should be clear what the purpose of this data gathering is. Additionally, the user should give informed consent for this data being gathered. The same goes for the questions following up to this question regarding the monitoring of the user's communications, the monitoring of the user's movement or location, and the use of biometrical data. In the case of the last question, it is important to note whether the user is informed about this before they start using the technology. Specifically following up to the last question is a question regarding the necessity of the use of this type of sensitive data. This should be discussed beforehand with third parties, and less privacy-intrusive alternatives should be explored and discussed. It is essential that these aspects of privacy are discussed and the structure and interlinked questions should help uncover ethical issues of the technology.

1. Are users of the technology aware that information is collected and for what purpose?
   (a) Is there information of the user collected in ways of which they are unaware?
   (b) Is information or (personal) data collected against the wishes of the user?
2. Can users access their personal data?
   (a) Is there a charge to access data and how has this been determined? If so, is the charge publicly available?
   (b) How long should it take before a user can access their personal data, including the response time to requests and providing the data?
   (c) Are there measures in place to ensure a user cannot be identified from their personal data?
3. Will the technology (also) collect data that is not necessary for the (stated) functioning of the technology?
   (a) Does the technology monitor the user's communications? If so, is this with consent?
   (b) Does the technology observe or monitor the user's movements or location? If so, is this with consent?
   (c) Does the technology use information from biometrics, e.g. fingerprints or eye scans? Is the user in advance informed about this?

i. Has there been consultation with third parties about the necessity of this type of data collection and are there less privacy-intrusive alternatives?

4.5.2 Data protection

The last section of the ethical framework will be on data protection. Data protection is guarded by the OECD guidelines as well as the EU's Data Protection Directive. To ensure that users are protected according to these guidelines, the first question will ask what the minimum amount of data to be collected is, how this will be determined and by who. This is an important aspect as this information should be provided to the user. After this three practical questions follow that state for what amount of time the information will be saved, what the purpose of the data collection will be, and whether the information will be removed once the purpose is fulfilled. These are all questions that should be answered early on in the discussion regarding data protection as these questions address the legislation regarding data protection. The importance of measures that help protect a user's personal data is very relevant and will therefore be discussed in a separate question. This question should be discussed right after the practical matters, as this is the basis of data protection. During this discussion, it is important to also clearly state what measures are in place. Following up on this question two questions are related. The first question will discuss who will have access to the technology and with what purpose they will have access. The second question discusses the safeguards that are in place to ensure the data is treated with confidence. These questions are related to the earlier question as they can violate the measures that are in place to protect personal data. Additionally, they are valuable to discuss to identify where data breaches could occur and in what ways the technology is currently still not ethical.

After this, a question is proposed regarding the assurances to determine the accuracy and correctness of the data. There should be measures in place to ensure these data qualities. This is both to protect the user and protect the data collector and can cause ethical issues when not done correctly. A question that follows up after this question asks about the consequences that can occur when collected information is inaccurate. This is important to discuss in light of the previous question.

Highly important to the data protection aspect of the technology is whether the data is used for the stated purposes and those stated purposes only. This is both a data protection and a privacy issue. Additionally, this can become an issue for the data collector when it comes to legislation. Though, most importantly, it is highly unethical to collect data for a stated purpose and use it for another purpose (as well). This question also addresses whether the data mitigates to another party. It should then also be considered whether the user knows about this.

Another subject that is important to discuss is the subject of profit when it comes to the use of the personal data of a user. For this subject, two questions are introduced that are interlinked with each other. The first question is specifically about whether the data is used to gain profit without the permission of the user, while the second question specifies whether the data is used to gain profit without freely given consent. During the discussion regarding this second question, it should also specifically be taken into consideration that consent must be freely given. For this, a user of the ethical framework

can refer back to the section on Informed consent.

The next question will discuss whether database changes will be publicly available. This is relevant since database changes can accommodate breaches and data leaks. Furthermore, errors could occur that would allow for inaccuracies in the data. Therefore, the user has a right to know about changes on such a fundamental level.

Lastly, this section will allow for discussion on the studies towards the pros and cons of the technology. If these have not been performed (yet) there can still be a discussion regarding whether these studies will be publicly available or not. It would be most ethical to have these studies publicly available since no information would be kept from the user of the technology.

1. What will be the minimum amount of personal data for the technology to collect? How will this be determined and who will determine this?
2. For what amount of time will the information be saved?
3. Is the purpose of the data collection clearly specified?
4. Will the information of the user be removed once the purpose of collection is fulfilled?
5. Are there measures in place to ensure the protection of personal data? If so, what are these measures?
    (a) Who will have access to the data that is collected by the technology and with what purpose?
    (b) What safeguards will function to make sure the personal data is treated in confidence?
6. What assurances are in place to determine the accuracy and correctness of the collected information?
    (a) What consequences are there to the inaccuracy of collected information?
7. Is the personal information used for the stated purposes, and does the data stay with the original data collector or do they mitigate elsewhere?
8. Is the personal data collected used to gain profit without permission from or benefit to the user who provided their data?
    (a) Is the personal data used to gain profit without freely given informed consent of the user?
9. Is information regarding changes to the technology or databases publicly available and announced? Will information regarding breaches also be publicly communicated?
10. Are there studies towards the pros and cons of the technology? If so, are they publicly available?

4.6 Visual tools for the Ethical Framework

The first visual tool that will be introduced for this ethical framework is the bubble diagram shown in Figure 4.1. This bubble diagram shows the sections and subsections of the ethical framework, which will allow the user of the ethical framework to identify what section they should discuss first if they want to use a certain subsection. Additionally, in Figure 4.2 through 4.6 the visualizations of the sections with subsections are added. The subsections are all connected to a set of themes that represent the themes of the questions that were constructed for the full ethical framework. These themes or subjects of the questions were immediately derived from the questions themselves and are structured in the same way as the questions. This will allow for navigation to certain subjects or themes by the user of the ethical framework. By visualizing the themes of the questions, the questions should also be found more easily, as the user can immediately go to the desired section and subsection. Additionally, the themes are represented in the figures in the same order as the structure of the questions in the ethical framework, which will also make the navigation smoother.

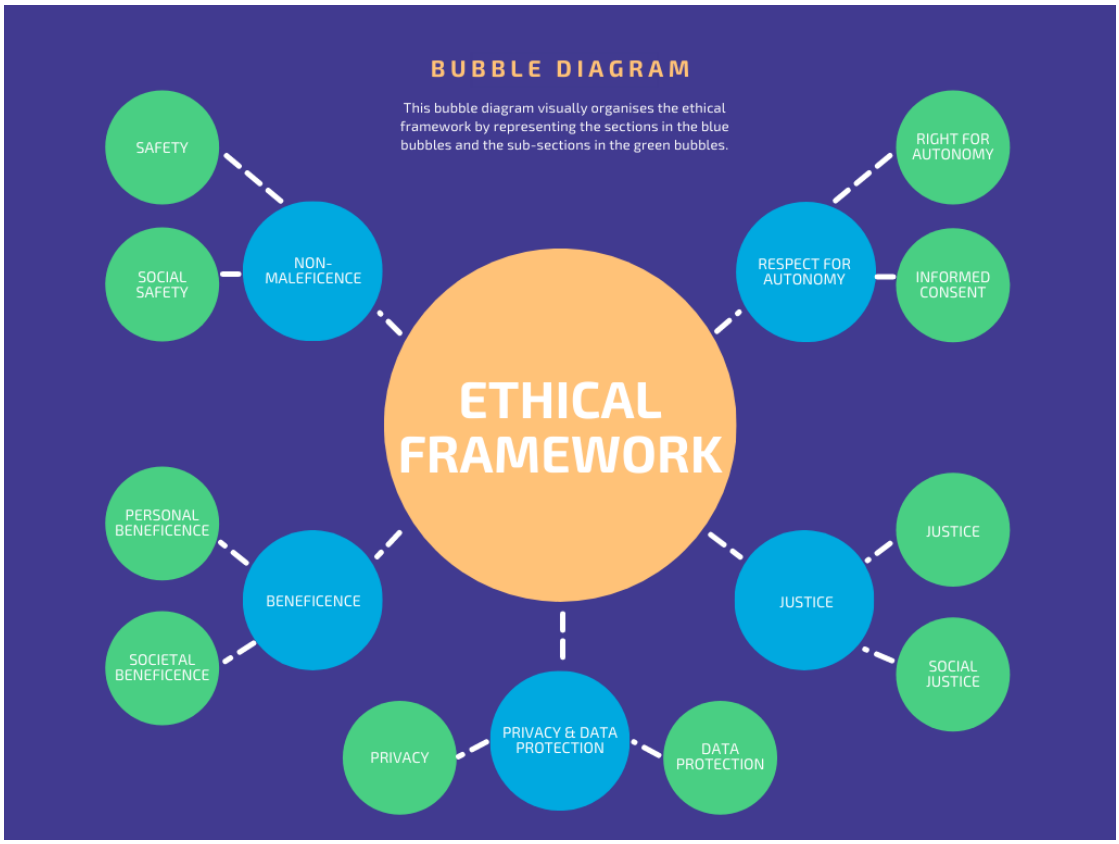

Figure 4.1: A bubble diagram of the ethical framework proposed by this study.

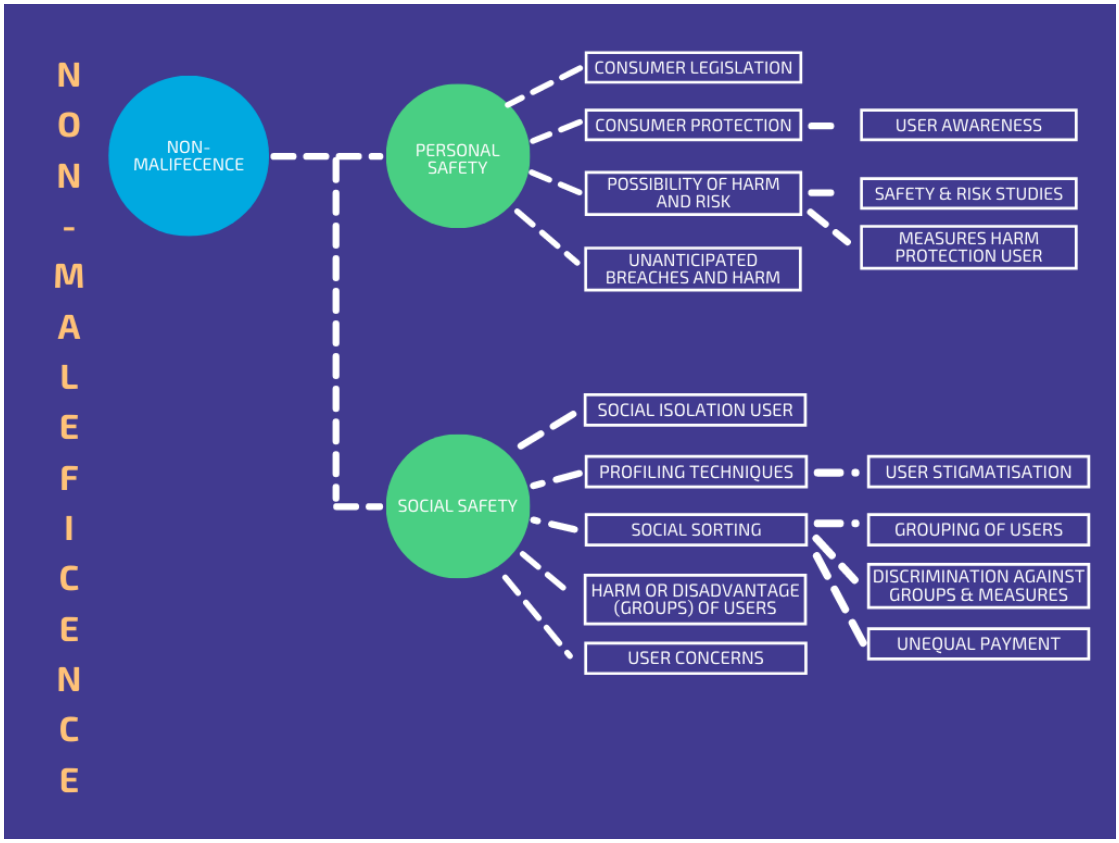

Figure 4.2: The ethical framework section on Non-maleficence, including the subsections and the themes that are discussed by the questions in each subsection.

4.7 Method to the practical use of the Ethical Framework

The ethical framework as laid out in the earlier sections of this Chapter can be used to lead into discussion regarding the ethical aspects that are introduced by the questions. Because of this, an important first step is to gather all, or at least most, relevant stakeholders of the technology to ensure that different parties get a say in the process. This responsibility has been explained before and lies with the project managers, policy-makers and technology developers. Besides performing an ethical evaluation with relevant stakeholders the ethical framework can additionally be used by the people that develop the technology themselves to monitor and evaluate their own work. Though, a most useful outcome can only be ensured when enough relevant stakeholders are included in the evaluation process. Additionally, it is important that tools to record the discussion are in place. This can be done by either recording the discussion in audio or video recordings, or immediately transcribing the discussion. Furthermore, some tools are needed to record the findings of the discussion. This can be done either by using pen and paper, or some tool that allows

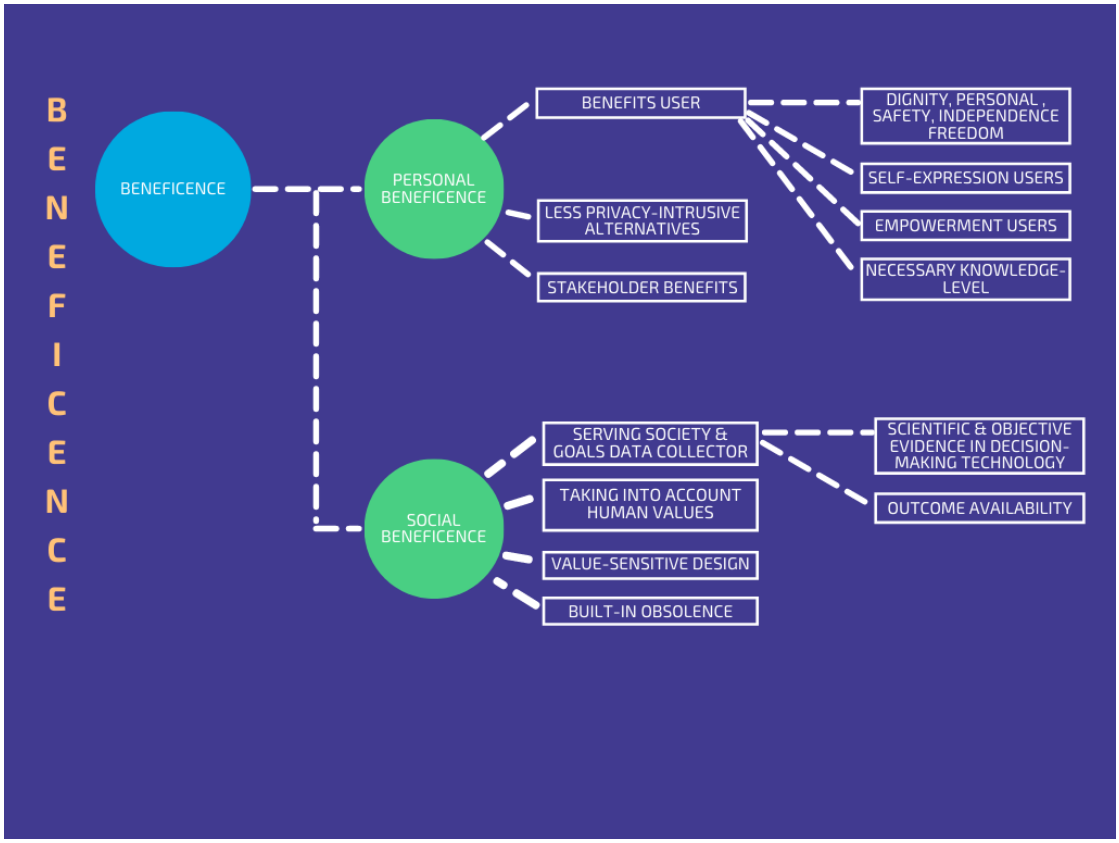

Figure 4.3: The ethical framework section on Beneficence, including the subsections and the themes that are discussed by the questions in each subsection.

one to easily write down important categorisations or notes. Examples of these could be a text document, like Word, or a table document, like Excel.

The framework proposes five different principles and with that five different sections that include multiple subsections. The ethical framework is structured in a way that will allow for these sections to follow up on each other in the way that was intended by Beauchamp and Childress with an addition of the privacy and data protection section [44]. Because of this, it is recommended to use the order that the ethical framework is proposed as. However, the user of the ethical framework could use a different order of sections if this is deemed necessary for their evaluation strategy. Though, it is highly recommended to work through one section fully and not use subsections from different sections at the same time. This is an important recommendation as the subsections are interlinked in the way that they belong to the same principle, while the questions within the subsections are interlinked and structured with each other. The order that was proposed as a structure in the ethical framework is based on literature research, which addresses ethical issues that are deemed more important first. This is based on the impact that the ethical issues that could arise might have. Additionally, the interlinked

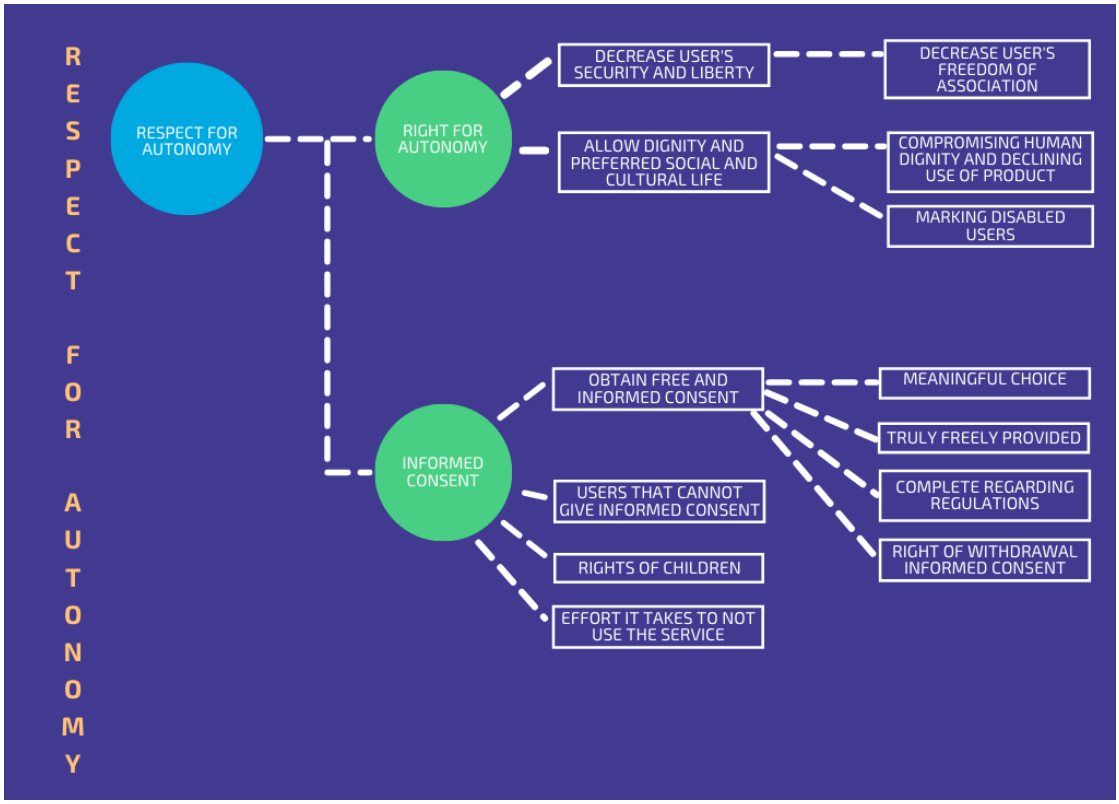

Figure 4.4: The ethical framework section on Respect for Autonomy, including the subsections and the themes that are discussed by the questions in each subsection.

structure of the questions is based on the subject the questions address. When a subject is already under discussion follow-up questions can be proposed that relate to the same subject or are relevant to the current theme. Because of this, the sections can be used interchangeably, if the section is worked through as a whole.

With this background knowledge in mind, the first step to the practical use of the ethical framework will be to choose a starting point. The starting point will be one of the main sections. Once the users of the ethical framework have decided what section they will start with, the order of the other sections should be decided upon. This is the second step to the method of practical use of this ethical framework. After the starting point, it is decided for all sections which order is used and thus the discussion will be fully structured. To determine the starting point and the order of the other sections, the visual tools can be used. The visual tools allow the user to pick themes that are relevant to their technology, or find themes that are known to be a problem area. If a section with more potentially problematic themes is found, it is recommended to discuss this section earlier in the discussion. Once the order has been determined, it is time for the third step, which is having the discussion.

As mentioned before, the ethical framework is first and foremost used to lead into

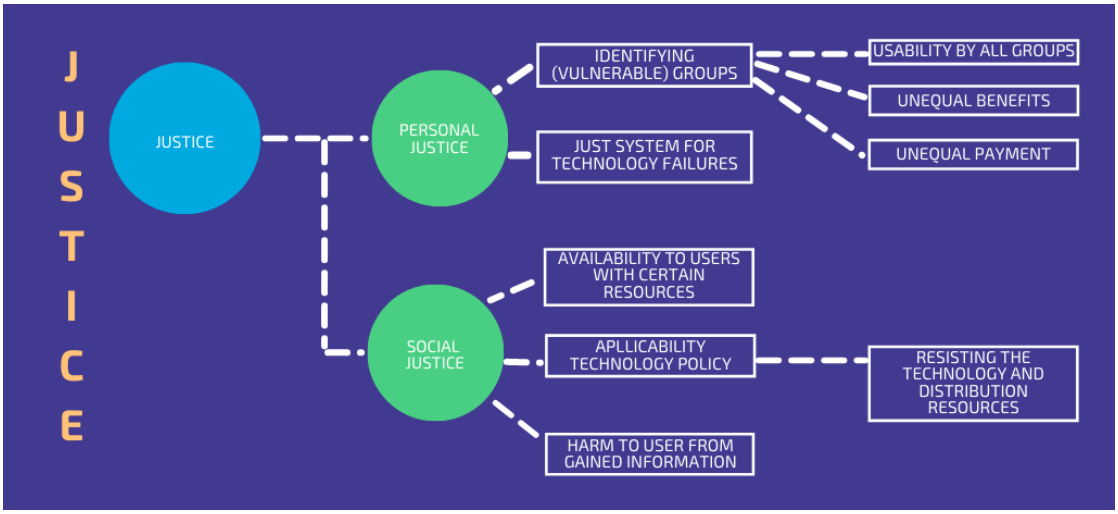

Figure 4.5: The ethical framework section on Justice, including the subsections and the themes that are discussed by the questions in each subsection.

discussion about the technology regarding the ethical principles. By doing so, ethical issues can be uncovered and investigated. The idea of having a (proactive) discussion is to either solve the problems that arise immediately, or even to prevent problems from arising whatsoever. During the discussion, the idea is that a question is proposed and all present parties discuss what they think the answer to that question is regarding the technology that is being discussed. This can be as in-depth as the participants of the discussion want it to be. However, more information might be uncovered when participants are more in-depth in their answers. Therefore, the recommendation is to avoid bipolar answers, like simple yes-no answers. The discussion regarding the ethical questions will be closely related to the fourth step. The fourth step is the categorisation of the subjects or themes that are discussed through the questions. This categorisation will allow the discussants to link one of the proposed categories to the theme or subject discussed by an ethical question immediately after the discussion. Stating this, categorisation can take place after each section, each subsection, or after each question. This depends on the preferences of the participants of the discussion. However, it is better to immediately categorise each question after the question is discussed since the participants will then still have the discussion fresh in mind. This categorisation is also based on the earlier discussed literature and consists of three categories. These categories are namely: *"Fully ethical, no room for improvement"*, *"Partly ethical, room for improvement"*, and *"Inadequately ethical, missing"*. These categories can then be recorded in the way of stating the section, subsection and question number with a category. This will allow discussants to quickly identify the sections, and thus principles, with specific ethical issues that can or did arise for the evaluated technology. Furthermore, an overview of the most problematic sections can be visualized in this way. This could, for example, be done by the use of charts that visualize the number of answers in a certain category for each section or even for each subsection. With this in mind, it is again endorsed that the sessions of the ethical

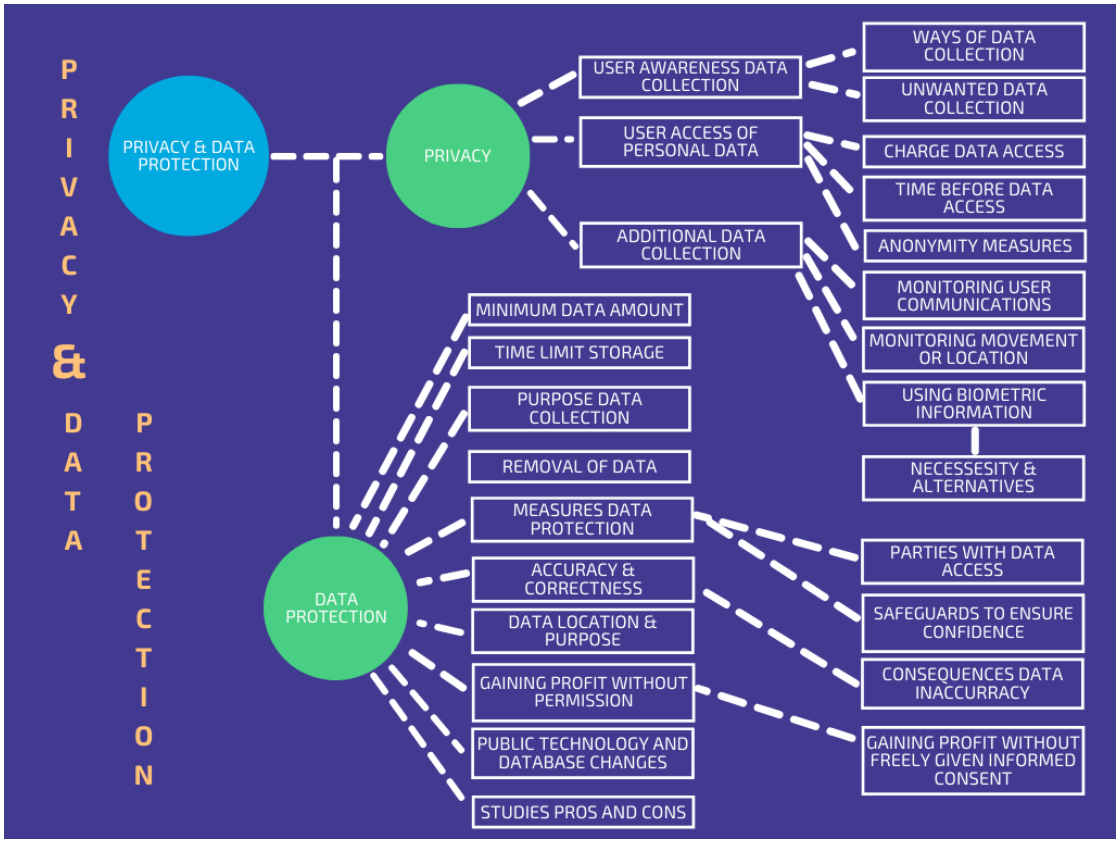

Figure 4.6: The ethical framework section on Privacy and Data protection, including the subsections and the themes that are discussed by the questions in each subsection.

framework will be recorded or transcribed so that no valuable information will be missed and lost. Additionally, the use of an additional tool is highly recommended to record the responses of discussants for the categories. As mentioned before, this can be pen and paper, but a tool like Excel can be very valuable for the easy extraction of graphs afterwards. It was chosen to not include a recommendation for a specific additional tool in this study so that a specific way of working with the ethical framework is not enforced, but rather stays a recommendation.

After the categorisation has taken place, it is time for the evaluation of the results. This will be the fifth step of the method to the practical use of the ethical framework. The evaluation of the results can be performed in the preferred way of the users of the ethical framework, and can thus simply be the counting of the categorisations per section or subsection. Another evaluation method would be to visualize what sections need work using graphs or to specifically target all the subject or themes that received a categorisation of *"Partly ethical, room for improvement"*, and *"Inadequately ethical, missing"*. In the evaluation phase, the participants will discuss what sections and what

specific questions they think will need work to be more ethical. They should then also discuss possible improvements that could in theory make the technology more ethical. Once all the theoretical improvements are laid out, there should be a discussion regarding what improvements would work in practice and what improvements could be implemented. This also includes discussing what improvements would be best to see and deemed to make the highest improvement regarding the technology being ethical.

Once the evaluation phase has taken place, there are discussed improvements that the owner of the technology could implement to make the technology more ethical. These improvements can be made after the owner of the technology has performed a small ethical evaluation themselves on the possible improvements, with the questions stated below [8]. Improvements can be decided upon and implemented by formulating actions and considering possible alternatives.

- Which action will produce the most good and do the least harm? (The Utilitarian Approach)
- Which action respects the rights of all who have a stake in the decision? (The Rights Approach)
- Which action treats people equally or proportionally? (The Justice Approach)
- Which action serves the community as a whole, not just some members? (The Common Good Approach)

These questions are merely a guideline towards what improvement possibility may be the most ethical approach. After this, a decision should be made and considered, by discussing which potential action best addresses the situation and whether the person or team using the ethical framework feels good about their decision. Then action can take place after which reflection on the taken action may happen. This can, again, be done by using the ethical framework again. Other questions that could be taken into consideration during reflection are the following [9].

- What were the results of this decision?
- What were the intended and unintended consequences?
- Would I change anything now that I have seen the consequences?

Once improvements have been implemented, the ethical framework can be used again in the same cycle, as is also illustrated in Figure 4.7. In the next section, there will be some examples of the use of the ethical framework for each section to illustrate what the method and specifically the categorisation of a technology would look like.

Since the use of the ethical framework is not enforced, but rather recommended, there is no set type of output from the method of use. Because of this, it was decided to

[8]https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions

[9]https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions

create a less explicit method of use with recommendations for outputs, rather than a very explicit method of use with predetermined outputs. The outputs that are recommended to have for each step of the method of use come down to the following: a section that will function as the starting point of the discussion, the order of the sections following the first section in the discussion, a list of categorisations per section, a verbal or written version of points of evaluation, a verbal or written version of points of improvement after evaluation, and a verbal or written version of implemented improvements.

4.8 Example of use of the Ethical Framework

Since some guidance can be necessary when it comes to the application of the categorisations to the outcome of certain questions, this section will provide examples to illustrate the categorisation technique. Furthermore, the example case will give an insight into an approach of choosing a starting point, structuring the further discussion and leading the discussion. The example will include a fictional company that works with a Human Monitoring Algorithm that feeds data to their recommender system for their online webshop.

The Foster Foundation is an organisation that sells online products over a web shop. This company was set up with the help of investors, who now have shares in the company. They want to start using a recommender system to allow their website to recommend new products the customer may also want to buy. For this, they need a Human Monitoring Algorithm to function on their website. However, due to the relatively new laws surrounding Privacy and Data Protection in Europe, they are concerned they might get in trouble for using an unethical Human Monitoring Algorithm on their website. Because of this, they want to look into how ethical the Human Monitoring Algorithm they want to implement is by using the ethical framework that is proposed by this thesis.

The owners of The Foster Foundation start by reading through the method of practical use of the ethical framework and decide that they should find stakeholders of their webshop before they start the discussion. Besides participating in the discussion themselves, they ask their ICT manager, their two shareholders, their lawyer and their customer service manager to participate in the discussion. These parties were chosen to have a representation of the technical possibilities, the wants and needs of their investors and include the opinion of someone who knows a lot about the customers' wants, needs and opinions. The owners of the Foster Foundation first wanted to make the discussion order before the meeting with the participants, but seeing that the other stakeholders might have a significant insight on what section they should start with, they decided to also discuss the starting point and order with everyone present. Once they gathered all these discussion participants together, they start by discussing the starting point of the discussion. By looking at the visual tools, they see what sections and subsections are included in the ethical framework. The ICT manager and customer service manager think it is most important to start with the section on Privacy and data protection, seeing that this will uncover a lot of issues regarding the laws that the owners are worried about. The stakeholders, however, are interested in the section of Justice, as they think this will be more relevant to them. Because they do not all agree, they look at the additional

visual tools that show the themes of the questions for the sections of Privacy and Data protection, and the section of Justice. The section of Privacy and Data protection is way more in-depth than the section of Justice, so they decide to discuss the section of Privacy and Data protection first and follow up with the section of Justice to keep the investors involved. Since nobody has a specific preference for the other sections to be discussed earlier rather than later, they decide to use the structure of the ethical framework for the rest of the sections. So after the section of Justice, the sections Non-maleficence, Beneficence and Respect for Autonomy will be discussed in this order.

Once the order of the whole discussion is agreed upon, the participants start with the discussion by looking into the section on Privacy and Data protection. The first question has two follow-up questions and the theme of this question is all regarding the collection of data with or without user awareness. The owners have looked into the Human Monitoring Algorithm they want to start using with the ICT manager and they know that the technology will give a pop-up to ask for permission for the collection of data. The pop-up will also include the terms and conditions in which they have to provide information regarding what data they want to collect and for what purpose. After a quick look at the second and third themes of the privacy section, they notice that the themes of the other questions are regarding user access to their data and the collection of additional data. They know that the information provided by them regarding data collection will allow them to answer the first question with two sub-questions as *Fully met, no room for improvement* if done correctly. So they start writing down information that should be provided in this section with their lawyer. The user will also get the right to be forgotten and free data access possibilities within 24 hours. The owners also know that the technology they want to use has some anonymity measures in place. However, these anonymity measures do not seem to be fully safe, as the technology only uses one simple hash for all users. This will allow them to answer the second question with the first two sub-questions all as *Fully met, no room for improvement*, while the third question is answered with *Partly ethical, room for improvement.* The algorithm will not gather any additional information about the user, so they decide that these questions should not be categorised, as they are not applicable. They do the same for the subsection of Data Protection, which involves a lot of discussion with their lawyer and ICT manager, who both know a lot about the possibilities and threats. After a fruitful discussion, they have written down all needed requirements to make sure they can mark each section either as *Fully ethical, no room for improvement*, or mark the question as N/A (Not Applicable).

The following section that they discuss is the section on Justice, in which the stakeholders were more interested. They state that they are interested in this section to determine whether the company is functioning in a just way. The first question of the subsection Personal justice is already difficult, as the owners did not think about finding out whether there are vulnerable groups on their website. They did, however, make sure that their website had high usability and accessibility by including colourblind options and making sure the website was readable by screen readers. Though, they are doubting whether this relates directly to their use of the Human Monitoring Algorithm. Because these groups of people could not use the website properly if these functionalities were not implemented, they decide that they could thus not use the functionality of the Human Monitoring Algorithm without these implementations. Therefore, they decide to mark

the first question and the first sub-question with *Partly ethical, room for improvement*, as the vulnerable groups should still be explored and therefore the usability by all groups as well. For the other two sub-questions of the first question they can luckily say that there is no question of unequal benefits or unequal payment on their webshop, so they can mark these questions as *Fully ethical, no room for improvement*. Since the technology will only function on their website and will only use the information that is gathered to give them personalized recommendations, the discussion regarding the section Social Justice goes smoothly and it is decided that no improvements can be made for that section.

After working through the section of Justice, they move back to the first section of Non-maleficence, followed by the sections of Beneficence and Respect for Autonomy. These sections are discussed rather smoothly aside from some questions that had to be answered with either *Partly ethical, room for improvement* and *Inadequately ethical, missing*. The subsection of Personal safety of Non-maleficence received only positive categorisations. However, in the section of Social Safety, the owners have to mark the question regarding user profiling with a *Partially met, room for improvement*, as the Human Monitoring Algorithm does use profiling techniques. The same goes for the use of social sorting which is asked about in question three. The purpose of the recommender system as a whole is to find customers with similar tastes and recommend items based on the items the customer has already bought or looked at. Because of this, there is a grouping of users in the recommender system. The section of Beneficence also had a few questions that did not meet the criterion of *Fully ethical, no room for improvement*. The algorithm is functioning mostly to sell more products, but also to allow the user for easy navigation of products they might like. Therefore, the benefits of the user are only partly met, and the benefits for the user could be larger if the algorithm also would take into account that the user is a unique individual instead of using a grouping algorithm. Therefore, these questions were also answered with *Partly ethical, room for improvement*. Real ethical issues might arise when it comes to the section of Societal Beneficence. The algorithm does not function as serving society whatsoever, and therefore question 1 and the sub-questions of this question all had to be answered with *Inadequately ethical, missing*. The same goes for the second question, as the algorithm does not take into account human values per se. The algorithm and recommender system simply function to make good recommendations and does not take complex human values into account. In the last discussed section, Respect for Autonomy, there were no issues in the first section Right for Autonomy. However, the owners did not take into account that informed consent was such a large issue. Therefore, they discussed in more detail with their customer service manager and lawyer what should be included in their informed consent form and their terms of service to ensure the technology to be fully ethical. They again wrote down all requirements to ensure this section will be answered with *Fully ethical, no room for improvement*.

Once all the questions were fully discussed and categorised, it was ensured that every involved stakeholder was satisfied with the outcome of the categorisations. Since the categorisation was approved by everyone, it was time for the evaluation phase. Of course, the owners had already written down certain requirements during the discussion which they wanted to implement to make sure the informed consent, privacy and data protection were ensured. These were all easy to implement as they could largely follow the laws and

the guidelines provided by the ethical framework. During the evaluation phase, however, they also decided that they wanted to implement a way for the algorithm to function in a way that would benefit society more. Therefore, they now want to use the algorithm to recommend the most popular items on their website as well. This would not make the algorithm fully ethical, but at least they could say the algorithm then shifts to partly ethical for this question. The owners use the provided set of ethical approaches to evaluate their improvement decision. Since a most popular recommendation would not require the personal data of the users to be collected, they feel like adding this functionality does more good than harm, respects individuals rights, treats people equally and serves society as a whole. Because of this, they decided to implement this functionality. The customers of the website responded positively to the new recommendation section by leaving positive reviews and were additionally happy with the personal recommendations they received. The implementation of the Human Monitoring Algorithm with the recommender system was a success.

Chapter 5

Construction of the Questionnaire

To construct a good questionnaire there is the need for a tool to construct and spread the questionnaire. Besides this, the determination of the questions should be performed carefully, as several implications can occur when the questions are not worded properly. The work of Martin on Survey Questionnaire Construction will be used as a base for the construction of the questionnaire [68]. As she states in her work, the construction of a questionnaire includes many decisions regarding the wording and order of the questions, the selection of wording and possible response categories, the formatting and mode of administration of the questionnaire itself, and introducing and explaining the survey [68].

Since there was already a clear idea of what the questionnaire tool should provide in functionalities, the questionnaire tool that will be used was chosen first. The tool that will be used to gather the questionnaire answers, should allow for the inclusion of an introduction to the questionnaire, the use of different types of questions and different types of possible response categories, and the extraction of graphs and grouped responses per question from the tool. One of the tools already known by the author that provides these functionalities is Google Forms. Additionally, other tools had to be explored to make an educated choice between different possibilities. To find different questionnaire tools that could be used, a blog-site was used that provided a personal top 21 questionnaire tools by the author of the article [1]. These tools were explored by the author of this paper to determine what tool could best be used for this questionnaire. The tools that were taken into consideration all had to conform to the three criteria stated above. Furthermore, the tools had to be considered easy to use by the author of this paper and understandable for respondents. Therefore, the following tools were taken into consideration; Typeform, SurveyMonkey, Qualtrics, Alchemer, Google Forms, and Pulse Insights. Other tools were excluded due to their focus on teams or customers, business-oriented style, website-based

[1]https://mopinion.com/top-21-best-online-survey-software-and-questionnaire-tools-an-overview/

nature or need for distribution via email. From the selected tools, the functionalities that are provided were explored to ensure compliance with the criteria. Deemed most important was the functionality of the questionnaire tool, rather than the layout of the questionnaire tool. Typeform is a very aesthetically pleasing questionnaire tool providing all the necessary functionalities. However, the tool is not entirely free, which makes for a problem. The same goes for the tools SurveyMonkey, Qualtrics, Alchemer and Pulse Insights[2]. Additionally, it can be argued that some of these tools, like Pulse Insights, engage in profiling and should therefore not be used as this may be deemed unethical. Google Forms is a tool that can be used by anyone that has a Google account, does not ask a fee or only gives a trial and conforms to all the criteria as stated above. Therefore, the tool Google Forms was used for the construction of the questionnaire.

For the design of the questionnaire it was chosen to first construct the questions, to make sure these questions are properly worded, not too complex, as non-ambiguous as possible and do not contain presuppositions. The construction of the questionnaire will be according to Chapter 7 of the book Educational Research [69]. The question creation also includes the determination of the type of question. After the questions are created, they will be structured to make sure the question context and order are in line with each other. This will ensure as little confusion under respondents as possible. Once the questions are created and structured, the possible response categories and mode of administration on the questionnaire will be reviewed. This also means that the questions will be implemented in the questionnaire tool. Once the questionnaire is fully set up, there will be room for one last evaluation of the questionnaire as a whole before the data is gathered. The choices that were made will be explained in the text below, while the full questionnaire can be found in Appendix D.

Since it was chosen to evaluate the full ethical framework, the questionnaire turned out to be relatively large. The time that was estimated to finish the questionnaire is 20 to 30 minutes. For a questionnaire, this is a large amount of time and it requires the participants to be involved in the outcome of the research. However, this length was necessary as the ethical framework turned out to be quite large as a lot of ethical issues can arise when it comes to technology ethics. Therefore, all these questions need to be evaluated by the participants as every question should be treated as equally important.

As a first step towards the construction of a questionnaire, the introductory text needs to be made. This text will explain to the participants the goal of the study and ensure informed consent to the use of their data. The introductory text allows to give a disclaimer regarding the participatory nature of the questionnaire, be transparent regarding the details of the survey, give a gist regarding the content of the survey, and prepare the respondent regarding the length of the survey and other necessary information. Once the participants agree to the introductory text, they will be taken to the first section of the questionnaire. This first tickbox that has to be clicked is mandatory since the participants will have to give free informed consent to participate in the study. The rest of the questions were chosen to not require a mandatory answer so that the

[2]A sidenote to make is that only after the survey was already distributed, the author was made aware of Utrecht University supporting the use of Qualitrics.

participants would not be pressured into answering ethical dilemmas. This does bring a risk of receiving data with empty answers, but this will be explored during the data analysis. When referring to a section in the following paragraphs, it means that each section is on a new page of the questionnaire. This was chosen to declutter the page and make sure that the participant could easily see what section they were working on by the use of titles with explanatory sections. The participant can still travel back and forth between sections they already answered and new sections.

To construct the questions of the questionnaire, it was chosen to start with some exploratory questions regarding the participant's knowledge. Since statistics are not relevant to this study, it was chosen only to ask questions regarding the participant's perceived knowledge rather than their career or personal information. First of all, it is important to know whether the participant participated actively in any sources that could provide them with background knowledge on the subjects of ethics or technology. Additionally, it is important to gain an insight into whether participants have a specific knowledge base in technology ethics. Because of this, the section contains three questions regarding the knowledge of the participant. The first question asks whether the participant has received education in either of these fields, including the option to pick one, both or neither of these fields. The second question in this section has a repeating structure to make answering the questions easier and more instinctive for the participant. The second question asks whether the participant has taken an interest in any or none of these fields by studying the field by themselves. The third question asks whether the participants work or study in one of these fields or have a personal interest in any of these fields. There is also an option to answer with *None of the above*. This question was added to gain some insight into what group the participant might belong to when it comes to where the questionnaire was distributed. When the participant works in one of these fields they are likely to belong to the group that works at the healthtech company. When the participant is a student in any of these fields they most likely belong to the group of students that were approached to fill out the questionnaire. The last two groups were added for the additional platforms the questionnaire was distributed on, which are Reddit and possibly LinkedIn as the connections of the author are not solely students. The last question of this section was added to ensure data quality and assure the participants of their right to participate in this study. The question asks whether the participant believes they have sufficient knowledge regarding the fields of technology and ethics to participate in this study. When the participant answers with "No" rather than "Yes" they will immediately be taken to the end of the questionnaire. This also allows to filter out these answers in data analysis immediately.

After these questions, it was chosen to introduce the topic of Human Monitoring Algorithms. The section will explain what is meant by the term Human Monitoring Algorithms in a small section after which the participant will be asked to answer three questions. The first question will simply be whether the participant thinks or knows they have encountered these Human Monitoring Algorithms either physically or online. This answer allows for a simple multiple-choice answer to which "Yes", "No" and "Maybe" can be answered. It was chosen to add the "Maybe" option to not pressure the participant in determining whether they have encountered any of these technologies. The other two questions in this section are open questions to allow the participants to give an

insight into what algorithms they have encountered and whether they think that these algorithms could cause ethical issues and what issues could occur. These questions are mainly added to ensure the understanding of the participants, additionally, interesting viewpoints or insights might be obtained.

Once the term Human Monitoring Algorithms is introduced, the principles on which the ethical framework is built will be explained to the participant. These ethical principles are the same five ethical principles that form the main sections of the ethical framework that was constructed for this study. Namely, these ethical principles are Non-maleficence, Beneficence, Right for Autonomy, Justice and Privacy and Data Protection. The remainder of the questionnaire will also be structured according to the sections of the ethical framework. By using these sections the questionnaire will have a clear structure and will give some guidelines to the participants regarding how much of the questionnaire remains. For these sections in the questionnaire, a recurring structure will be used. The section has a header, after which an explanation of the section follows. This explanation also includes an indication of how the questionnaire records the answers. A scale from 1 to 9 is offered to the participant and the corresponding values are stated with each number, in which 1 is equal to completely disagree and 9 is equal to completely agree. The numbers in between also have a worded value. The participants are asked to rate on this scale whether they feel like this principle is applicable to the field of technology ethics and Human Monitoring Algorithms. By asking this the participant indicates whether they feel like these principles should be discussed when performing an ethical evaluation of Human Monitoring Algorithms. It was chosen to use a scale to be able to have a recurring structure for the questionnaire. The scale makes answering the questions simpler to understand, as the participants answer the same question for every ethical question. Additionally, this recurring structure and the use of a scale will allow for the participants to fill in the questionnaire quicker over time due to getting used to the structure and the use of the scale.

Once this section is finished, the participants will receive a section with only text that introduces the ethical framework. This section states that the following sections will introduce the questions that were constructed for this ethical framework. Additionally, it is stated that at the end of each full section an additional open question is asked. The question will ask whether the participant can clarify why, if any, they disagreed with questions being a valuable addition to the ethical framework. By doing so, the structure of the following sections is clear. In this section, it is also ensured that the participants know what the questionnaire is asking again, even though the section explanations will also state the same. This was done to ensure clarity. Therefore, this informative section states that the idea is to rate whether they feel like the question should be in the ethical framework on the earlier introduced scale. It is clearly stated that they are not asked to answer the question. Again, this was done to ensure clarity. Eventually, it was chosen to add another open question to the end of each section to ensure the understanding of the participants. This question asks the participant to fill out any numbers of questions they feel like they did not understand or found hard to grasp the concept of. The section ends with a sentence ensuring that the participants know what they are going to be answering in this questionnaire; whether they think the subject or theme a question introduces should be discussed when performing ethical evaluation on a technology.

The following five sections all have the title of one of the five principles. The same order is used as in the ethical framework, to ensure solidarity. The section description will contain the explanation of the principle as stated earlier in the question and an explanation of the sub-sections that were chosen for this ethical principle. Additionally, an explanation regarding how and why the questions are interlinked is given. At the end of the section, the participants are asked to rate each question on whether they think it should be discussed when performing ethical evaluation on technology. The scale is also copied here so the participant can easily see what each number means. Every section has a section header with a small explanation. Then the questions are introduced using numbers. Numbers after the decimal are used to indicate that the question is a sub-question. Once all the questions are rated, the participant is asked whether they would like to provide an explanation regarding the questions on which they disagreed with them being a valuable addition to the ethical framework. Furthermore, a question is added that asks whether the participants can indicate any questions they might not have understood or found hard to understand. This will ensure that the participant can give any additional information regarding their choices. Besides this, the last question will make it easier to find questions that are generally hard to understand or might need a different formulation.

The last section of the questionnaire is meant for any additional thoughts the participant might have regarding the ethical framework, the questions and the work that the study has performed so far. The header thanks the participant for their participation and states that these three questions are the last three questions that will be asked. The first question very generally asks what the participants thought of the ethical issues that were introduced. This different formulation might allow for the participants to give different answers than just answering what ethical issues they disagreed with. It allows for more additional ideas and thoughts they had regarding the ethical issues and the framework as well. After this, the questionnaire asks whether the participant felt like they missed any ethical issues in the ethical framework since they so far only commented on what they thought was unnecessary to discuss. The very last question asks whether the participant feels like the ethical framework will form a solid base in the ethical evaluation of technology and specifically for Human Monitoring Algorithms. This question is a simple yes or no question. That last question concludes the questionnaire with an overall thought of the participant and will give an insight into how many people think the ethical framework is a valuable base for ethical technology evaluation.

Chapter 6

Data analysis on the collected questionnaire data

The data collection phase lasted for four weeks. A pilot of the questionnaire was not performed, however, the questionnaire was spread through Reddit before distribution on other platforms. This allowed to uncover some issues that participants experienced, including the misunderstanding of the use of the scale and scanning the text rather than reading it fully due to the length. Some minor tweaks were made by adding a description of the use of the scale earlier in the questionnaire, as well as providing a more elaborate textual description with further distribution. Most answers were given within the first week and the possible participants were reminded to fill out the questionnaire if they still wished for a week and a half before the data analysis phase started. Besides the time limit that was set for data collection being fulfilled, the questionnaire also received 31 answers. However, some of these answers will have to be filtered out. The answers that were filtered out, and that will therefore not be taken into consideration, will be discussed in the following paragraph.

In the last Chapter, it was discussed that a question was included to ensure that the participants felt confident enough in their own knowledge regarding the fields of technology, ethics and technology ethics to participate in this study. This question was the fourth question in the questionnaire and immediately sent participants that answered with "No" to the end of the questionnaire. It was chosen to include this question since participants that are not certain regarding their knowledge for these fields are highly likely to misunderstand questions or not see the importance of questions. Additionally, this question was added to ensure the participants that did answer with "Yes", that they were a good fit to participate in the study. Six participants answered with "No" on this third question. Therefore, these six participants will be filtered out of the data analysis.

Additionally, some participants wanted to participate but did not finish the questionnaire. The participants were asked directly to provide an insight into why they could not finish the questionnaire. Several participants felt like the level of English was too high for them, as they had difficulties translating it back to their native language due to, in their own words, their own level of English. Additionally, some people had

difficulties understanding what was asked of them. The questionnaire consisted of quite a lot of text and people started skimming over this, making them misunderstand how they were supposed to answer the scale questions. Participants were trying to answer the question itself, without the context of a specific technology or way to answer the question in the questionnaire. The last difficulty that was experienced was the length of the questionnaire. Especially people from Reddit had difficulty with going through the entire questionnaire, as they were not as involved as personal contacts or coworkers of the health technology company that were asked to participate. Because of all the reasons stated above, the answers that are not finished are highly likely to have misunderstood at least some of the questions and will, therefore, not be included in the data analysis.

Furthermore, there were two answers that two answers stood out from the others, which seemed like they gave random answers to the questions. The first answer was a participant which answered "No" on whether they felt like they had ever encountered Human Monitoring Algorithms and left all the textual answers blank. Additionally, the ratings of the questions seemed to be completely random and no explanation was given for any of the lower ratings. The second answer was an answer that did fill out many of the open questionnaire answers but seemed to be someone that purposely filled out answers that did not make sense. They talked about inappropriate subjects and subjects that did not relate to the questionnaire at all. These answers are assumed to be Reddit users that just filled out the questionnaire randomly and will, therefore, be excluded from the data analysis.

After cleaning the received data, 20 answers were left that were not filtered out. As mentioned before, this study is a qualitative study and the only aim is to evaluate whether the ethical framework is deemed to be a valuable addition for the ethical evaluation of Human Monitoring Algorithms. Because of this, this number of participants will provide significant and valuable insight. All the graphs of the closed questions and the transcripts of the open questions of the questionnaire can be found in Appendix C.

6.1 Questions regarding the perceived knowledge of the participants

The first section of the questionnaire is regarding the personal knowledge of the participants. In this section, three questions gain valuable insight into the participants' knowledge in the fields of technology, ethics, and technology ethics. The questions are regarding received education, self-study, and current work in these fields. The fourth and last question of this section is simply a question that asks the participant whether they feel like they have enough knowledge of these fields to participate. Most participants at least had experience in either or both of the fields that were mentioned by having received education or self-studying. The third question asked whether the participant felt like they belonged to any of the described groups, which were namely working, studying, or having a personal interest in any of these fields, or none of the above as can be seen in Figure 6.1. Interestingly enough, there was one participant that did work in the field of technology or ethics but had never received any education and did never do any self-studying regarding any of these fields. Still, all participants felt like they at least had

some knowledge regarding either or both of the mentioned fields, or belonged to one of the described groups. All these participants answered that they felt like they had enough knowledge to participate in this study.

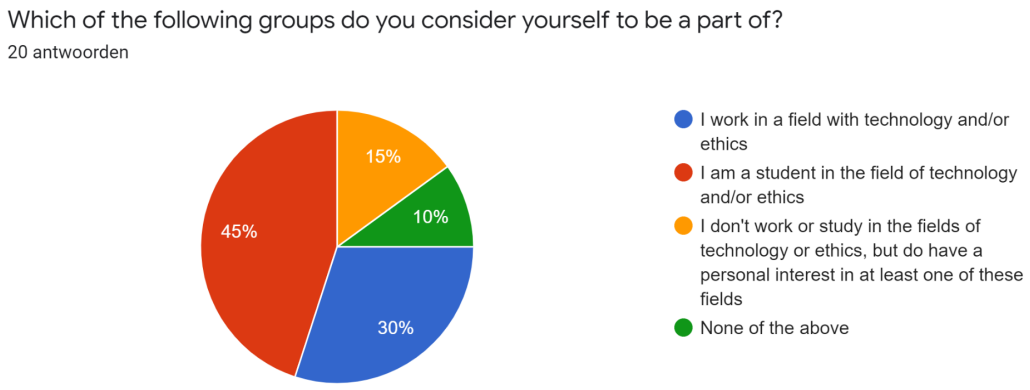

Figure 6.1: Pie chart Question 3 regarding the group the participant feels like they belong to

6.2 Questions regarding Human Monitoring Algorithms

This section was regarding Human Monitoring Algorithms in specific. The term was explained and the first question asked whether the participant felt like they ever encountered these technologies online. All of the participants but one answered with "Yes". The last participant answered with "Maybe". The other two questions in this section were open questions which respectively asked what kind of HMAs the participants had encountered and what ethical issues they thought these technologies could cause, if any. The first open question was included to see whether the participants understood the term that was explained. Interestingly, most participants started with answering the question by stating products or companies that are known to use HMAs for their services. Companies and products included, but were not limited to, Apple, Android, Alexa and Google. The other three coding categories that were chosen were based on the themes that most often arose in the answers of the participants. Most often discussed were physical sensors and wearables like step counters, location type data, and different types of online HMAs. Because of this, the coding was chosen to include a colour for physical sensors, which also included wearables, one for location type data, and one for the mentions of online HMAs. The functioning of the online HMAs would include providing personalized advertisement recommendations, logging behaviour on social media and shopping websites, and monitoring behaviour or preferences. The coded answers can be

found with a legend in the Appendix.

The following question in the questionnaire, regarding what ethical issues could arise from the use of Human Monitoring Algorithms, yielded interesting responses. The coding of these answers was done according to the personal insight of the author of the paper. Because of this, some labels could belong to other themes that were found as well with the right argumentation. This means that the point of the coding for this question is not regarding what ethical issues are connected to what ethical theme per se, as others might code the answers differently. However, the finding that can be taken away from this question is that the participants together introduced all the themes that are discussed in the ethical framework. This is an interesting finding since the themes that are discussed when it comes to ethical issues that could arise are confirmed to be important ethical issues by the participants. Some participants stuck to only one theme in their answer while others discussed up to three themes in their answer. The themes that were found by colour coding the answers were Data protection, Informed consent, Justice, Non-maleficence, Beneficence, Respect for Autonomy, and Privacy. The themes Non-maleficence, Data Protection and Privacy were most often named and, therefore, seen as more important by the participants in general. It can be seen in the colour coded table in the Appendix that two answers were not coded. The answers that were not coded were a simple "Yes" without answering the question, and a participant chose to post a link to an article regarding ethical issues that can arise regarding technology. Because of this, these answers could not be linked to any of the themes specifically. Seeing the answers of the participants to these questions, it can be said that they all understood the subject of the questionnaire well enough to be included in the evaluation of the ethical framework. The answers of the participants to this last question showed that the ethical themes that are discussed in the ethical framework are deemed to be important by the participants.

6.3 Questions regarding the ethical principles

The next section of the ethical framework asked the participants to rate on the introduced scale whether they thought the ethical principle that was introduced was applicable to technology ethics and in specific to HMAs. They were asked to rate the questions on a scale from 1 to 9, where 1 was equal to "Completely disagree" and 9 was equal to "Completely agree". An example of a question can be seen in Figure 6.2.The other numbers also all had a textual description. For the principles, it was not necessary to state whether the principles would be considered for removal, as the principles are all based on the literature review and were not up for removal.

As can be expected by the outcome of the last question, the principles of Non-maleficence and Privacy and Data protection were both rated highly, where the principle of Privacy and Data protection scored best with 15 answers being "Completely Agree". Additionally, the principle Respect for Autonomy scored very high with 16 answers on the scale being either an 8 or a 9, evenly divided. Participants seemed to think the principles of Beneficence and Justice to be less applicable than the other principles. To determine what principle was deemed most important to least important, the average

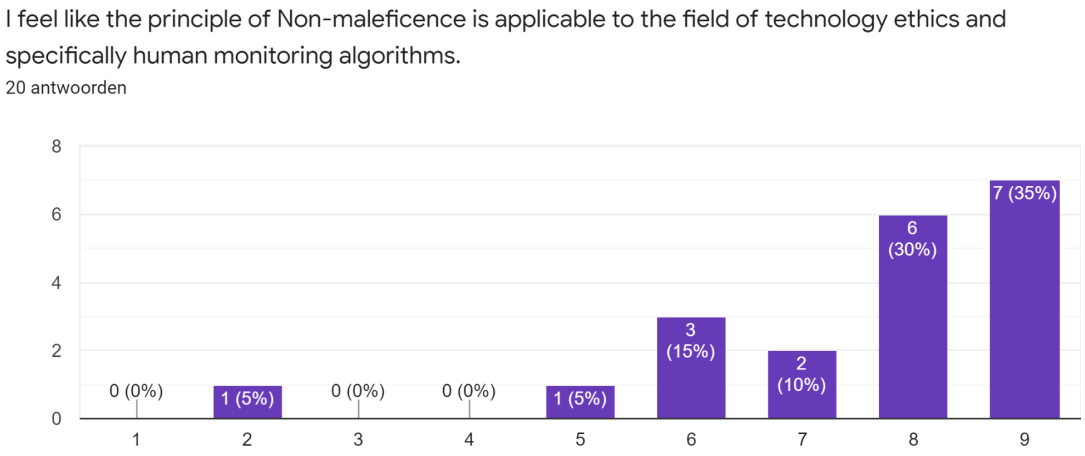

Figure 6.2: Bar chart Question 8 regarding the principle of Non-maleficence

score of the participants was calculated. This was done by simply adding up all the scores and dividing the scores by the number of participants. The score of Non-maleficence was 7.5 on average, Beneficence received an average of 6.65, Respect for Autonomy an average of 7.65, Justice an average of 6.3, and Privacy and Data protection got an average of 8.55. These average scores are out of 9 since the scale ranges from 1 to 9. For clarity, the average scores of the principles can be found in Table 6.1 below.

Non-maleficence	7.5 / 9
Beneficence	6.65 / 9
Respect for Autonomy	7.65 / 9
Justice	6.3 / 9
Privacy and Data protection	8.55 / 9

Table 6.1: Table with the average scores of the ethical principles

As can be seen, Privacy and Data protection seems to be the principle that is the most applicable to technology ethics according to this set of participants. This principle is followed by Respect for Autonomy and Non-maleficence with an almost identical score. Beneficence is deemed to be a bit less applicable and Justice was seen as least important. After receiving oral feedback from some of the participants, it can be said that at least three participants thought that Justice was less important as a principle as they felt like the regulations should already take care of this aspect. However, all the ethical principles received a positive score. With an average score of 5 being neutral, all scores above that can be seen as the principle being deemed to at least somewhat be applicable to technology ethics and HMAs in specific.

6.4 Questions regarding the principle Non-maleficence

The following section of the questionnaire introduced the first main section of the ethical framework, Non-maleficence. The two subsections of Safety and Social safety were also introduced. The participants were asked to rate each question on the introduced scale. After this, the two open questions regarding providing an explanation on disagreeing with any of the questions and possibly misunderstanding questions were stated. These questions were introduced to visualize the reasoning of the participants and to possibly filter out outliers due to misunderstandings. The other principle sections will have the same structure, to prevent repetition, these sections will, therefore, not receive a further explanation regarding the structure as well. Again, all the figures and the answers to the open questions can be found in the Appendix. Instead of first looking into the scaled answers, the answers to the open questions will be explored beforehand to see if there were any common disagreements on questions being valuable, and to find possible misconceptions.

When it comes to the evaluation of the bar charts, the average score over all participants that answered will be calculated. Based on this score it will be determined whether a question should be considered to be removed from the ethical framework. Since perfection does not exist in the field of ethics, it is highly unlikely to ever receive a score close to a 9 over all participants. Because of this, a scale is introduced. Questions that are averaged above 8 are deemed to be Extremely important by the participants, questions between 7.5 and 8 are Highly important, and questions between 6.5 and 7.5 are deemed Important. The last scale was chosen to be a whole point since the scale ranges from more than slightly agree to more than moderately agree. Based on the fact that 8.5 to 9.0 is very unlikely to occur, this half point was added to the bottom of the last scale that is deemed important. Questions that have an average score under 6.5 should be analysed again and considered for removal from the ethical framework.

The answers of the participants regarding what questions they disagreed with are important to discuss in detail, as this could explain possible outliers in the data. One participant disagreed on question 3.3 of the section on Social Safety. They argued that it was not unethical to pay less for certain services since one can have student discounts, for example. However, that is not entirely the point of the question, as the question talks about automatically paying more by belonging to a certain group. This data on question 3.3 is the outlier that is the rating of 3. Another participant decided to answer with a rating of 5 for neither disagree nor agree to indicate that they felt like the question would not answer anything that was not discussed or touched upon by other questions. Additionally, they thought it would perhaps make the framework too long. This is something that could be looked into in further analysis, as questions that receive a lot of neutral ratings may be superfluous. The third participant that disagreed with questions did disagree with 4 of the questions they mentioned with a rating of 1, or “Completely disagree”. Question 3.1 received a rating of 3 of this participant. This makes for outliers on these questions. They felt like the section of Social Safety contained multiple questions, namely question 1, 2, 2.1, 3.1 and 5 to not be topics the

ethical framework should be concerned with. They argued that other parties should be responsible for these topics, like the government, technology companies and other actors. However, the ethical framework should be used by the ones that own the technology, which could then also be the government. Still, another participant also mentioned the first question of the section on Social Safety. They stated that in terms of the individual, technology does not have that big of a role in social isolation as in the other topics. The last participant disagreed on question 2 of the section Safety. Their argument was that some technologies rely on the user not knowing they are monitored to receive authentic data. This is interpreted to mean that the functioning of the algorithm is more important than consumer protection in some cases.

When it came to the misunderstanding of questions, five participants mentioned they had some sort of misunderstanding. The participant that did not understand question 3 in the section of Social Safety on social sorting, decided not to fill out that question, which is of course the best course of action for the analysis of the results. Another participant mentioned that the term consumer protection in question 2 of social Safety was new to them, however, they still filled out the question and gave the question a rating of 8. Because of this, it is assumed that they either looked up the term or understood the term in the context. Another user had trouble with question 2.1 of the section Social Safety, which used the term "stigmatise". They also decided not to fill out this question. The fourth participant did not understand the profiling technologies question, which is question 2 of the section Social Safety. They decided to still fill out this question with a rating of 4. Because of this, the rating of 4 might be an outlier for this question. The graph of the question can be found in Figure 6.3 below. The last participant made a note saying that they found the scale confusing because they felt like they had to rate the questions on which one they thought was more important. However, they did not fill out the questionnaire in this way as their answers still rate each question individually. This comment, however, is something that should come up in the discussion.

With these possible outliers in mind, the questions of the section on Non-maleficence will be analysed. To analyse the questions over all participants, the average score for each question will be calculated. Important to note is that sometimes a participant did not fill out the question. In this case, the question was still divided by the number of participants that did fill in the question to gather a true average. Questions that are not deemed important by the participants will be analysed further. A table will be included with the average scores that each question received for clarity on the rating of the question, this can be found under Table 6.2. As can be seen, even without filtering out the outliers that were discussed in the section above, all the questions for the section Non-maleficence have an average score above 7. The score of 7 is equal to "Moderately Agree". Thereby, a score of 8 is equal to "Largely Agree". Since everyone has their ethics and opinions on certain topics differ per person, it can be said that perfection cannot be achieved when it comes to ethical questions. Therefore, a score that is close to 9 is not likely to occur. Because of this, it can be said that at least the scores of 7.5 and higher are deemed to be highly important additions to the ethical framework according to the participants. Questions with a score of 7 or higher on average are still deemed to be important additions, while questions with a score lower than 7 should be analysed more closely. Because of this, the section on Non-maleficence should stay as it is, seeing that

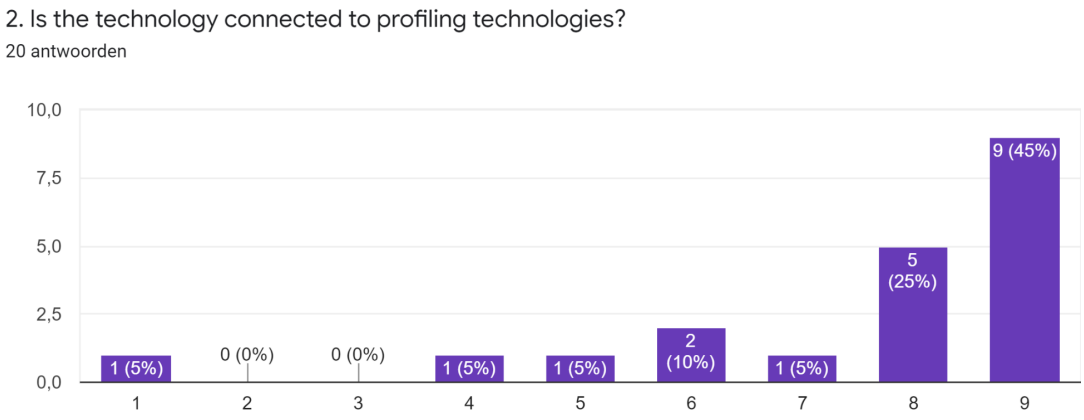

Figure 6.3: Bar chart Question 21 regarding the use of profiling technologies

all questions have a rating that is high enough to say that most participants agree on the question being a valuable addition to the ethical framework. Since this is already the case, no further analysis is needed, even with the presence of the earlier mentioned outliers.

Section	Question number and topic	Average score out of 9
Safety	1. Consumer legislation	8.05
Safety	2. Consumer protection	7.85
Safety	2.1 User awareness	7.5
Safety	3. Possibility of harm and risk	7.95
Safety	3.1 Safety and Risk studies	7.9
Safety	3.2 Measures harm protection user	7.6
Safety	4. Unanticipated breaches and harm	7.85
Social Safety	1. Social isolation user	7.35
Social Safety	2. Profiling techniques	7.5
Social Safety	2.1 User stigmatisation	7.42
Social Safety	3. Social sorting	8.3
Social Safety	3.1 Grouping of users	7.5
Social Safety	3.2 Discrimination against groups and measures	8.2
Social Safety	3.3 Unequal payment	7.15
Social Safety	4. Harm or disadvantage (groups) of users	8.3
Social safety	5. User concerns	7.45

Table 6.2: Table with the average scores of the ethical questions section Non-maleficence

6.5 Questions regarding the principle Beneficence

Following this, the section that is discussed is on Beneficence. Again, the last two open questions will be discussed first for this section before any further analysis takes place. For the first question regarding an explanation on any disagreements, five participants provided an explanation. The first participant stated that they felt like technology should not necessarily be empowering, which is question 1.3 of Personal Beneficence. For this question, they answered with a rating of 2, which could be a valid outlier as this is their opinion on this ethical issue. In Figure 6.4 the answers on this question can be found. The second participant responded regarding question 1.4 on the knowledge level of the participant also from the section Personal Beneficence. Their argument was that they did not see how this could cause risks or harm, relating to the principle of Beneficence. However, this participant might have misunderstood what principle was related to what type of ethical issues, as the issue they are mentioning relates to

the principle of Non-maleficence. Therefore, their answer with a rating of 4 might be an outlier in the analysis of the questions. The third participant commented with an explanation for their ratings of 5. They stated that they felt like the questions on which they rated 5 would be nice for some technologies to know, but would not be applicable to all technologies. The fourth participant felt like technologies are not obligated and "should" not benefit the user personally, which made them disagree with the entire section of Personal Beneficence. These may all be outliers which would possibly be better to filter out if other participants do not feel the same whatsoever. However, the fifth participant that wrote an explanation on their disagreements also disagreed with questions 1 through 1.4 of the section Personal Beneficence as they felt like these questions should not be answered by an ethical framework but by the company that builds the technologies. As with the last section, this participant might have misunderstood the use of the ethical framework, as it is meant to be used by the people who own or make the technology. Therefore, the answers of this participant might have to be filtered out for the analysis of these questions as well. This same participant stated to feel the same way about question 3 of Personal Beneficence and Questions 1 and 1.2 of Societal Beneficence. Therefore, the same goes for these answers, if the answers of this participant are deemed to be outliers for this question.

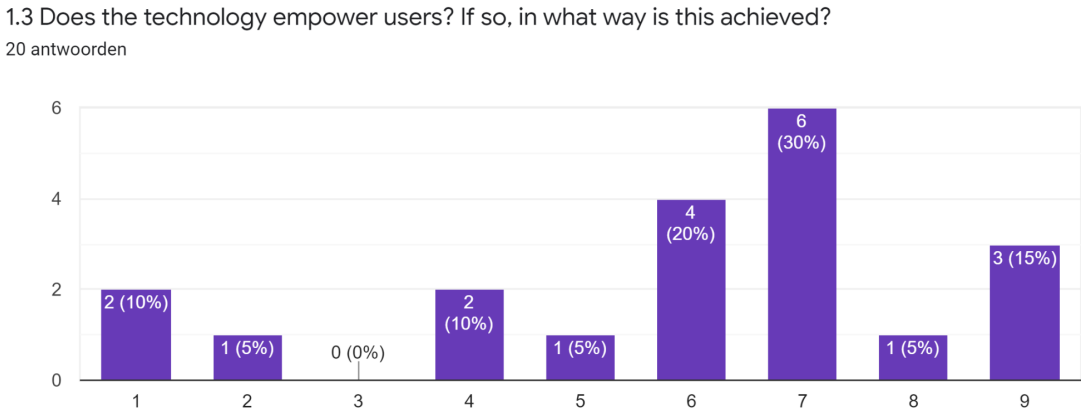

Figure 6.4: Bar chart Question 34 regarding empowerment of the user

The four participants that mentioned they did not understand any questions all mentioned question 4 of the section Societal Beneficence. This question was regarding the technology containing built-in obsolescence. From the participants that were spoken to insight was gained into this phenomenon. The term built-in obsolescence was not something that was a common term to the participants, which made at least two participants not easily understand this question. The participants rated this question with ratings of 5, 6, 5, and 6. This would possibly make the question more neutral when it comes to the average rating of this question. This could thus be explained by

participants not understanding the term "built-in obsolescence". The last participant also mentioned not properly understanding question 3 regarding value-sensitive design. This could also make the question to be rated more neutrally, which could come up in the analysis of the questions.

To analyse the scores that the questions received over all participants, a table with the average scores will be included. This table can be found below under Table 6.3. As can be seen, this section is rated lower than the previous section. This was already to be expected as Beneficence was rated the second-lowest of the principles that were mentioned. As mentioned before, the questions that are rated 7 or higher are deemed to be important or highly important by the participants and do, therefore, not have to be explored further.

Section	Question number and topic	Average score out of 9
Personal Beneficence	1. Benefits user	6.8
Personal Beneficence	1.1 Dignity, personal safety, independence, freedom	6.35
Personal Beneficence	1.2 Self-expression users	6.15
Personal Beneficence	1.3 Empowerment users	5.9
Personal Beneficence	1.4 Necessary knowledge level	6.45
Personal Beneficence	2. Less privacy-intrusive alternatives	7.55
Personal Beneficence	3. Stakeholder benefits	6.7
Societal Beneficence	1. Serving society and Goals data collector	7.45
Societal Beneficence	1.1 Scientific and objective evidence in decision-making technology	7.25
Societal Beneficence	1.2 Outcome availability	7.37
Societal Beneficence	2. Taking into account human values	7.75
Societal Beneficence	3. Value-sensitive design	7.8
Societal Beneficence	4. Built-in obsolescence	6.68

Table 6.3: Table with the average scores of the ethical questions section Beneficence

However, since multiple questions have received a score lower than 7, some recalculations will have to be made with the outliers that were discussed before. These outliers were chosen to be filtered out for a recalculation as there is reason to believe that the participants who filled them out either misunderstood the question, filled out the question with another principle in mind, misunderstood the use of the ethical algorithm, or represent a very strong individual opinion that does not represent the opinion of the group. Questions that still have a lower score than a 6.5 should be considered for

removement of the ethical framework at the end of the data analysis. As can be seen, after recalculating the questions without the outliers, most questions now receive at least a score of 7 or higher. There are still three questions that were deemed to be less important by the participants. These questions are, namely, question 1.1, 1.2 and 1.3. The scores of these questions are respectively, on average, 6.94, 6.72, and 6.44. Because of this, at least the last question regarding the empowerment of the user should be taken into consideration for removal of the ethical framework. However, since this is the only question in this section that will be up for removal, it is not a highly important issue as the question is only 0.06 points of a score in the scale "Important". Because of this, this section will stay as it is.

Section	Question number and topic	Average score out of 9
Personal Beneficence	1. Benefits user	7.44
Personal Beneficence	1.1 Dignity, personal safety, independence, freedom	6.94
Personal Beneficence	1.2 Self-expression users	6.72
Personal Beneficence	1.3 Empowerment users	6.44
Personal Beneficence	1.4 Necessary knowledge level	7.24
Personal Beneficence	2. Less privacy-intrusive alternatives	7.89
Personal Beneficence	3. Stakeholder benefits	7.76
Societal Beneficence	1. Serving society and Goals data collector	7.79
Societal Beneficence	1.1 Scientific and objective evidence in decision-making technology	7.58
Societal Beneficence	1.2 Outcome availability	7.72
Societal Beneficence	2. Taking into account human values	7.75
Societal Beneficence	3. Value-sensitive design	7.8
Societal Beneficence	4. Built-in obsolescence	7

Table 6.4: Table with the recalculated average scores of the ethical questions section Beneficence

6.6 Questions regarding the principle Respect for Autonomy

The next section that will be discussed is the principle of Respect for Autonomy. The same structure will be followed as in the last two sections. There were only two participants

that shared an explanation on any questions they disagreed with for this section. The first participant mentioned that they thought the questions belonging to the section Right for Autonomy seemed hard to check. This is something that should be taken into consideration in the discussion. The other participant mentioned that they disagreed on question 4 of the section Informed consent with a score of 1. They argue that they think a provider should be able to determine whether they want to use a technology and that if the user does not want to use this technology they should be able to turn it off. This makes it seem like the participant did not understand this question, as the question is regarding the technology making it difficult to turn off or not use the services it provides. The graph of this question is provided in Figure 6.5. Therefore, this answer will be filtered out by the first calculation of the average scores already.

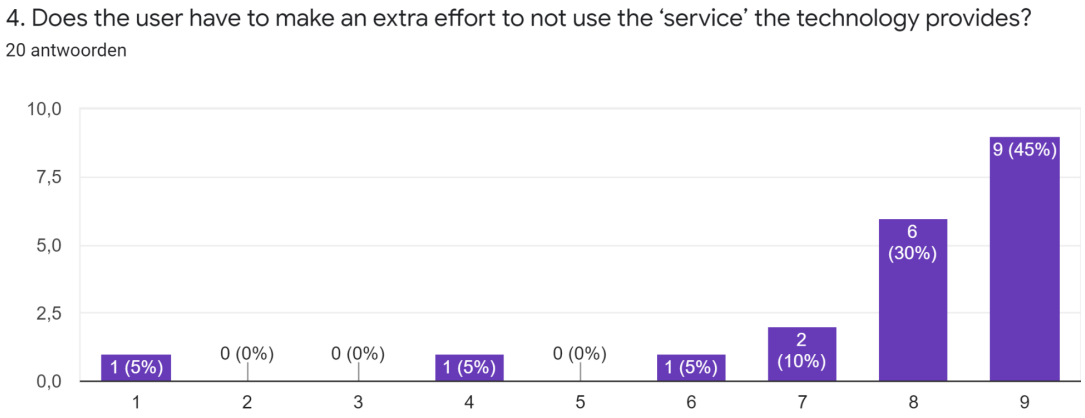

Figure 6.5: Bar chart Question 58 regarding having to make an effort to not use the service

Three participants mentioned they had difficulties with questions. The first two participants mentioned that they had difficulties understanding question 1.1 of the section Right for Autonomy, which was regarding freedom of association. These participants answered this question with a score of 6 and 7. Based on these, it cannot be said whether they fully misunderstood or still did understand the question. Because of this, these answers cannot be filtered out for the calculation of the average score per question. The third participant mentioned that they had difficulties with question 1.3 since they had to look up the term GDPR. This, however, did not influence their ability to form an opinion on the question, as they still rated this question with a score of 9.

Since there were not many disagreements or misunderstandings for this section, there is only one single answer that will be filtered out in the calculations that can be found in Table 6.4.

As can be seen, all answers in the section Respect for Autonomy were rated at least above a score of 7 on average. There was an exception of one question that was not rated

Section	Question number and topic	Average score out of 9
Right for Autonomy	1. Decrease user's security and liberty	8.15
Right for Autonomy	1.1 Decrease user's freedom of association	7.9
Right for Autonomy	2. Allow dignity and preferred social and cultural life	7.45
Right for Autonomy	2.1 Compromising human dignity and declining use of product	7.9
Right for Autonomy	2.2 Marking disabled users	7.7
Informed Consent	1. Obtain free and informed consent	8.35
Informed Consent	1.1 Meaningful choice	8.5
Informed Consent	1.2 Truly freely provided	8.3
Informed Consent	1.3 Complete regarding regulations	8.1
Informed Consent	1.4 Right of withdrawal informed consent	8.3
Informed Consent	2. Users that cannot give informed consent	8.1
Informed Consent	3. Rights of children	8.3
Informed Consent	4. Effort it takes to not use the service	8.05

Table 6.5: Table with the average scores of the ethical questions section Respect for Autonomy

above a 7.5 on average, which was the question regarding allowing to live a life of dignity and independence and also allowing the individual to participate in their preferred social and cultural life. It is not clear why this question was deemed to be less important from the data. An interesting find is that all the questions in the section Informed consent were rated above a score of 8, which is extremely high. It seems that certain terms are well known and deemed very important by the participants. The section Respect for Autonomy should stay as it currently is, seeing that the questions were all rated highly.

6.7 Questions regarding the principle Justice

In this section, the questions that were asked regarding the fourth principle, Justice, will be discussed. When it comes to the questions that participants disagreed with, there were two answers for this section. The first answer was of a participant that mentioned

that they did not disagree with any of the questions but simply thought that some of the questions that were mentioned before better fit in this section. Sadly enough, this participant did not mention what questions they meant, but this is still valuable information for the discussion. The other participant that explained their disagreement, stated that for almost all the questions they thought that the outcome of the question was based on the market and not the job of the government. Because of this answer, it is likely this participant did not understand this section of the questionnaire properly. Therefore, the answers from this participant on the questions stated in their disagreement message will not be taken into consideration for the calculation of the average scores.

Only one participant mentioned that they had difficulties with a question. They mentioned that question 1 of the section Social Justice was hard for them to answer since they felt like the question was irrelevant as inequality always plays a role in the current society according to them, the answers to this question can be seen in Figure 6.6. Of course, ethical issues arise in different areas of society and even the world, however, that does not mean an ethical issue is not relevant or up for discussion anymore. Since this participant also answered this question with only a score of 2, based on this opinion, this answer will be filtered out in the calculations for this section. In Table 6.5 the average scores of the section Justice can be found.

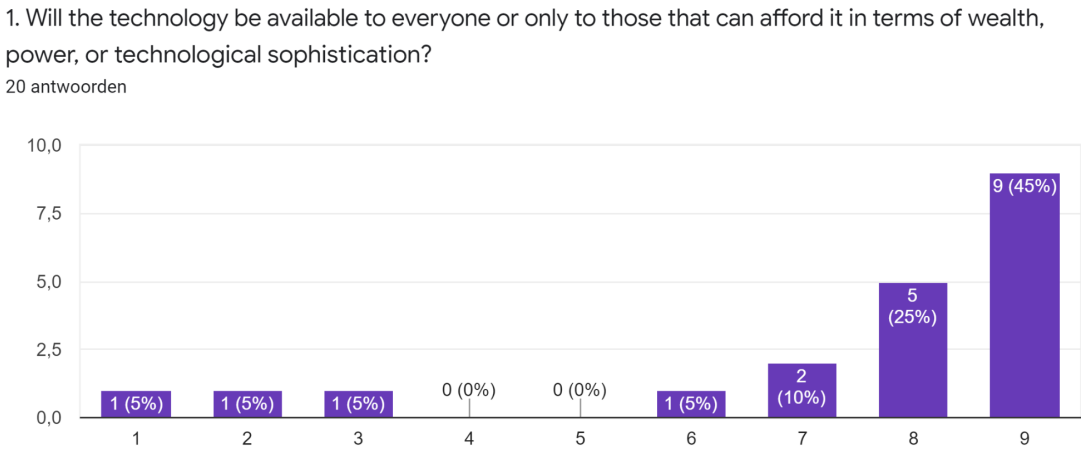

Figure 6.6: Bar chart Question 66 regarding availability to everyone

As can be seen in Table 6.3 above, after filtering out the mentioned outliers, the average scores of these questions are all a score of 7 or higher. Because of this, it can be said that the participants deem this section to contain valuable questions for the ethical framework. There were two interesting finds. One of these was the average rating of 7 for question 2 of the section Justice. This question asked whether there is a just system in place for the addressing of technology failures with appropriate communication and compensation to affected stakeholders. Eight of the twenty participants answered this

Section	Question number and topic	Average score out of 9
Justice	1. Identifying (vulnerable) groups	7.9
Justice	1.1 Usability by all groups	8.05
Justice	1.2 Unequal benefits	7.79
Justice	1.3 Unequal payment	7.56
Justice	2. Just systems for technology failures	7
Social Justice	1. Availability to users with certain resources	8
Social Justice	2. Applicability technology policy	7.95
Social Justice	2.1 Resisting the technology and distribution resources	7.79
Social Justice	3. Harm to user from gained information	8.1

Table 6.6: Table with the average scores of the ethical questions section Justice

question with only a score of 6, which is equal to "Slightly agree". This was interesting, since the participants, as users of technology, could be the stakeholders as well. It is assumed that the participants did not fully realise this as this explanation was not provided. The second interesting find was that the questions of the section Justice were all highly rated, while the principle of Justice was deemed as a principle that was not very applicable to technology ethics. This can be explained by the participants gaining more insight into the principle through answering the questions in the section.

6.8 Questions regarding the principle Privacy and Data protection

This section is the largest in the ethical framework, as both topics are highly applicable to technology and technology ethics. For this section, three participants provided an explanation for some of the questions they disagreed on. The first participant mentions that the tenth and last question of the section Data protection was not as important to discuss as the other questions. Their argumentation was that the pros and cons would be discussed in detail upon launching the technology already. They felt like the other ethical issues that were proposed by the ethical framework should be prioritised over this one. This is, of course, a valid opinion and they did not seem to misunderstand the question. Therefore, this answer will not be filtered out for the calculations. Of course, the other ethical issues that were discussed are already prioritized over the last ethical issue. The ethical framework was structured to propose the most important ethical

issues first. The second participant mentioned that they thought question 1.2 of the section Privacy was hard to answer, the answers to this question are shown in Figure 6.7. They felt like questions 1 and 1.1 already asked enough questions in this direction. The same participant also felt like question 3 was already contained partly in the privacy questions 1 and 1.2. This information is always valuable for the discussion of the work. The last participant mentioned for several questions that it was not the government's job to evaluate these topics. Again, this participant probably misunderstood the use of this ethical framework, and therefore their answers to the questions they mentioned will not be taken into consideration for the evaluation. Aside from that, no participants indicated that they misunderstood any questions.

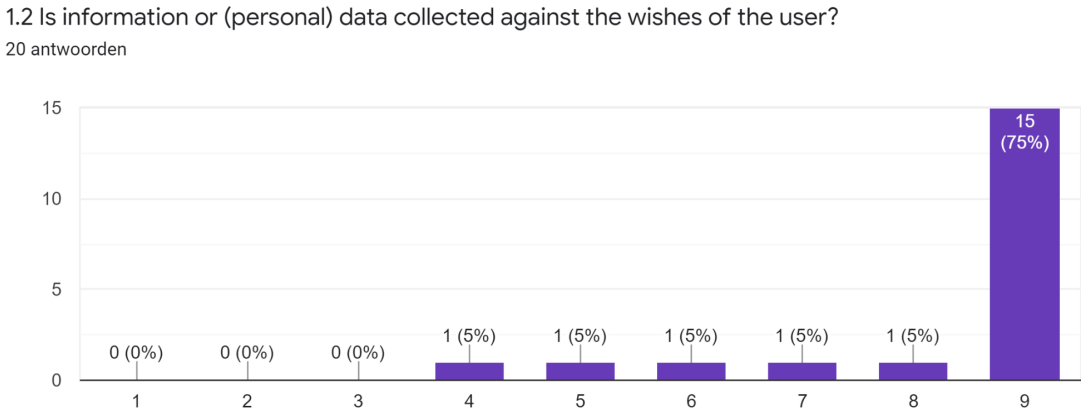

Figure 6.7: Bar chart Question 74 regarding the collection of data against the wishes of the user

The calculations for these sections were performed in the same way as the calculations for the other sections. The calculations for the section Privacy and Data protection can be found in, Table 6.6 below.

As can be seen by the average scores displayed in the table, all the questions in these sections are at least deemed important, if not highly important or extremely important. Interesting to see is that all participants agreed that privacy and data protection issues are in general extremely important ethical issues that should all be taken into consideration. Interestingly enough, the participants thought less highly of their data accuracy and the consequences thereof. In the subsection of Privacy, they rated the time before personal data can be accessed lowest. There are no indications of why the participants rated these answers this way, but it can be speculated that they simply did not think having quick access to personal data is highly important. When it comes to the inaccuracy of data, they rated the consequences to inaccuracy and the inaccuracy itself on average the same. Therefore, it can be speculated that the participants do not think inaccuracy of data can arise highly important ethical issues.

Section	Question number and topic	Average score out of 9
Privacy	1. User awareness data collection	8.35
Privacy	1.1 Ways of data collection	8.4
Privacy	1.2 Unwanted data collection	8.25
Privacy	2. User access of personal data	8.2
Privacy	2.1 Charge data access	7.9
Privacy	2.2 Time before data access	7.25
Privacy	2.3 Anonymity measures	8.05
Privacy	3. Additional data collection	8.2
Privacy	3.1 Monitoring user communications	8.2
Privacy	3.2 Monitoring movement or location	8.25
Privacy	3.3 Using biometric information	8.4
Privacy	3.3.1 Necessity and alternatives	7.89
Data Protection	1. Minimum data amount	7.47
Data Protection	2. Time limit storage	8.05
Data Protection	3. Purpose data collection	8.05
Data Protection	4. Removal of data	8.1
Data Protection	5. Measures data protection	8.35
Data Protection	5.1 Parties with data access	8.2
Data Protection	5.2 Safeguards to ensure confidence	8.1
Data Protection	6. Accuracy and correctness	7.32
Data Protection	6.1 Consequences data inaccuracy	7.32
Data Protection	7. Data location and purpose	8.15
Data Protection	8. Gaining profit without permission	8.1
Data Protection	8.1 Gaining profit without freely given informed consent	8.1
Data Protection	9. Public technology and database changes	8.25
Data Protection	10. Studies pros and cons	7.47

Table 6.7: Table with the average scores of the ethical questions section Privacy and data protection

6.9 Questions regarding additional thoughts

The last section of the ethical framework consists of three questions. The first question asks openly what the participants thought about the ethical issues that were introduced.

The second question asked whether they thought ethical issues were missing since so far they were only asked to state whether they felt like ethical issues should be removed. The last question was a closed question with the options "Yes", "No", or "Other", for which the last option could be used to provide an explanation. Since these questions are simply a way for participants to put down their thoughts they will not be coded, but they will be added to the questions in the Appendix and discussed in this section in more detail.

The thoughts of the participants regarding the ethical framework ranged from elaborate answers to simply encouraging or positive messages. It was brought up by a participant that having to use such a framework for a company would increase their paperwork. This participant made the argument that it would attack the free market. However, the goal of this framework is not to be mandatory in use, which would make it a free choice of the technology owner to evaluate their technology with this ethical framework. The participant also mentioned they were glad to have filled out the survey and that it made them more aware. Other participants also mentioned that some of the ethical issues had not been considered by themselves yet, but that they felt like the ethical issues do play a big role and are important to be brought up. Two participants mentioned that they feel like the most important part of this ethical framework when it comes to HMAs and technology ethics will always be the section on privacy and data protection. One of the participants indeed admitted to having assumed the ethical framework be used by the government, which makes the filtering of the data in earlier sections more sound. Other comments included that some questions seemed to be more important than others, that sometimes not all subjects will be in line with the circle of influence of the technology and that the ethical framework was very pressing matter. Additionally, this version of the ethical framework was said to be important, versatile and thorough and a participant mentioned that they thought it was a good step towards developing an ethical framework.

On the question of whether the participants felt like any ethical issues were missing, eight participants answered with a negation. Four participants mentioned improvements for a new version of the ethical framework. The first participant felt like the actor that is the data controller may have implications regarding what is considered to be ethical. They asked whether these actors should be treated differently. Since ethics should apply to all fields equally, the actors should not be treated differently. However, the way they will use the ethical framework to evaluate their work will be different due to their view on ethics. That will not only depend on what type of actor they are or in what field they are active but also on their view on ethics. This is something that cannot and should not be prevented as every individual has their own set of ethics. Another participant mentioned that the impact of technology on nature, the earth, and climate was missing. They wished to include a section on sustainability. This is a great future recommendation for the next version of the ethical framework. Another participant wanted to discuss the future view of the internet and technology in such a way that it could be implemented in an ethical evaluation. However, this input was very abstract and could be implemented in many different ways. Though, it could still be a good addition to the ethical framework. The last participant mentioned introducing an obligation to have an easily accessible helpdesk for users. However, this is out of the scope of the ethical framework.

In the last question, the participants were asked to state in a closed question whether they thought the ethical framework forms a solid base for the evaluation of technology

and in specific HMAs. Of the 20 participants, one participant used the option to type a different answer, but they simply put "Other" in Spanish. The other 19 participants answered this question with "Yes". This means that the ethical framework as it currently is is thought of by the participants to form a solid base for the ethical evaluation of technology and in specific HMAs.

Chapter 7

Discussion

As with any type of research, some points of discussion have come up during the project. This Chapter aims to provide an insight into these points of discussion with an aim for completeness and inclusion. The discussion will mostly include concerns that were brought up by participants, found during the data analysis and concerns that form edge-cases in this research. Additionally, the distribution of the framework, which was not included in the purpose of this research, will be discussed.

First of all, the discussion will dive into the decisions that were made regarding the questionnaire and the spread of the questionnaire. After this, the concerns that were found during the data cleaning and data analysis phase. In this section, the edge cases that were found during data analysis will also be included. This will be followed by the concerns brought up by participants and non-participants. In this case, non-participants were individuals that were asked to participate but eventually decided not to do so. Lastly, the distribution of the framework will be discussed.

7.1 Questionnaire decisions

The decisions that were made regarding the construction of the questionnaire and the distribution of the questionnaire are explained in detail in the earlier Chapter *Construction of the questionnaire*. This section aims to explain what concerns were found or brought up by participants regarding the questionnaire. Additionally, the decisions that were made can be further elaborated upon in this section.

The questionnaire was chosen to be used solely for the evaluation of the ethical framework that was constructed. This was chosen to be this way since the base of the ethical framework, the principles, were completely based on other works that used the same principles. Therefore, the structure of the ethical framework did not have to be questioned, as multiple works already confirmed the use of these principles. The questions, however, were constructed during this research. Additionally, the questions have the aim of guiding the practitioner of the ethical framework towards a certain theme. Because of this, the exact phrasing of the questions could have been slightly different and the question would still be effective in its aim. Though, since the questions were constructed

for this ethical framework, it was chosen to ask participants to evaluate the questions on whether they thought it was a valuable addition to the ethical framework. This made the questionnaire quite long, as it eventually included all of the ethical questions and additional questions as explained before. Due to the questionnaire being so long, there might have been a lot of participants that decided not to fill out the questionnaire. There is no knowledge of this happening, but it is a high risk since the questionnaire was approximated to take 20 to 30 minutes of the participants' time.

Additionally, the questionnaire had to explain a lot of new terms to the participants in addition to what was asked of them in this questionnaire. Because of this, the questionnaire contained a lot of text aside from the questions, as can also be seen in the Attachment. Participants did provide feedback on this, as they felt like they started scanning the text after a while. This made participants misunderstand what was asked of them regarding the use of the scale. The first distribution of the ethical framework was through Reddit, which was actually good, as the first feedback regarding the use of the scale came in right then and there. This made for an alteration of the posts to include an additional EDIT tag with another explanation regarding the use of the scale. After this, it was also decided to explain the use of the scale in the message that asked individuals to participate. This solved the problem and made participants navigate the questionnaire better.

Regarding the distribution of the questionnaire, it was a questionable decision to gather participants through Reddit. This decision was made to gather more input from different sources, with an addition of international participants. However, it turned out that people from Reddit often did not have the appropriate knowledge, English proficiency or patience to fill out such a questionnaire. This information was retrieved from the comments on the posts and reaching out to those that did provide feedback through the comment section. The use of the scale was deemed to be the most important hurdle, as participants kept stating that they could not answer the questions with a scale. It can thus be said that these participants are likely to not have read the texts properly and, therefore, did not understand that they were not supposed to answer the questions, but rather rate them on added value to the ethical framework. Additionally, the use of Reddit opens up the possibility of people "trolling" and trying to ruin your data. Luckily, only one person mentioned that they filled out random answers and this answer was most likely filtered out during data cleaning. The participants from Reddit that did fill out the questionnaire fully and were interested, however, were lovely and provided very valuable opinions.

It turns out that the use of the question regarding the perceived knowledge level of the participant was a very good inclusion. Participants reached out to say that they felt like they questioned their knowledge level but felt assured by this question. Additionally, it made data cleaning very efficient since the participants that did not think they had a proficient knowledge level on these fields, did not participate. Participants were also positive regarding the open questions at the end of each section. They stated that they were happy to be able to give textual feedback and that they found the phrasing inviting for answers in the last section on additional thoughts. One participant mentioned that they would have liked to see the inclusion of a page counter or a tool that shows how far you are in answering the questions. Sadly enough, this was not an option that could be

found in the tool that was used.

Lastly, it is important to discuss the perceived demographic of the participants. To understand the rigor and relevance of the ethical issues that were discussed with this questionnaire, the participants needed some sort of knowledge in the fields of technology, ethics or technology ethics. Because of this, the education level of the participants must have been quite high, since the participants all needed to speak English fluently and, additionally, understand the topics that were discussed. This makes it so that the participants that were asked to function as expert opinions are all personal contacts of the author and make up about half of the respondents. Seeing this, it could be questionable to have half of the respondents be of the same group of people, as these respondents are all likely to be from the same privileged, highly educated group. However, the other half of the respondents consist of individuals without higher education or respondents through Reddit, of which at least two are located internationally in the USA and Thailand. It is always positive to have some international response, but it can still be argued that the main population of the respondents belongs to the same group and most likely to the same culture. Because of this, it is important to reach out to a larger audience and multiple different cultures to discover any trends or differences in the responses. However, due to the assumption that the largest part of the respondents belongs to the group of expert opinions on the matter, due to having studied and currently working in the field of technology and technology ethics, it can be said that the validation of the respondents is valuable. For the validation purposes, there should still be further research towards physical focus groups in future work. Though, for this work, the aim was to gather a qualitative evaluation of the ethical framework. Due to the nature of the evaluation, it can be said that over 15 responses yields a significant outcome, especially since at least half of the respondents can be deemed to belong to the group of expert opinions. Additionally, it has to be mentioned that participants took their time to fill out the questionnaire, as recommended by the author. Several participants reported taking multiple days to fill out the full questionnaire so that they could provide a valuable answer.

7.2 Data analysis and edge-cases

The points of interest that were found during the data cleaning and data analysis phase were somewhat mentioned in the earlier Chapter on data analysis already. In this section, the points that were found will be discussed in more detail.

As mentioned in the previous chapter, data cleaning was very efficient due to the inclusion of the fourth question of the questionnaire. Additionally, the inclusion of the open questions was also a very good decision. This allowed for the participants to provide their thoughts, but also made it easier to spot participants that did not fully understand the purpose of a question. The answers that were filtered out were always based on the answers that were given in the open questions, which made these questions very valuable. Eventually, the use of a Chi-squared test was not necessary as there were not many answers that gave different themes. The simple coding that was done already provided enough insight into the themes that were found to get to conclusions.

During the data analysis phase, there were several interesting findings. There was one participant that kept assuming that the framework was to be used by the government. This means that the purpose of the framework was not stated clearly enough. Because of this, some of the answers of this participant had to be filtered out. Therefore, the purpose of the framework should have been stated more clearly as valuable data got lost. However, as only one participant experienced this problem, it is not a large concern.

The most interesting find overall is that participants did generally not feel like Beneficence was a principle that is applicable to or valuable for technology. The assumption that is made regarding this phenomenon is that the participants are likely to not include themselves as a stakeholder in the technology. One of the participants also commented on exactly this, stating that they felt like they were often not a stakeholder. However, it is thought that the participants would rate the questions of the section Beneficence higher if they did include themselves as a stakeholder more often. In the current era, everyone is a stakeholder in technology, and the users are by far the biggest group of stakeholders. Because of this, it is important that users of technology start seeing themselves as a group that is important and should benefit from the use of technology. Especially since the whole point of using technology is to gain some sort of benefit from it. Technology allows us as individuals to do things we could never have done without it. Consequently, it was chosen to leave the section Beneficence as it is proposed in the first version of the ethical framework. Even though, some questions were rated a bit lower than what is desirable.

The other interesting find was that the principle of Justice was, relatively, rated as an invaluable principle to the ethical evaluation of technology and in specific HMAs. However, all the questions in the section of Justice were still rated highly. It is assumed that this partly occurred due to the participants gaining more insight into the ethical themes that were proposed by the ethical framework by rating the questions from earlier sections. Several participants that provided oral feedback also stated that they felt like the section Justice was less valuable for ethical evaluation as they thought this was already legislated. They stated that the ethical themes that were brought up in the section, however, felt important to them for ethical evaluation.

7.3 Concerns brought up by participants and non-participants

The open questions of the questionnaire also allowed participants to bring up concerns and additional thoughts. The concerns that were brought up by participants were already mentioned in the previous Chapter. In this section, they will be discussed in more detail.

One of the participants did mention that they thought the scale was confusing in one of their comments as they felt in the beginning that they had to rate their questions based on which one was more important. However, as mentioned before they did not fill out their questionnaire this way, so it should not form a concern for the reliability of the data. Other comments that were made were regarding some questions seeming hard to check, questions being moved to a different section, and some questions being redundant or already having enough questions towards a certain theme. These comments

were all taken into consideration and are seen as very valuable opinions. To explore these comments further, a recommendation will be made in the section *Recommendations for future work*. However, for this work, it was chosen to not implement these comments as they are currently too vague and should be explored in more detail. Regarding questions being hard to check, it can be said that this is part of the purpose of discussing the question. Topics that seem hard to check should be discussed in more detail so that the technology owner will look into this subject. The comment on moving questions to different sections was only made by one participant. Due to them not stating what questions they meant, it cannot be said for sure what questions should and should not be moved as of now. Lastly, the inclusion of questions that might seem redundant is done so by choice. This decision was made as it is made clear in earlier works that the use of slightly rephrased questions will yield different answers. Additional recommendations that were made by participants were found in the section regarding additional thoughts of the participants. These recommendations will be discussed in Chapter *Recommendations for future work*.

Non-participants were people that were asked to participate but decided not to. One of these non-participants mentioned that they were advised to not use Google Forms for data collection. This comment was made based on the data of Google Forms being processed in the USA. However, the data that was being processed by this questionnaire did not contain any identifying information of the participant by choice. Additionally, it can be argued that the chance that this data specifically will be looked into by other parties is extremely small.

Another comment that was made by a non-participant was regarding the distribution of the ethical framework. The distribution itself is not a part of this work and will be included in the section *Recommendations for future work*. However, it can be said that there is an interest in the use of the ethical framework. First and foremost, the healthcare technology company where the expert opinions were gathered has expressed an interest in the use of such a tool. Additionally, participants did mention that they felt like this ethical framework would be a good tool to use for the ethical evaluation of technologies like HMAs.

Chapter 8

Conclusion

In this work, an ethical framework for the ethical evaluation of Human Monitoring Algorithms was proposed. This ethical framework consists of a set of structured and interlinked questions. The structure is derived from the literature and based on principles that are also used by other works that perform an ethical evaluation. The interlinked nature of the questions is based on the theme, subject or topic the questions propose. With the ethical framework in text, visual tools, a method of use and a use case are provided.

The ethical framework was evaluated through the use of an elaborate questionnaire. Based on the answers of the participants and the evaluation of the results, it was chosen that the ethical framework will not be altered to a second version. The first version was deemed to be complete by most participants. Additionally, when asked whether the participants thought this ethical framework would form a solid base for the ethical evaluation of technology and in specific HMAs, the answer was an almost unanimous "Yes".

Because of this, it can be said that the ethical framework that is proposed by this work is deemed as a valuable tool for the ethical evaluation of technologies like Human Monitoring Algorithms. Additionally, the ethical framework can be used to evaluate other technologies as well. The tool can be used by any stakeholder of the technology but is aimed to be used by technology owners. There is an interest in the use of this tool, which makes it a valuable addition to the research base.

Chapter 9

Recommendations for future work

For future work, the participants made some recommendations in the additional thoughts section of the questionnaire. Additionally, some recommendations can be made based on the outcome of this research paper. First of all, the recommendations by participants will be proposed.

In the additional thoughts section, a participant mentioned that they would like to see a sustainability section in the ethical framework. This is thought of as a great initiative since sustainability is a very important and upcoming topic. This would be a valuable addition to the ethical evaluation of any technology. By including this section, the comment of another participant would also be included. The participant in question talked about taking into consideration a future perspective on technology rather than only looking at the technology in the current state of the world. Because of this, in a future version of the ethical framework, a section regarding sustainability should be included.

To gain more insight into the participants' thoughts, a focus group can be organised to discuss the questions in more detail. By doing so, the understanding of the participants will be assured and additional valuable insights could be gained. Additionally, it is important to make note of the fact that most participants are most likely from a first world country and highly educated. Because of this, it is important to organise focus groups with a variety of ethnicities and knowledge levels regarding the fields of technology, ethics, and technology ethics. A focus group can then also be performed with experts in the field of technology or ethics, like ethicists. This would further increase the value of the ethical framework as a tool.

Regarding the distribution of the ethical framework, it could be looked into to either start or team up with a foundation. There are foundations like the Electronic Frontier Foundation (EFF) that already concern themselves with the distribution of tools that help with the evaluation of technology. Perhaps a foundation like this could help with the spread of the ethical framework. Otherwise, parties like the government or large organisations could be approached regarding the use of the ethical framework.

Appendix A

Ethical framework by Van de Poel

Table 3 An ethical framework for experimental technology

From: An Ethical Framework for Evaluating Experimental Technology

1	Absence of other reasonable means for gaining knowledge about risks and benefits
2	Monitoring of data and risks while addressing privacy concerns
3	Possibility and willingness to adapt or stop the experiment
4	Containment of risks as far as reasonably possible
5	Consciously scaling up to avoid large-scale harm and to improve learning
6	Flexible set-up of the experiment and avoidance of lock-in of the technology
7	Avoid experiments that undermine resilience
8	Reasonable to expect social benefits from the experiment
9	Clear distribution of responsibilities for setting up, carrying out, monitoring, evaluating, adapting, and stopping of the experiment
10	Experimental subjects are informed
11	The experiment is approved by democratically legitimized bodies
12	Experimental subjects can influence the setting up, carrying out, monitoring, evaluating, adapting, and stopping of the experiment
13	Experimental subjects can withdraw from the experiment
14	Vulnerable experimental subjects are either not subject to the experiment or are additionally protected or particularly profit from the experimental technology (or a combination)
15	A fair distribution of potential hazards and benefits
16	Reversibility of harm or, if impossible, compensation of harm

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Figure A.1: Ethical framework by Van de Poel [50]

Appendix B

Ethical questions by Burls

Table 2. Questions to Motivate Ethical Reflection and Analysis in HTA

1. Why was this technology selected for assessment?
2. At what point in a technology's development should it be assessed?
3. Are there moral challenges related to components of the technology?
4. Are there related technologies?
5. What are the characteristics of the technology to be assessed?
6. Is the symbolic value of the technology of moral relevance?
7. Are there morally relevant issues to the choice of endpoints in the assessment?
8. Are there morally relevant issues related to the primary studies?
9. Are there moral issues from research ethics that are important?
10. Are the users of the technology in the studies representative of the users that will apply it?
11. Are the participants representative of those who will receive the technology in practice?
12. Is the economic evaluation and modeling ethically appropriate?
13. What are the moral consequences of implementing the technology and using the HTA?

HTA, health technology assessment.

Figure B.1: Questions to Motivate Ethical Reflection and Analysis proposed by Burls [51]

Appendix C

Data analysis graphs

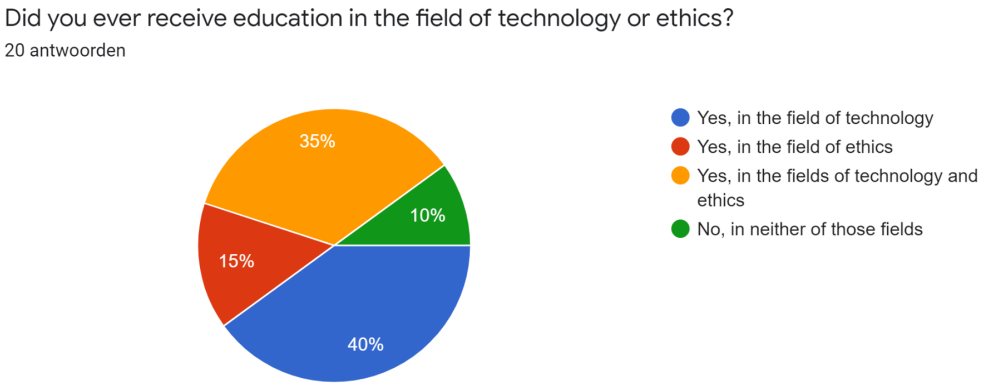

Figure C.1: Pie chart Question 1 regarding education of the participant

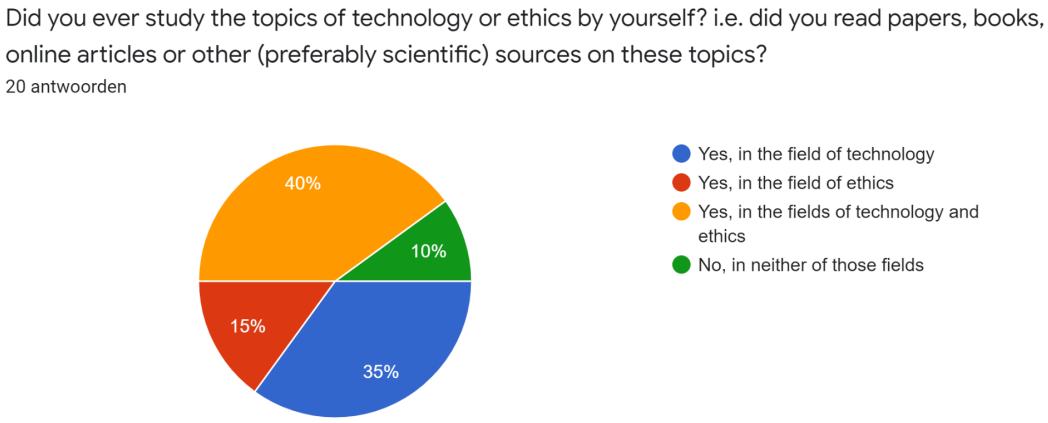

Figure C.2: Pie chart Question 2 regarding self-study of the participant

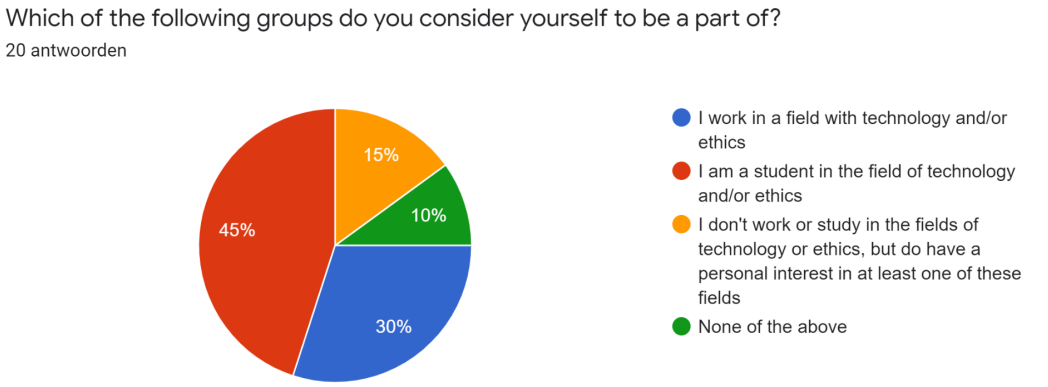

Figure C.3: Pie chart Question 3 regarding the group the participant feels like they belong to

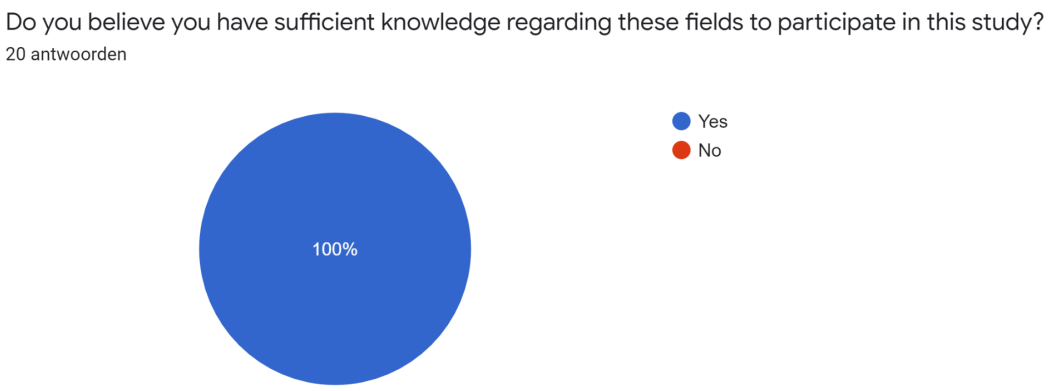

Figure C.4: Pie chart Question 4 regarding perceived knowledge of the participant

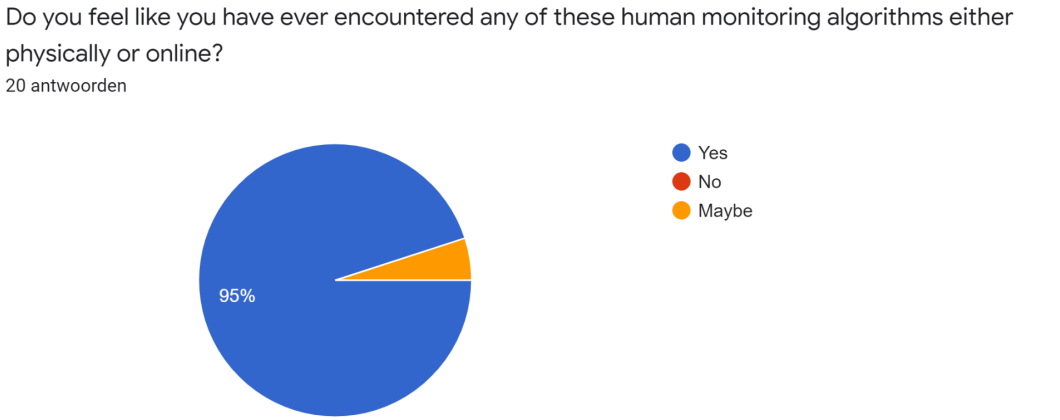

Figure C.5: Pie chart Question 5 regarding encountering HMAs

Red = Companies and products Blue = Physical sensors Green = Location tracking
Yellow = Online algorithms

If you answered yes or maybe to the last question, what types of human monitoring algorithms have you encountered?
I use step counters a lot, especially by Xiaomi. I have also made a few discord bots used in one event and a cognitive psychology experiment which used one such algorithm (Navon's task).
All sensor-related algorithms in my Apple Watch, online analytics algorithms
Everything google (search, maps). I think one time I even verbally said something and ads related to it showed up later on my Facebook (my Android was listening). I think in Taiwan they used cellphone location monitoring in covid-19 tracing
smart watch, alexa, recommendation systems on websites and apps.
Personalized ads on whatever website (from Amazon to Instagram/Reddit), word-choice algorithms on mobile keyboard, step counter on fitness band, location history on GMaps
The most recent I remember is that I've used apps on my Iphone which monitored my steps and location. I also use the health app to track some health progresses.
Search results, internet of things, wearables, surveys
Shopping advertisement, Fitbit watch that tracks me, my phone tracks my steps, Facebook, google and Instagram are tracking my geographical and online behavior, they know my interests
Step counters, location devices, shopping behaviour, tailored ads
Those connected to sensors
Online everything is logged, on social media and shopping websites you can see the effects clearly of them logging/monitoring your information. In some sense governments also monitor personal information of income, tax payments or diplomas.
step counters, shopping behaviour...
Cookies, tracking, activity tracking (like mouse movement on a website), keystroke trackers and probably many more
Step counters, location tracking, heart sensor, recommendation algorithms (Netflix, shopping -> if you like this you also like this and this, Based on your location you want to go to this restaurant, spotify algorithms -> discover weekly, radio's based on previously listened music, google -> the website recommendations when you open google and every recommendation it does when you start typing, marktplaats recommendations based on stuff I looked for), optimal battery charging schemes in your phone, facial recognition on your photo's, the location function of snapchat, every cookie from a website you visit, climbed routes in my climbing app, gathered data from videogames I play
I have encountered traffic monitoring cameras, personalized advertisement algorithms, and traffic counters for bicycle lanes.
My iPhone
Previous online search behaviour resulting in similar or related content matter in advertisements and topic suggestions during later internet access.
Location devices on watch or telephone. Online following systems for what i'm watching and reading (all sorts of advertising messages are sent to me). Receiving calls from all sort of companies.
Algorithms that monitor behaviour and preferences

Figure C.6: Coded answers with legend from Question 6 regarding encountered HMAs

Red = Data protection Blue = Informed consent Green = Justice Yellow = Non-maleficence
Orange = Beneficence Purple = Right for Autonomy Pink = Privacy

Do you think that these monitoring algorithms can cause any ethical issues? If you think ethical issues can occur, please describe the most problematic ethical issue in your opinion and in what scenario this would occur?
The most problematic ethical issue would be some hacker or organization stealing the data. In human research fields, confidentiality is of the utmost importance. The data of my experiment can be hacked into, although I don't think hackers will be interested in some unusual study some nobody is conducting. As far as data of discord bots is concerned, that can be hacked easily, because I'm no programmer or cybersecurity expert. I made no efforts to protect the data stored by my bots. Also, the data stored within my fitness band can be hacked as well. Though I am confused what aim can be accomplished with those sorts of data.
Data collection without explicit permission
Yes, I think ethics do come into play but it's also very cultural dependent. I am ok with ads and memories of places visited/seen showing up. But the day that someone with bad intentions uses my data for something dangerous is when I will mind it. I am from Taiwan where data is a little bit less protected (compared to US and Germany)
Algorithms learn from the data they are given, which can be biased, but are perceived as neutral. This means that they can be perpetuating problems we currently have as a society and because it is coming from a "neutral" source (an algorithm won't get labelled as racist or sexist for example), it will be more difficult to identify. They can also be a powerful tool for manipulation as it happened with Cambridge Analytica.
As soon as the data isn't connected to physical identities and isn't used to harm anyone, but only to give free services (because if something is free, the product is you) I don't think there is so much ethical problem. Even if the control applied by Facebook inc apps is scary (idk, people I talk to on WhatsApp that comes in my suggested friend list on Facebook), so I think something should be done to avoid similar things.
Yes, like any data collection that tracks human information I do believe there's ethical risks. There's a few but the most prominent one I can recall is how the increased value of data has influenced companies' choices to sell our data and how often this is an underwhelming concern of most.
Data could be sold or used for profiling to guide people towards certain beliefs
Most problematic for me is people's privacy. There is no privacy anymore and people do not even know how much of them is tracked and analysed
If personal data that is collected is used in any other way that is not intended. For example, if, based on personal demographic data (age, gender, etc.), certain products, ideas or other harmful products/content is suggested to the individual (as has happened to a friend of mine), when they may be in a vulnerable state and thus more susceptible to it
If the algorithms are biased and thus displays biased output data
I think that from this monitoring ethical issues can arise for sure, already in that it can make people feel watched or unsafe in some cases to have all their information gathered and stored. From what is thought to be anonymously gahtered information identity can already be extrapolated if enough info is put togehter which can be an issue. Also what the body owning the data plans to do with the insights gained ftom the data can form an ethical issue. For example the scandal surrounding cambridge analytica.
The collecting of data in itself is an issue, but the selling of that data in order to, for example, target adds to the user is an ethical issue. This would occur when google for example, sells your browsing behaviour to a targeted add company.

Figure C.7: Coded table Question 7 regarding encountering HMAs top part of the table with legend

There is no privacy. Your fundamental right to anonymity is gone
Yes. The most problematic would if these algorithms would be used for exclusion of certain things. So a wild example would be that if you listen to certain music you would be excluded from certain websites. Or because you watched this movie you cannot enter this country any more.
The only one that could potentially form an ethical issue is the personalized advertisement algorithms, because these kinds of algorithms tend to infringe on the right to privacy. For example by agreeing to use facebook, facebook then sells the user data to advertisement firms.
https://link.springer.com/article/10.1007/s00146-021-01154-8
Getting caught in bubbles of only like-minded thinkers and, and as worst case scenario, fake news spreaders. This can occur if the user does not initiate efforts to also search other sources and explore different viewpoints.
Yes, privacy issues, it can causse conflicts between which personel information is accesible and which isn't.
Yes

Figure C.8: Coded table Question 7 regarding encountering HMAs bottom part of the table

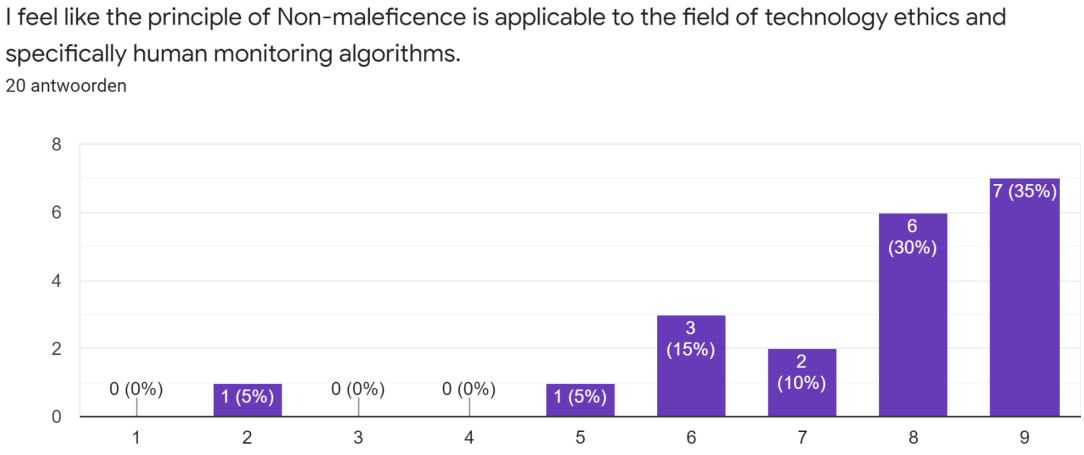

Figure C.9: Bar chart Question 8 regarding the principle of Non-maleficence

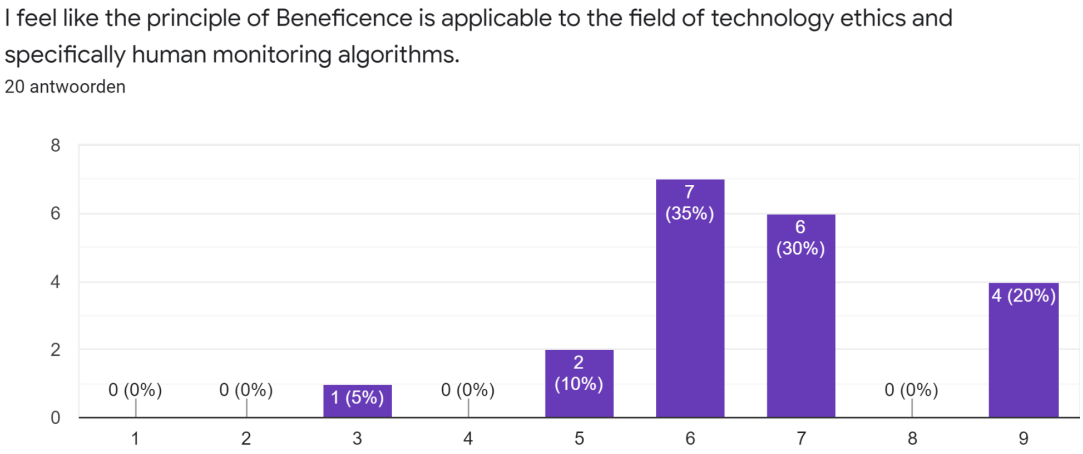

Figure C.10: Bar chart Question 9 regarding the principle of Beneficence

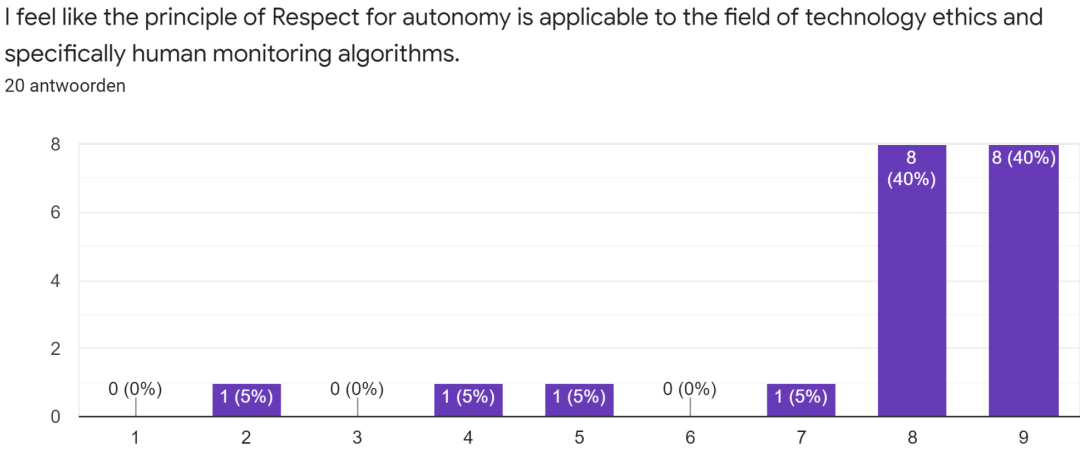

Figure C.11: Bar chart Question 10 regarding the principle of Respect for Autonomy

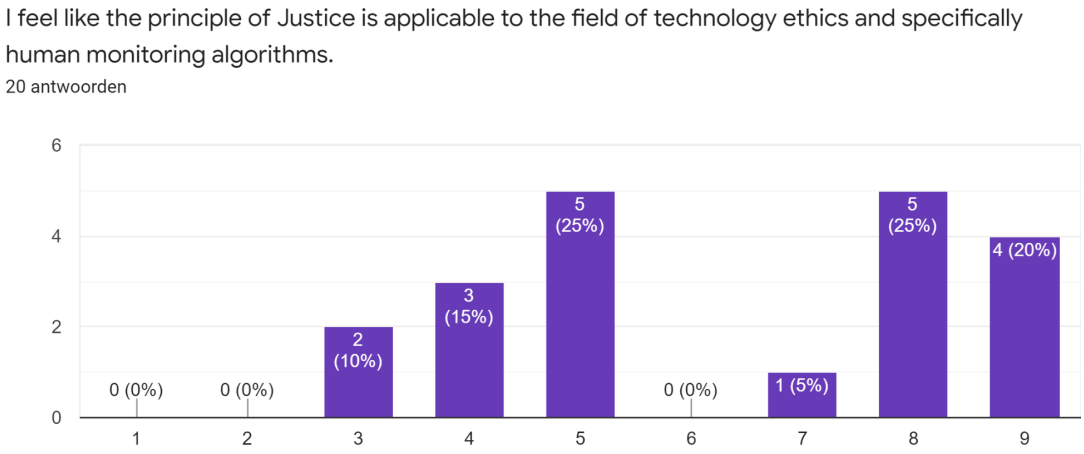

Figure C.12: Bar chart Question 11 regarding the principle of Justice

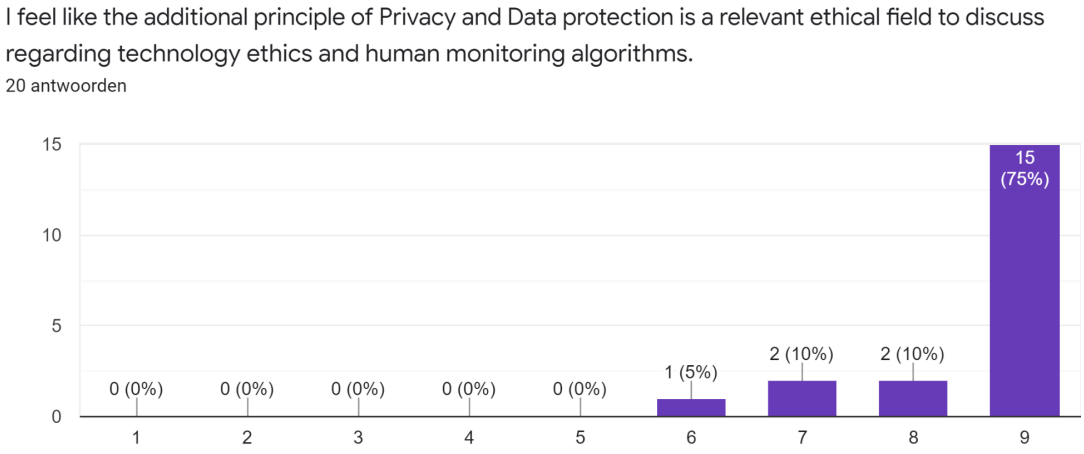

Figure C.13: Bar chart Question 12 regarding the principle of Privacy and Data protection

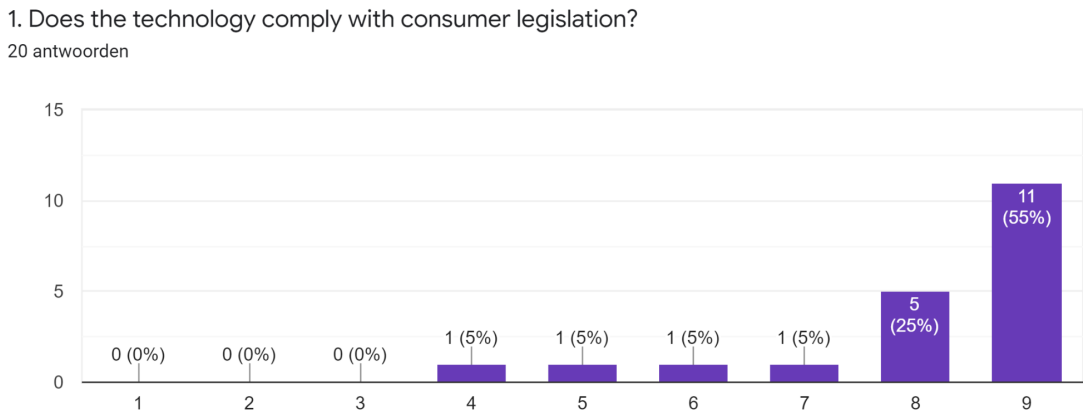

Figure C.14: Bar chart Question 13 regarding consumer legislation

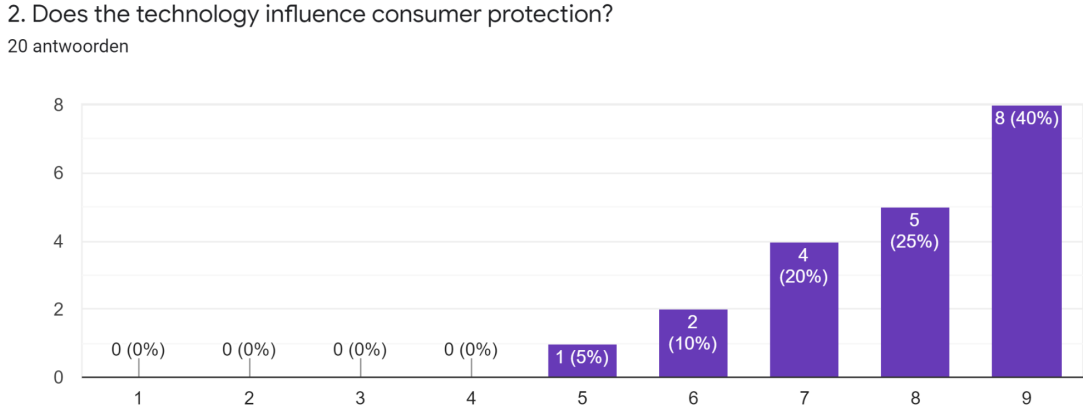

Figure C.15: Bar chart Question 14 regarding consumer protection

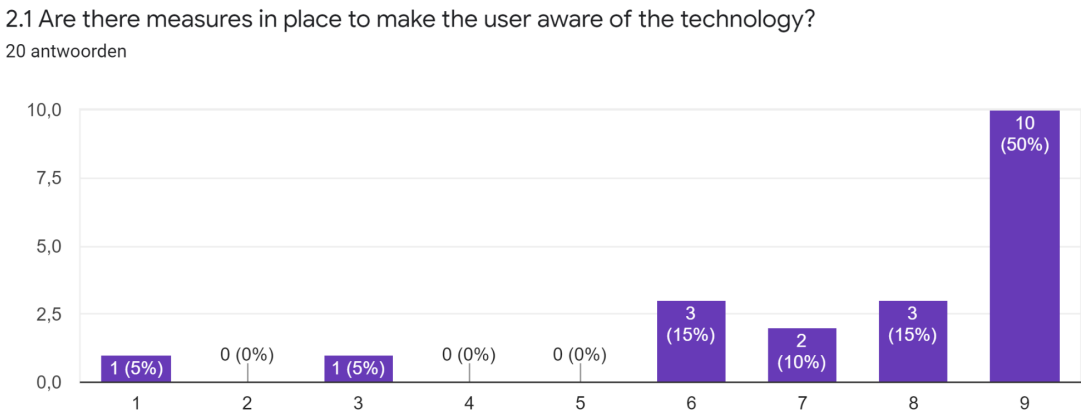

Figure C.16: Bar chart Question 15 regarding user awareness

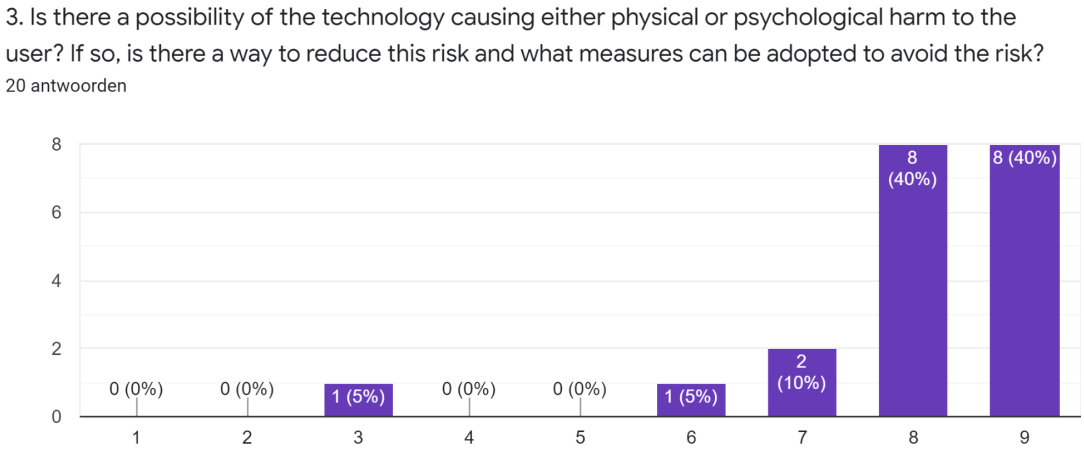

Figure C.17: Bar chart Question 16 regarding possible harm to the user

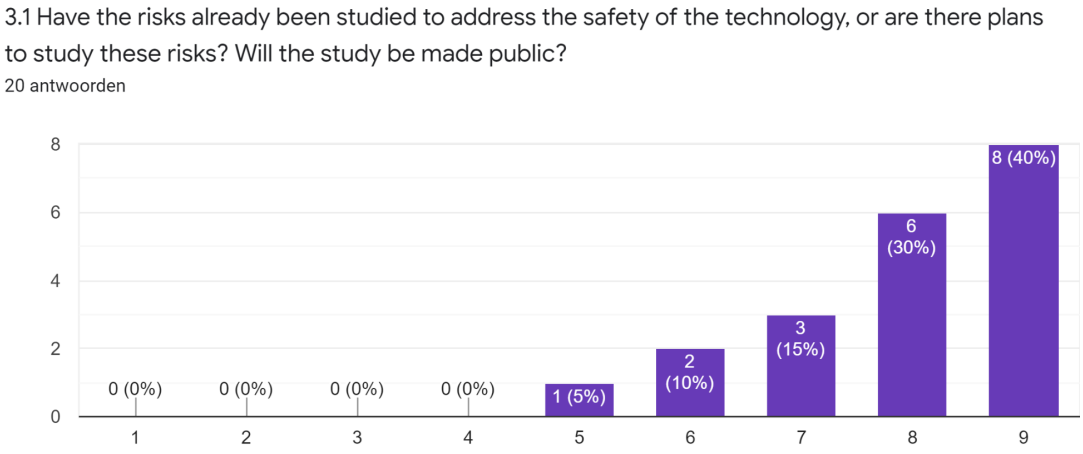

Figure C.18: Bar chart Question 17 regarding studying risks

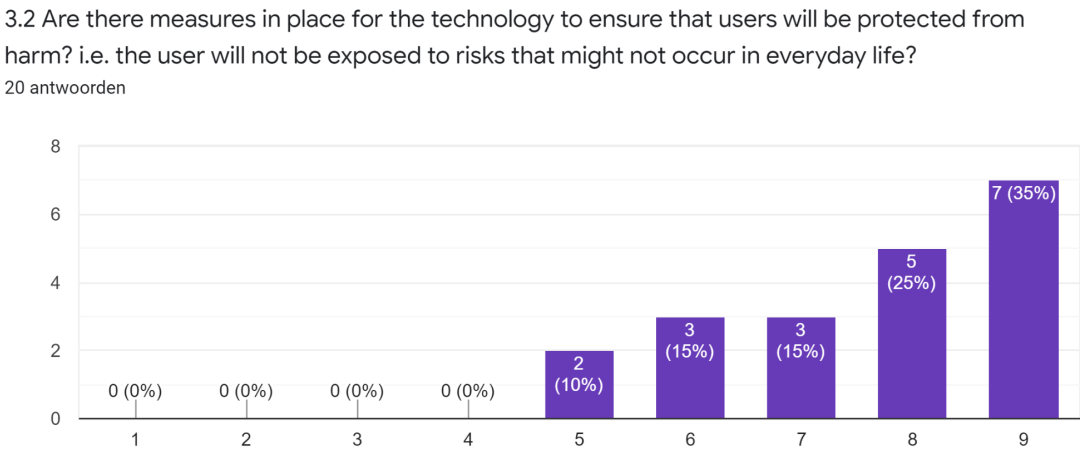

Figure C.19: Bar chart Question 18 regarding measures for user protection

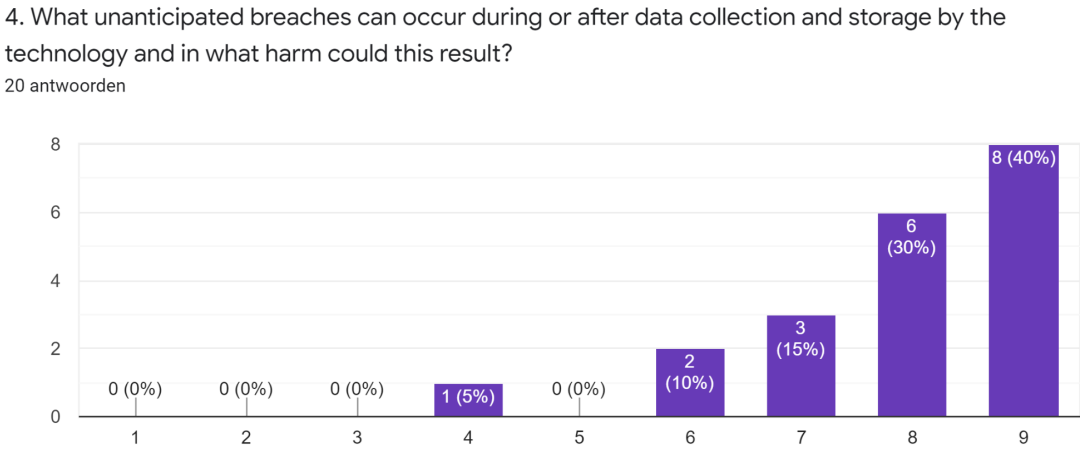

Figure C.20: Bar chart Question 19 regarding unanticipated breaches

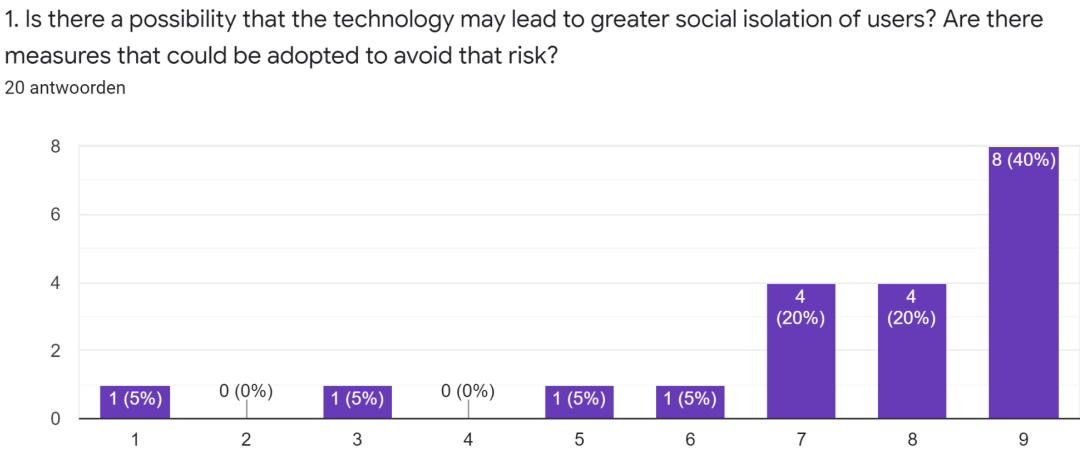

Figure C.21: Bar chart Question 20 regarding possible social isolation

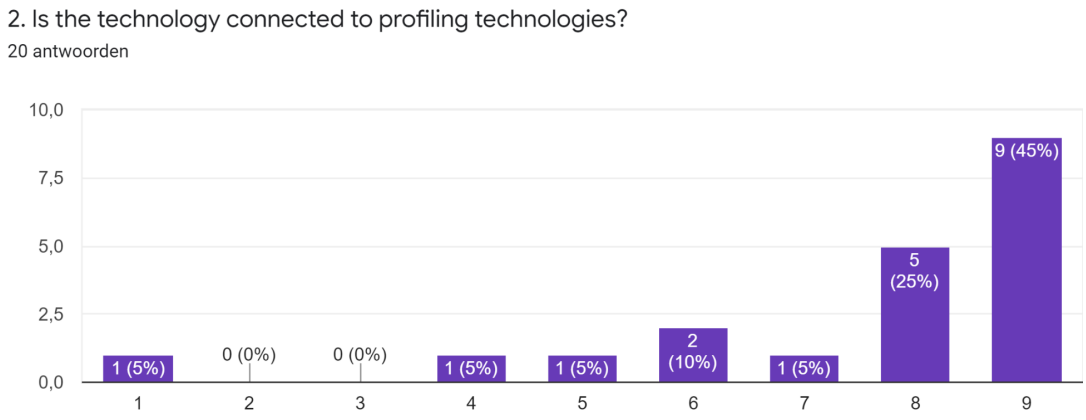

Figure C.22: Bar chart Question 21 regarding the use of profiling technologies

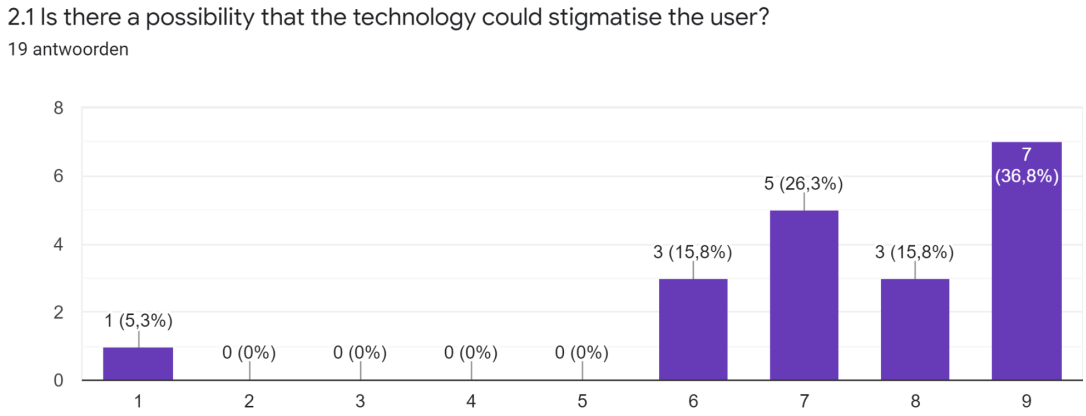

Figure C.23: Bar chart Question 21 regarding stigmatising the user

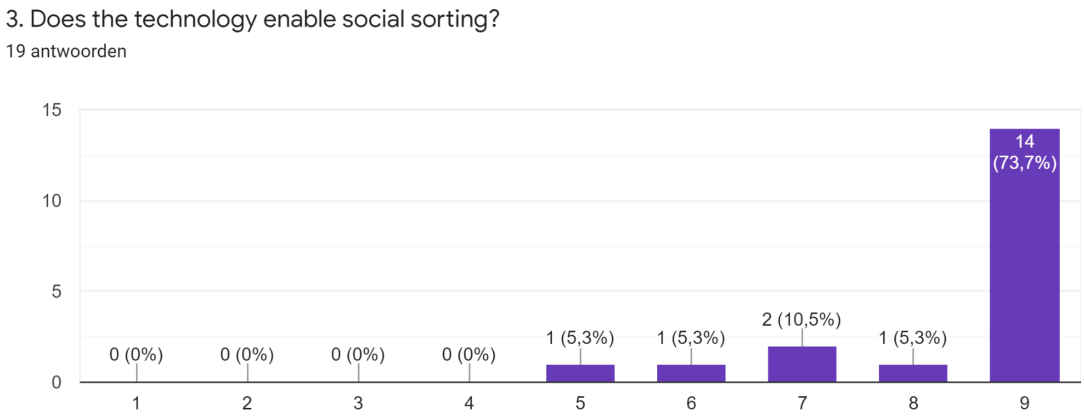

Figure C.24: Bar chart Question 23 regarding social sorting

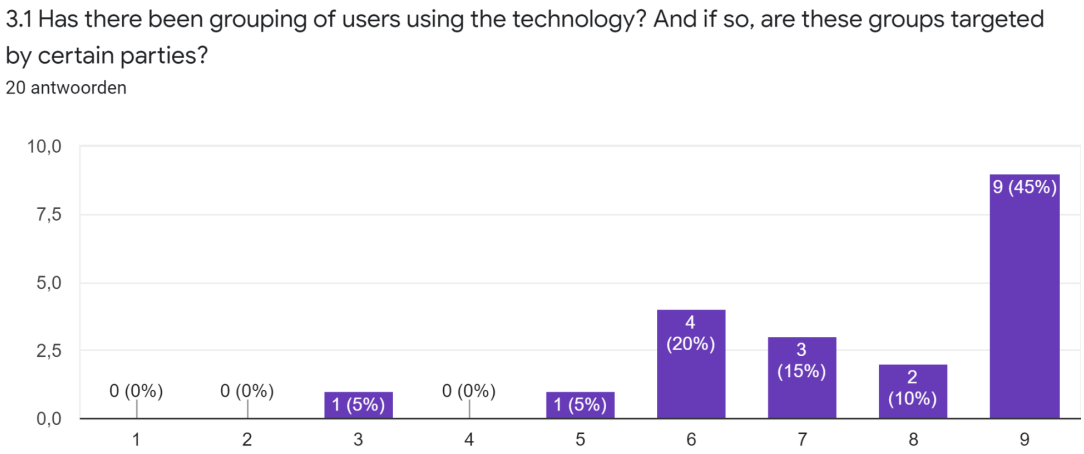

Figure C.25: Bar chart Question 24 regarding user grouping

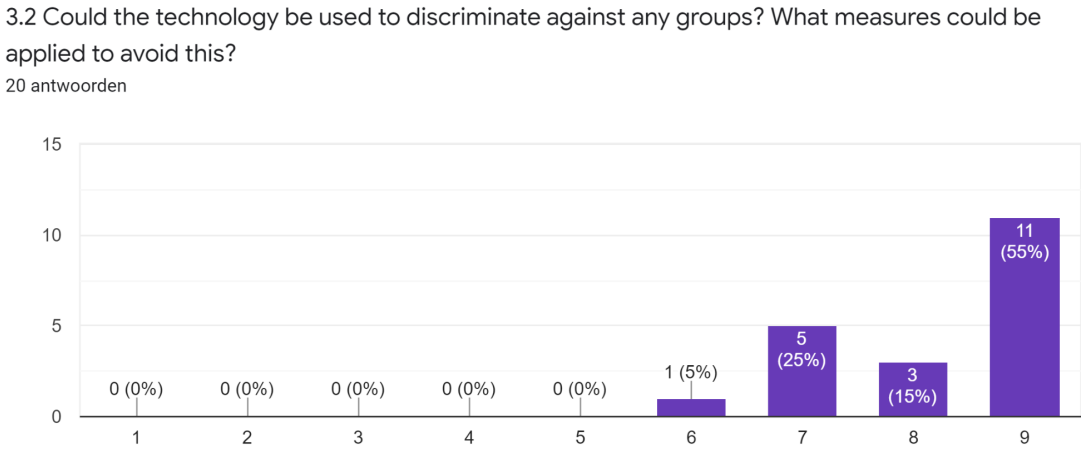

Figure C.26: Bar chart Question 25 regarding discrimination against groups

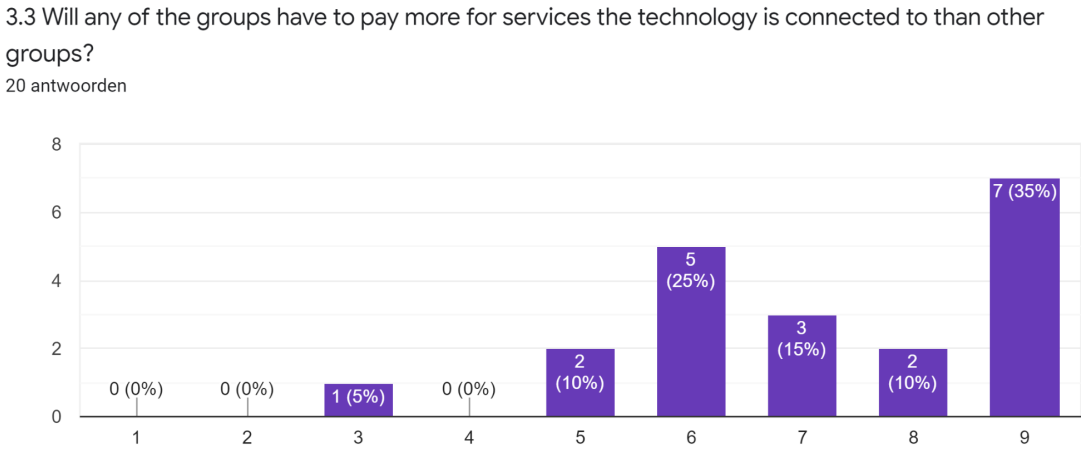

Figure C.27: Bar chart Question 26 regarding inequality of payment

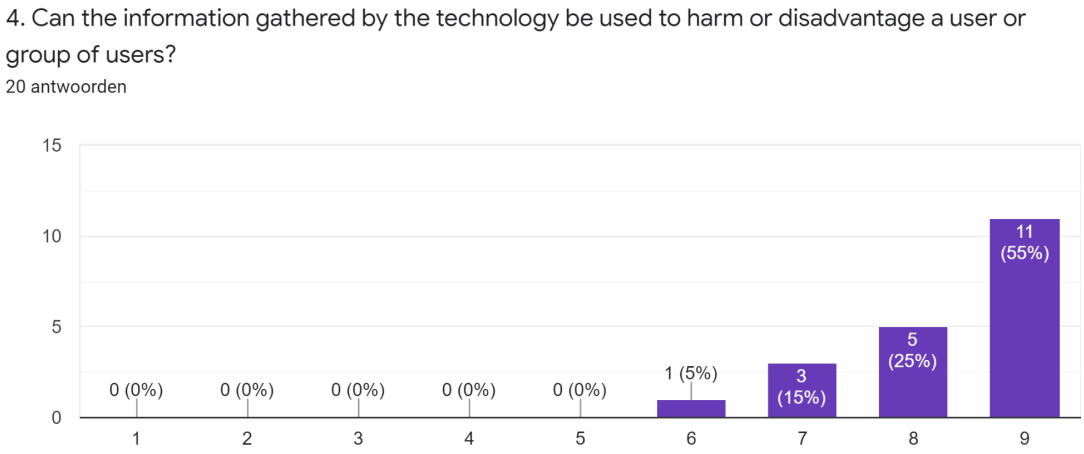

Figure C.28: Bar chart Question 27 regarding disadvantage occurring from gained information

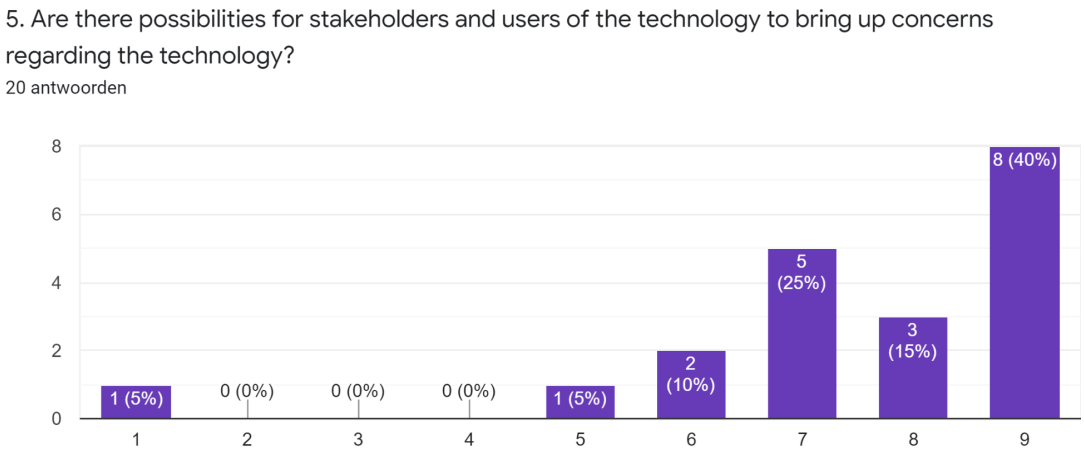

Figure C.29: Bar chart Question 28 regarding communicating concerns

If you answered "disagree" in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.
3.3 I don't think paying less is unethical (for example, student discounts).
For the neither agree or disagree, I felt like they did not answer new things as they were kind of covered or would maybe make a potential framework too long
1. do not feel that is the job of any ethical framework probably enforced by the government, to deal with. 2. do not feel that profiling is an issue full stop, it is basic human behaviour and often makes sense. 3.1 same as the above, however, obviously need to bear in mind that indeed this can we used by bad actors so would be good to think about data protection. 5. that should be between the user and the technology company, do not see a role for the government there to enforce anything.
Social safety 1: I do not think it is the role (as big as the other topics) of technology to have influence on social isolation (in terms of an individual, if talking about groups it is a different story).
Safety 2. Some technologies rely on the user not knowing they are being monitored to exclude the chance the data might not be authentic.

Figure C.30: Table Question 29 regarding disagreements on questions from the section Non-maleficence

Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.
I didn't understand the profiling technologies connection question.
3
2.1
Under safety, question 2. The term consumer protection is new to me
I am not quite sure what is the desired answer these are all questions and the scaling tries to sort out with subject is more important?

Figure C.31: Table Question 30 regarding misunderstandings on questions from the section Non-maleficence

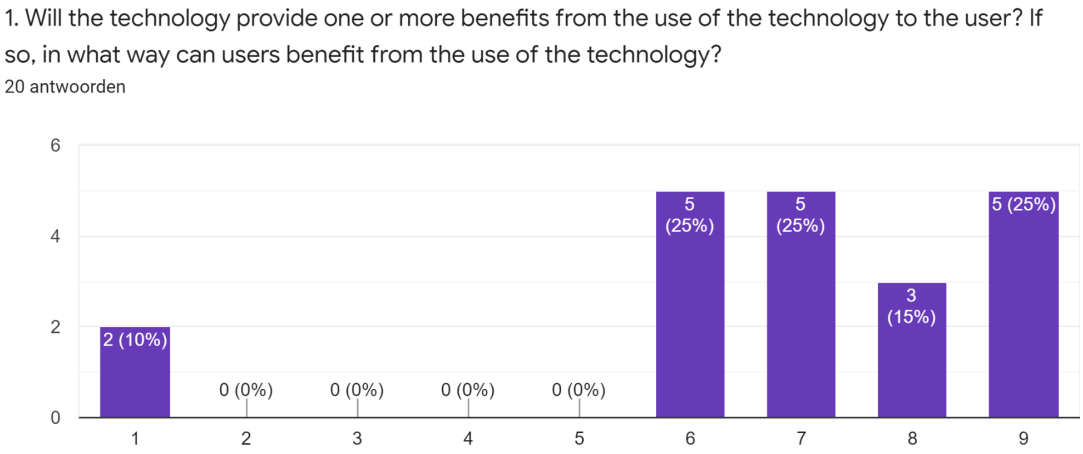

Figure C.32: Bar chart Question 31 regarding benefits for the user

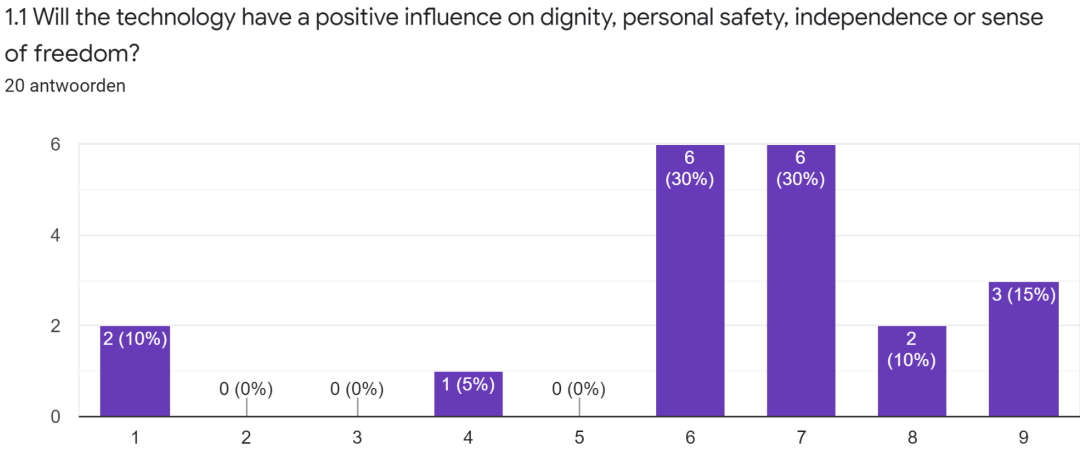

Figure C.33: Bar chart Question 32 regarding positive influence of the technology for the user

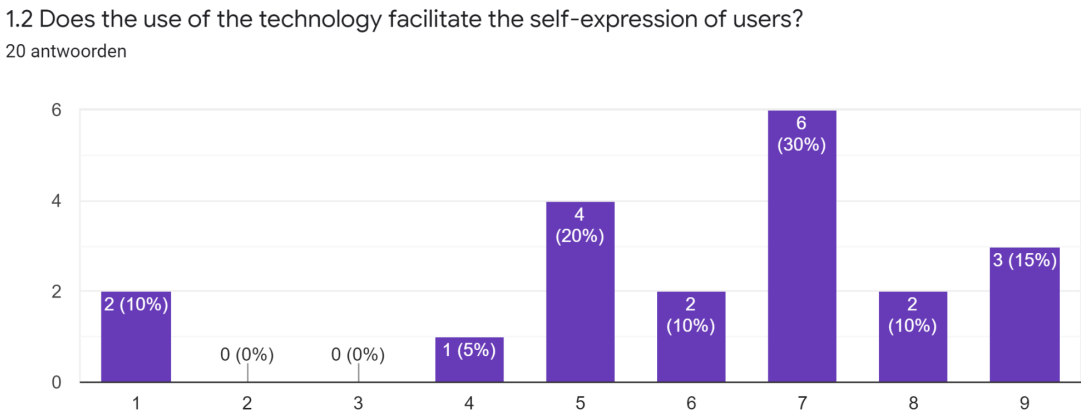

Figure C.34: Bar chart Question 31 regarding self-expression of the user

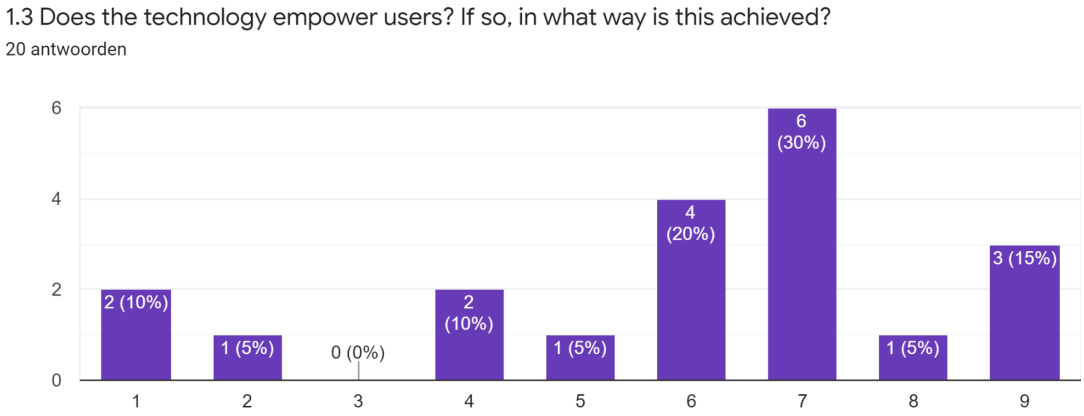

Figure C.35: Bar chart Question 34 regarding empowerment of the user

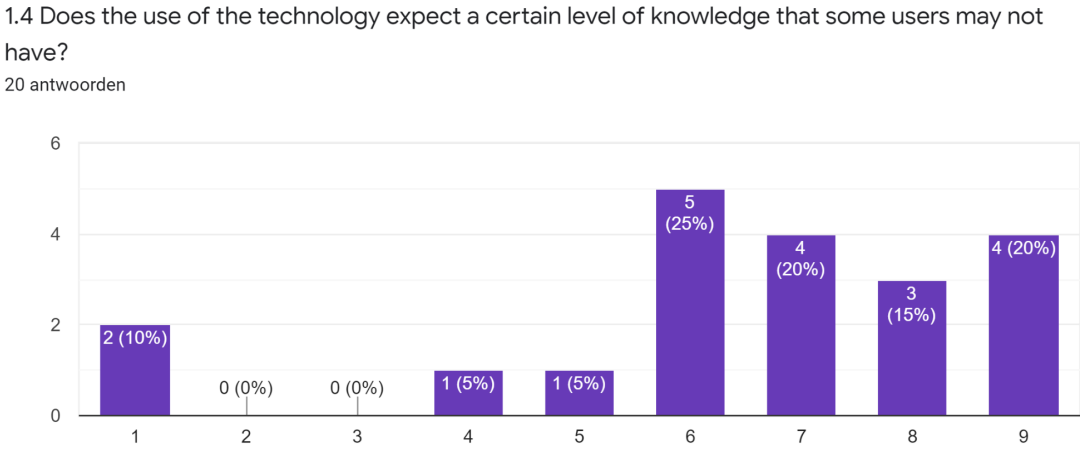

Figure C.36: Bar chart Question 31 regarding the needed knowledge level of the user

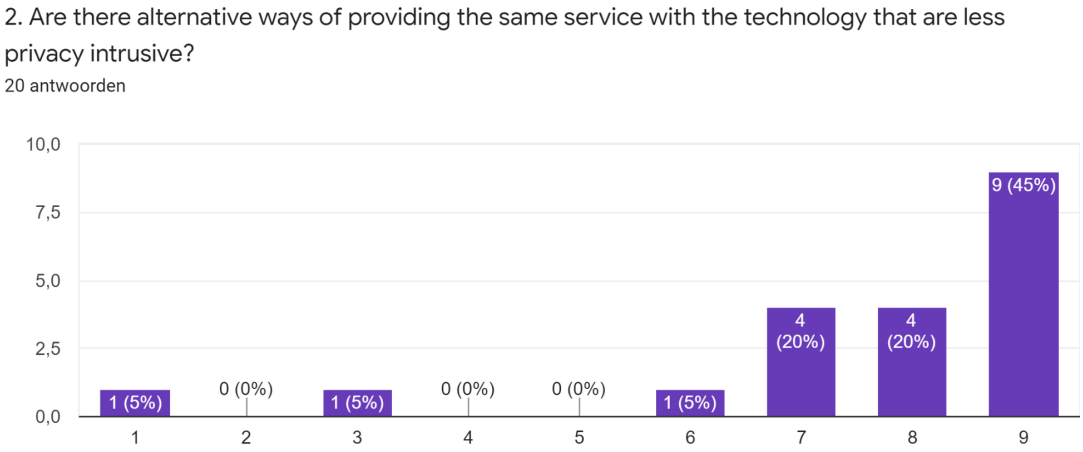

Figure C.37: Bar chart Question 36 regarding less privacy intrusive alternatives

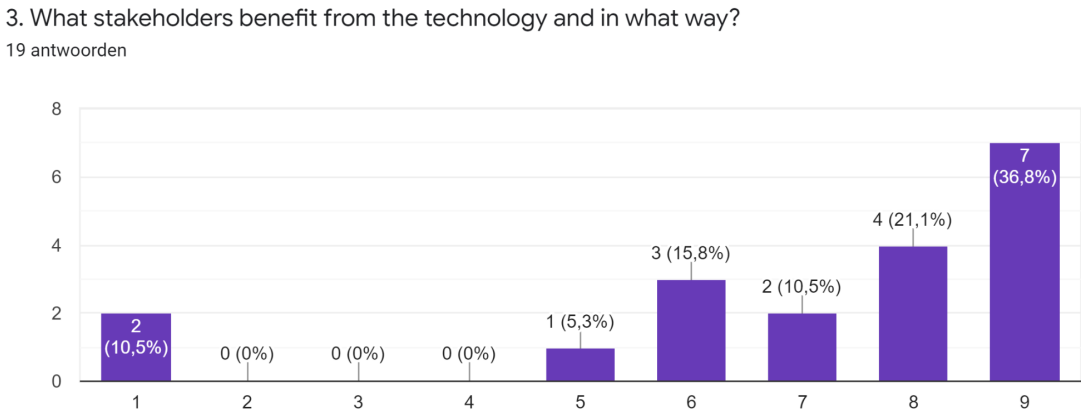

Figure C.38: Bar chart Question 37 regarding benefits stakeholders receive

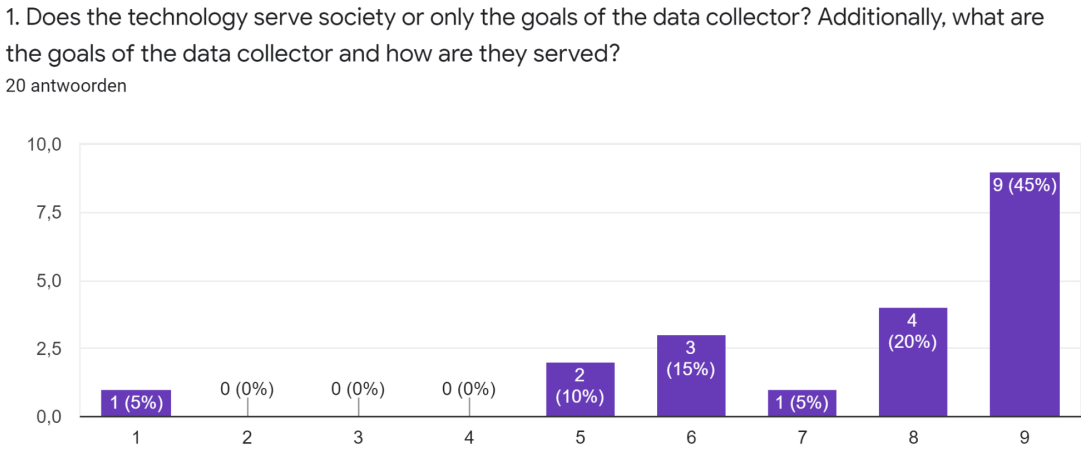

Figure C.39: Bar chart Question 38 regarding whether the technology serves society

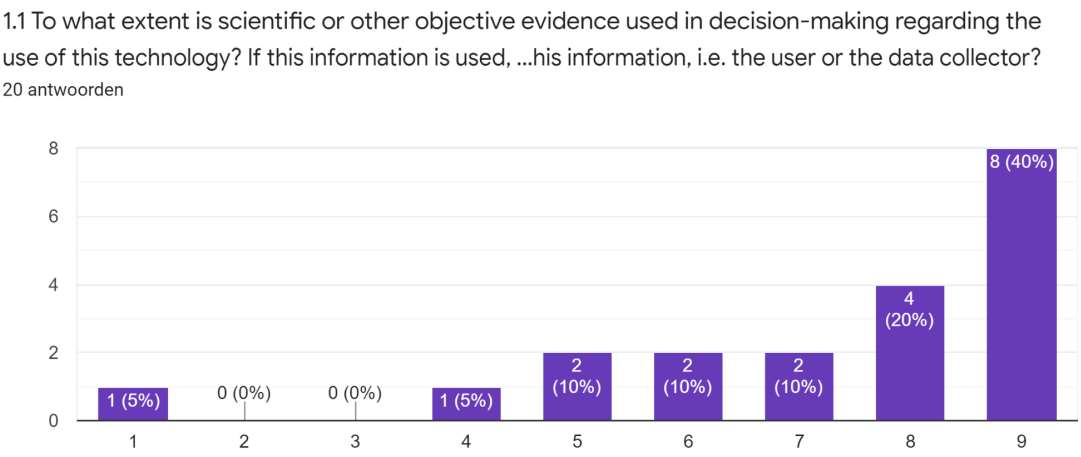

Figure C.40: Bar chart Question 39 regarding the use of scientific evidence

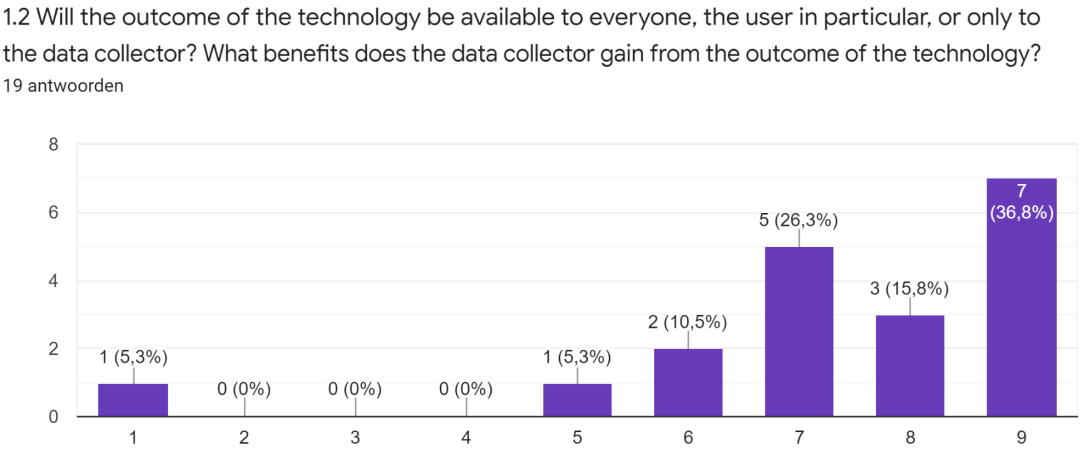

Figure C.41: Bar chart Question 40 regarding the availability of the outcome of the technology

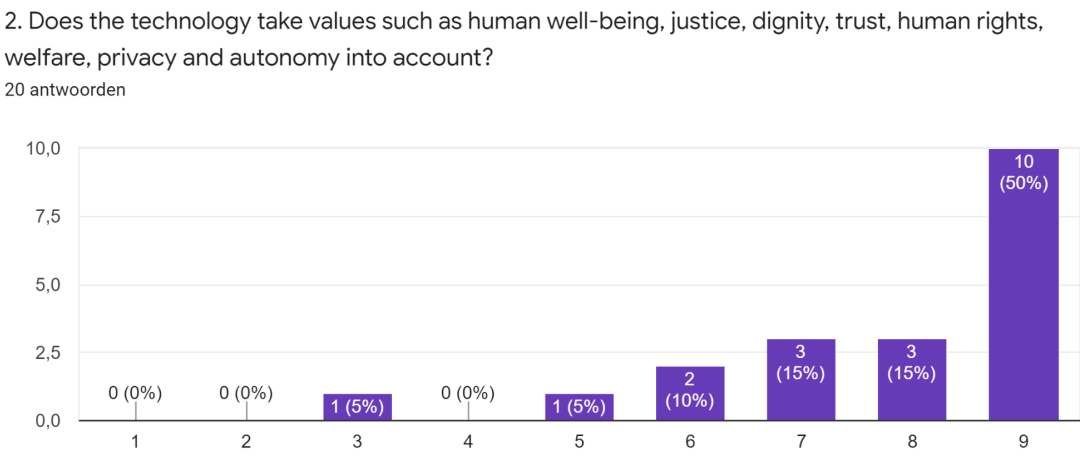

Figure C.42: Bar chart Question 41 regarding whether human values are taken into account

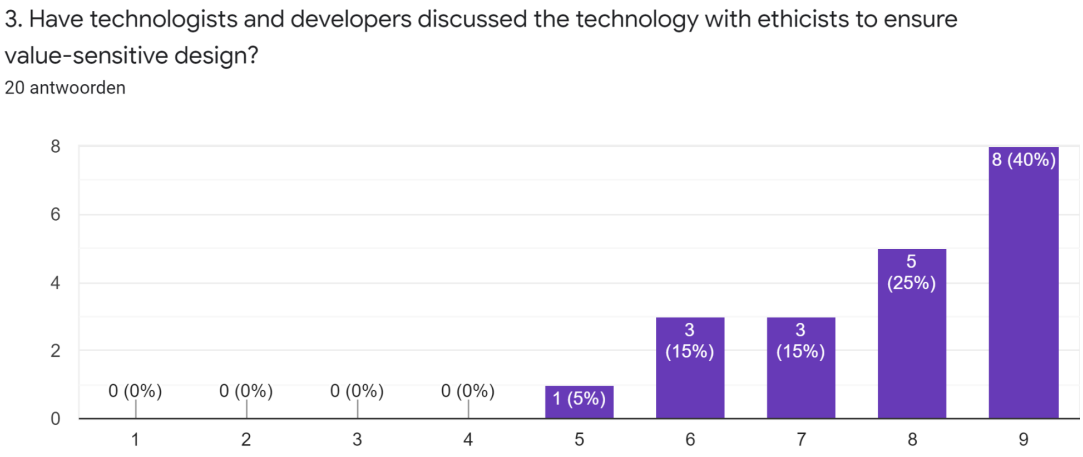

Figure C.43: Bar chart Question 42 regarding using value-sensitive design

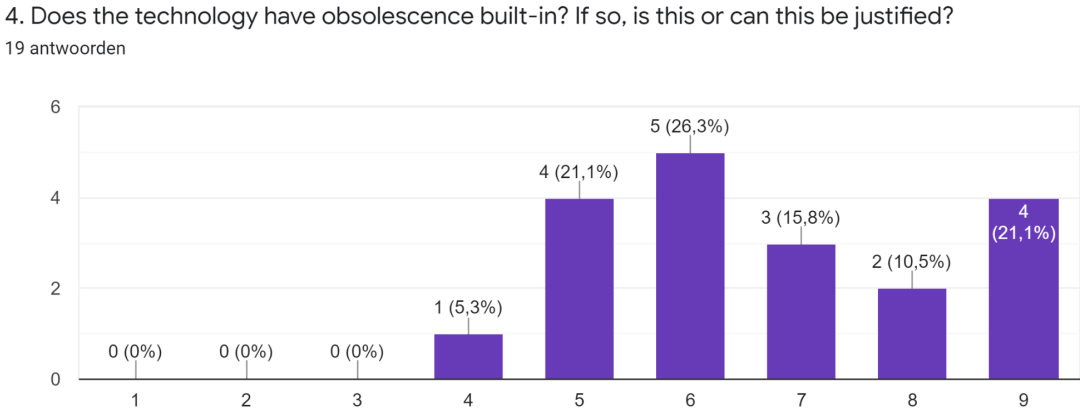

Figure C.44: Bar chart Question 43 regarding using built-in obsolescence

If you answered "disagree" in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.
I don't think a technology should necessarily be empowering
1.4 Does the use of the technology expect a certain level of knowledge that some users may not have? I don't fully understand the relevance of this question in relation to the principle of Beneficence, as I don't think I see how a lack of knowledge on the user's end could lead to risks or harm
Neither agree nor disagree answers: feel like it could be nice to know for some technologies but for most I think it is unnecessary to take that into account specifically
I do not think any of the technology 'should' benefit the user. So therefore, I have disagreed with the entire first section.
Personal 1 - 1.4: I don't think these are questions to be answered by an ethical framework, but rather by the company building the algorithms. Same goes for personal 3 and societal 1 -1.2.

Figure C.45: Table Question 44 regarding disagreements on questions from the section beneficence

Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.
I couldn't easily understand the obsolescence question.
4. Does the technology have obsolescence built-in? If so, is this or can this be justified?
4 (the last one of this section)
3 and 4

Figure C.46: Table Question 45 regarding misunderstandings on questions from the section beneficence

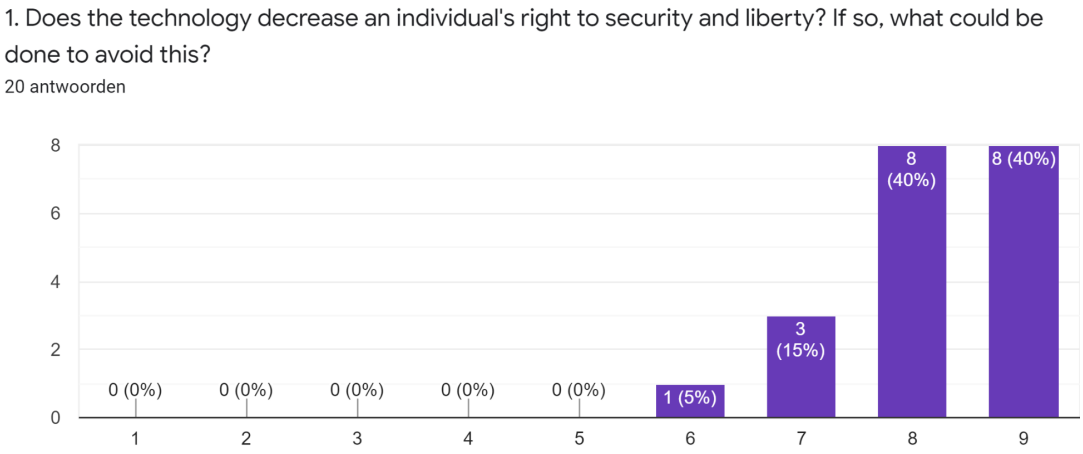

Figure C.47: Bar chart Question 46 regarding the technology decreasing security and liberty

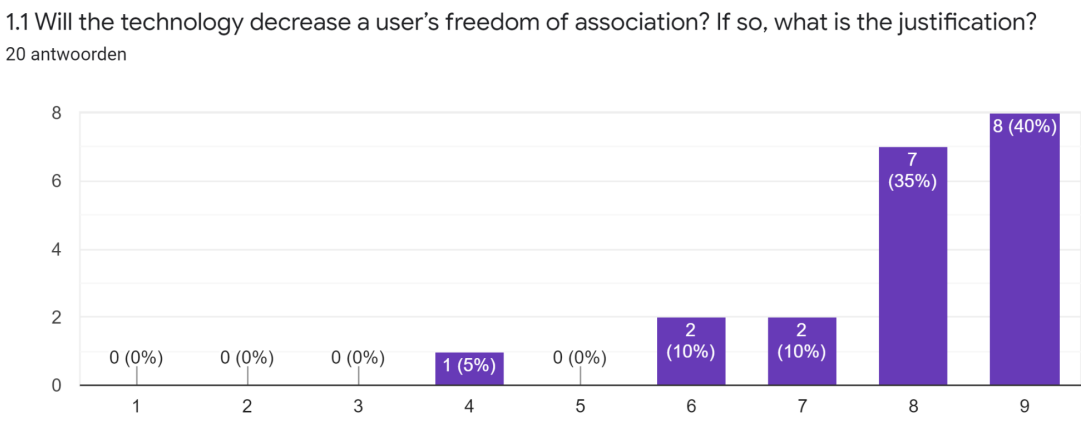

Figure C.48: Bar chart Question 47 regarding freedom of association

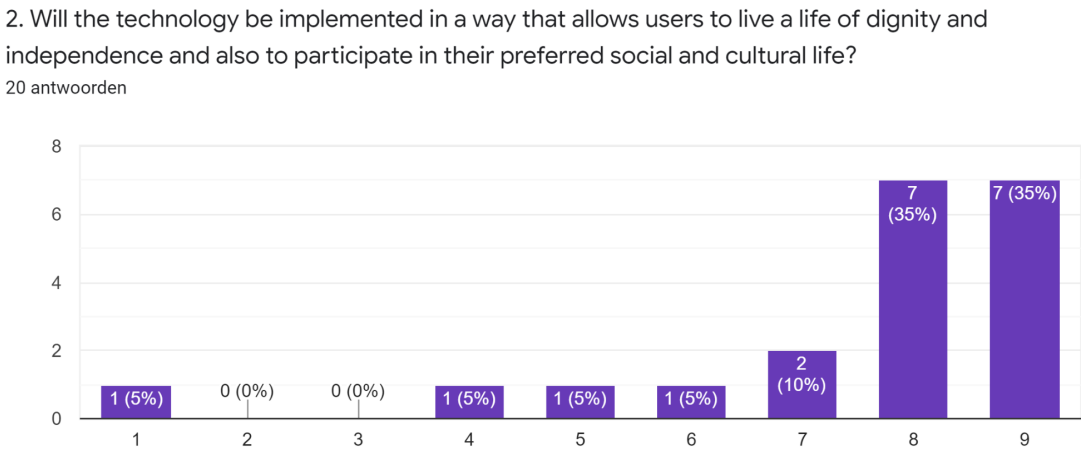

Figure C.49: Bar chart Question 48 regarding dignity and independence

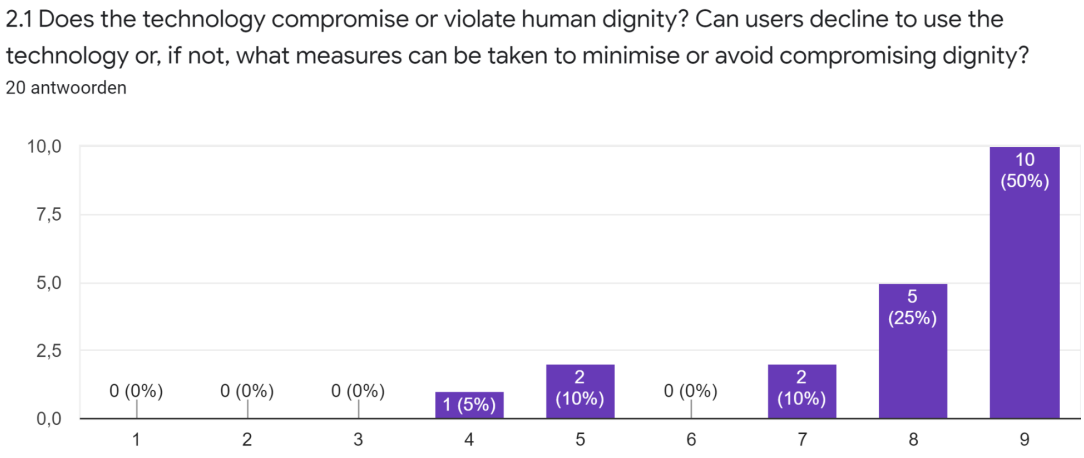

Figure C.50: Bar chart Question 49 regarding compromising human dignity

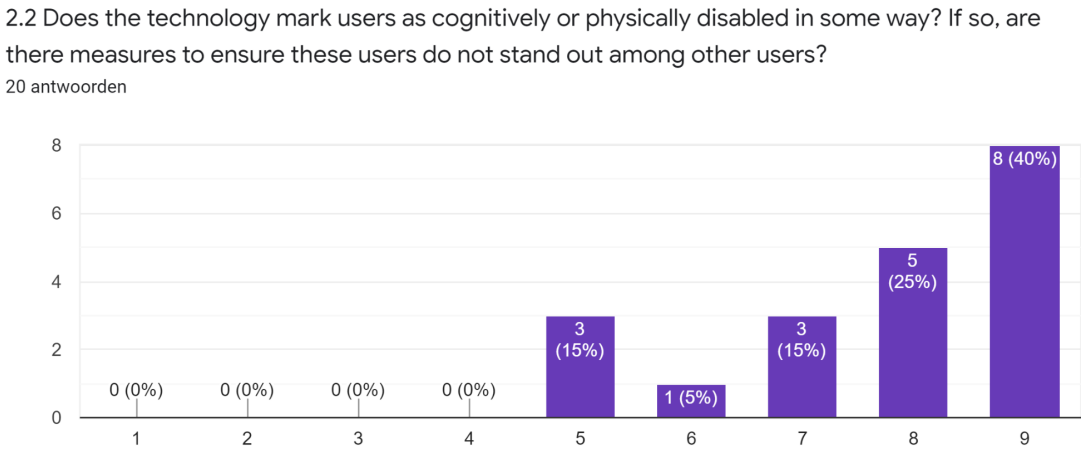

Figure C.51: Bar chart Question 50 regarding marking users physically or mentally disabled

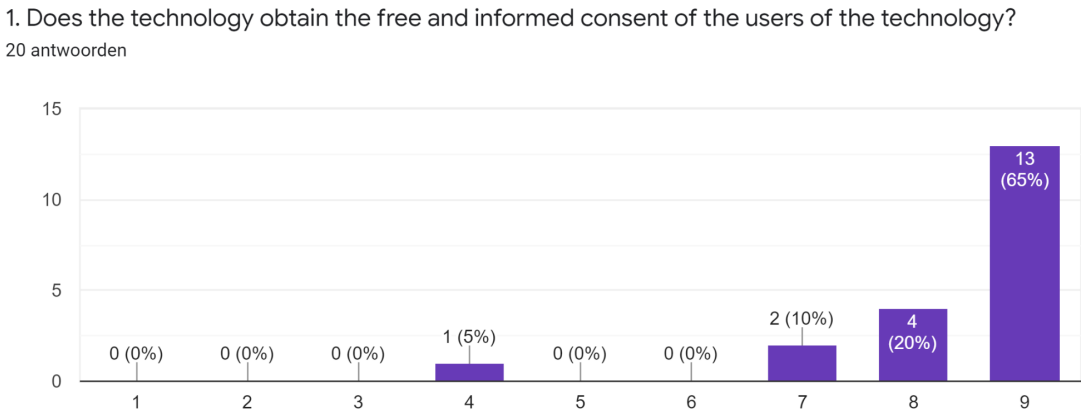

Figure C.52: Bar chart Question 51 regarding informed consent

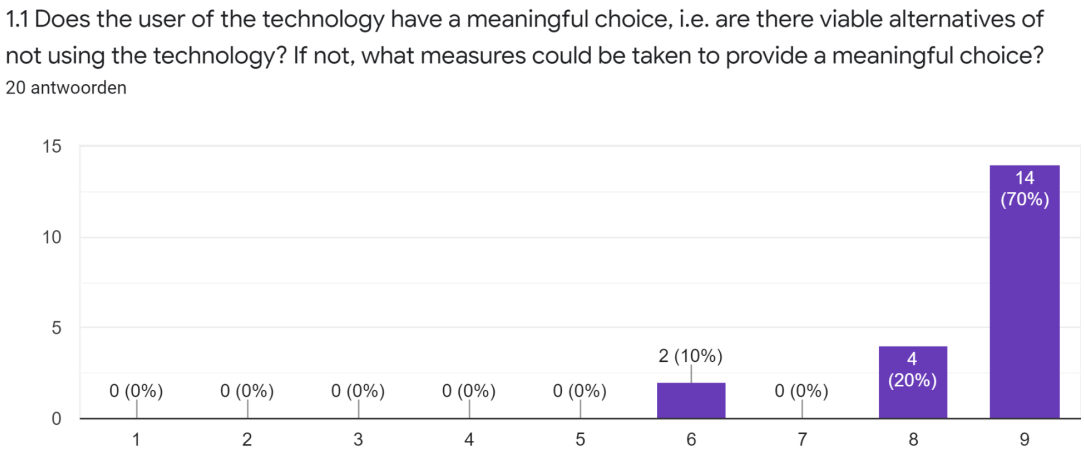

Figure C.53: Bar chart Question 52 regarding having a meaningful choice of giving informed consent

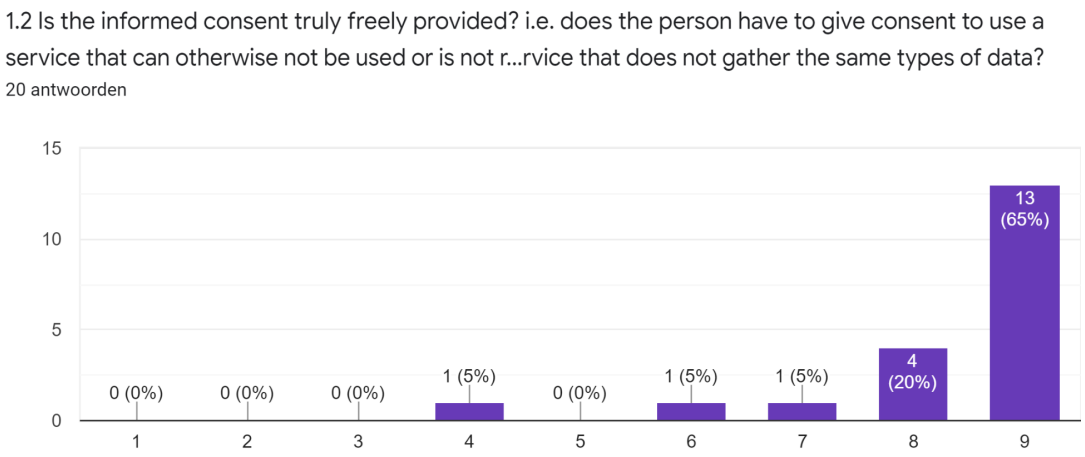

Figure C.54: Bar chart Question 53 regarding informed consent being truly freely given

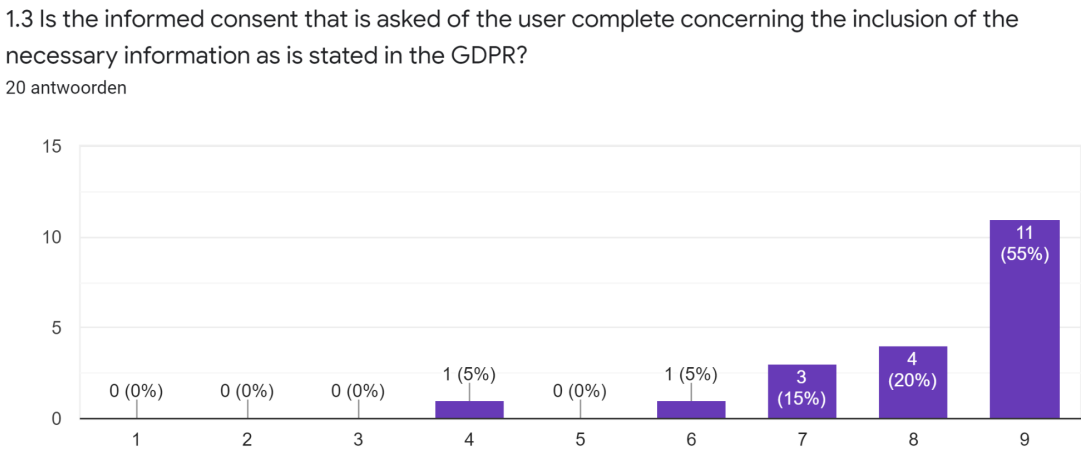

Figure C.55: Bar chart Question 54 regarding completeness of informed consent

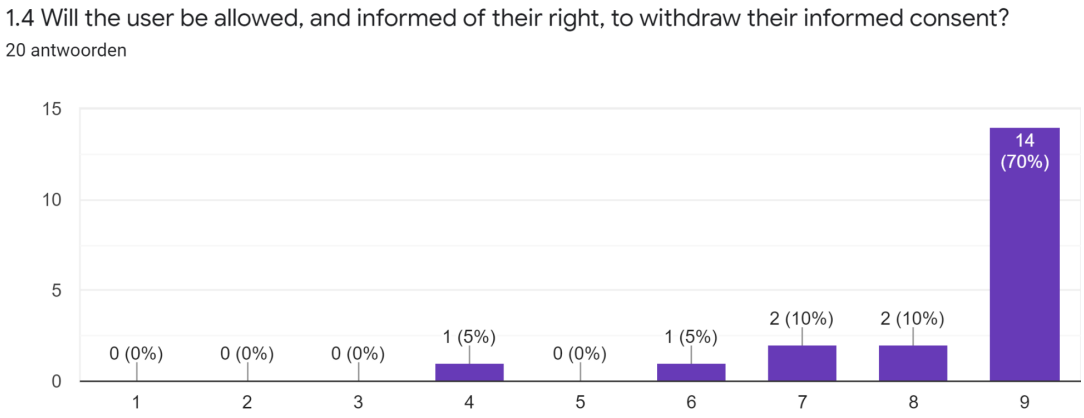

Figure C.56: Bar chart Question 55 regarding withdrawing informed consent

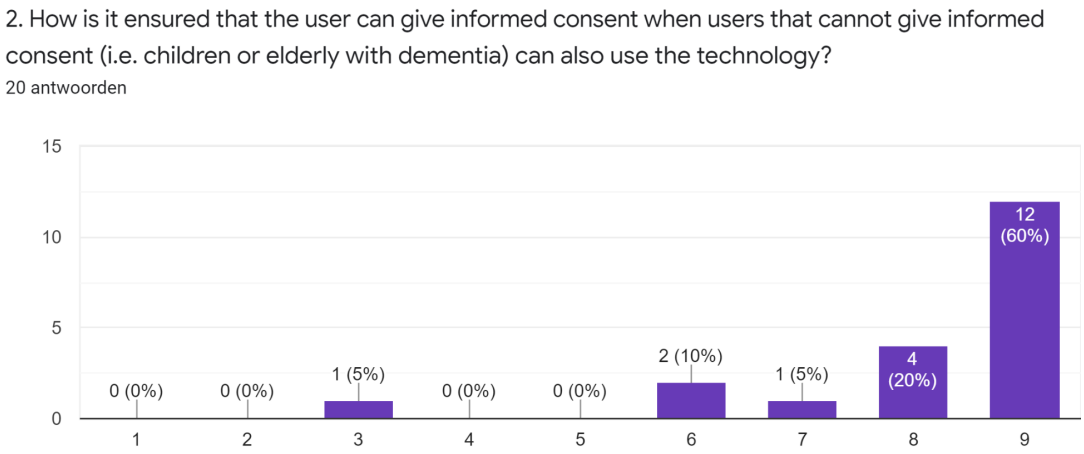

Figure C.57: Bar chart Question 56 regarding ensuring the ability to give informed consent

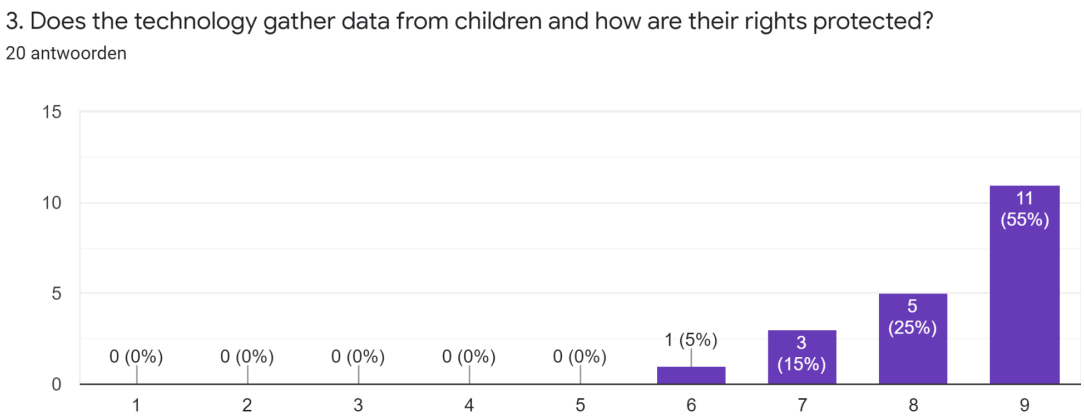

Figure C.58: Bar chart Question 57 regarding gathering data from children

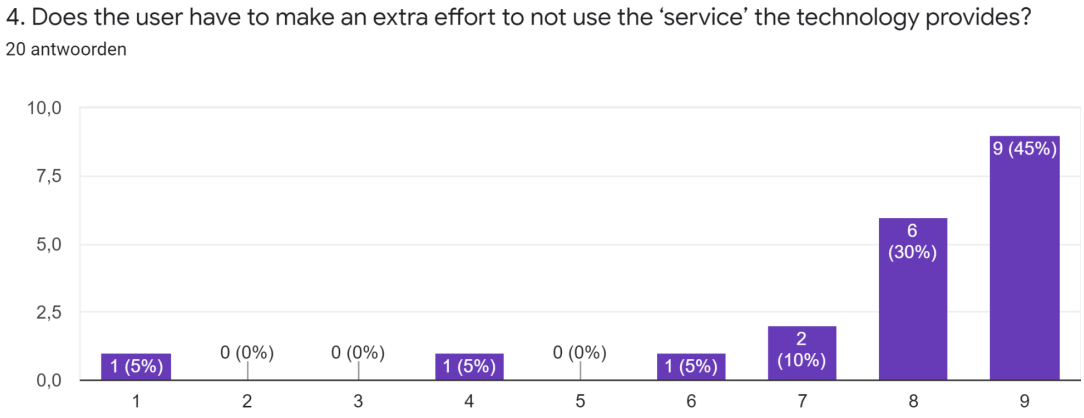

Figure C.59: Bar chart Question 58 regarding having to make an effort to not use the service

If you answered “disagree” in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.
Questions under right of autonomy seem hard to check
4. If a provider wants to use the technology, that is up to them. If you in turn do not, it should be up to you to disable it.

Figure C.60: Table Question 59 regarding disagreements on questions from the section Respect for autonomy

Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.
1.1 freedom of association
first 1.1 of this section
Question 1.3: Abbreviation GDPR (had to look of up)

Figure C.61: Table Question 60 regarding misunderstandings on questions from the section Respect for autonomy

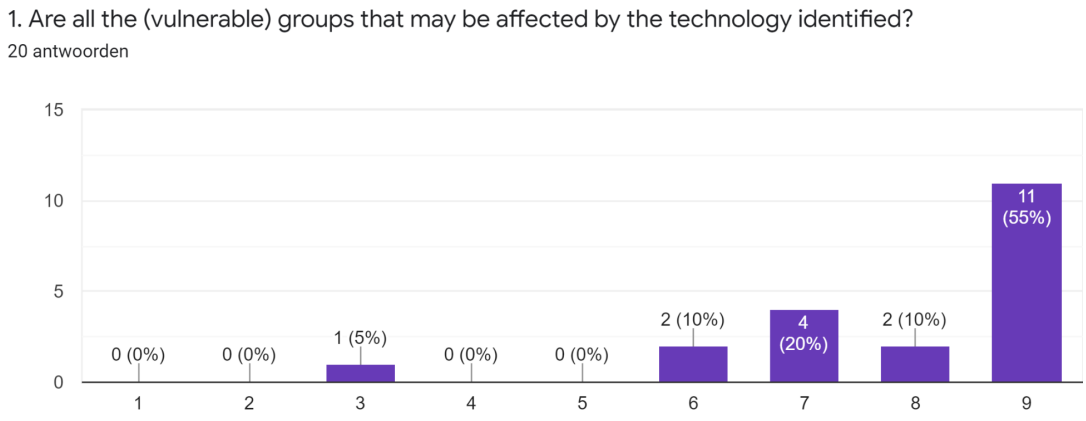

Figure C.62: Bar chart Question 61 regarding identifying all vulnerable groups

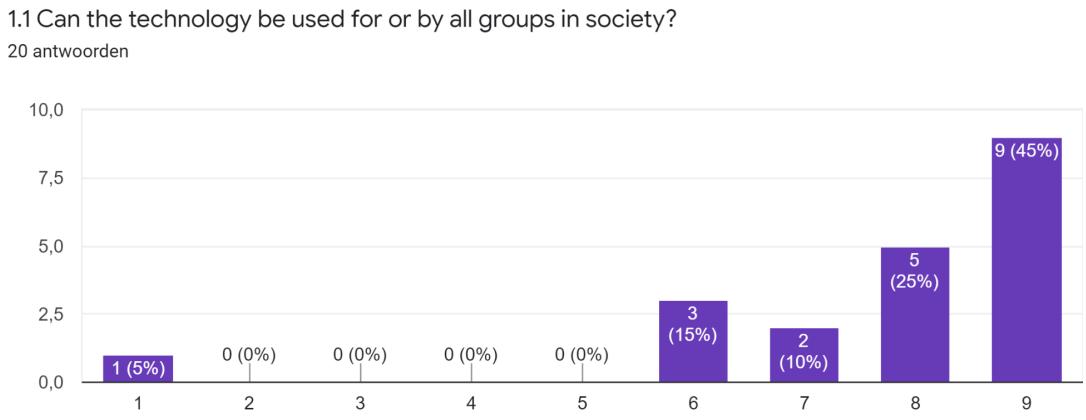

Figure C.63: Bar chart Question 62 regarding inclusion of all groups

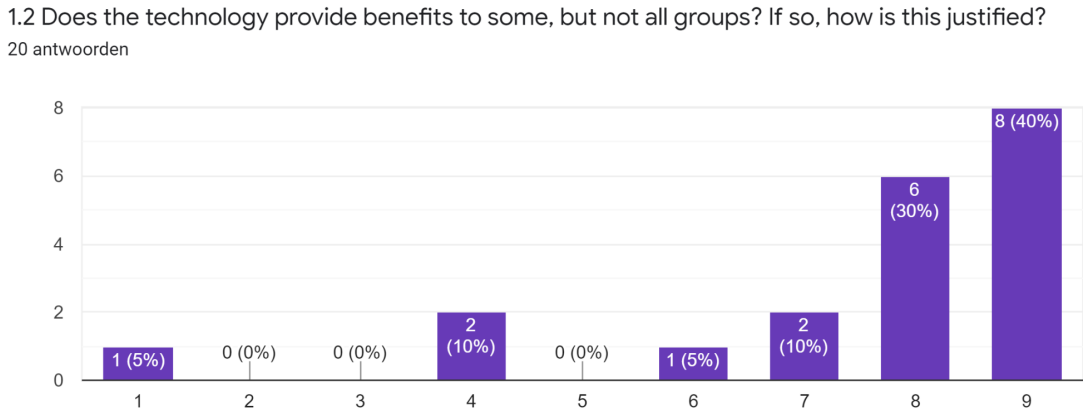

Figure C.64: Bar chart Question 63 regarding benefits of some but not all groups

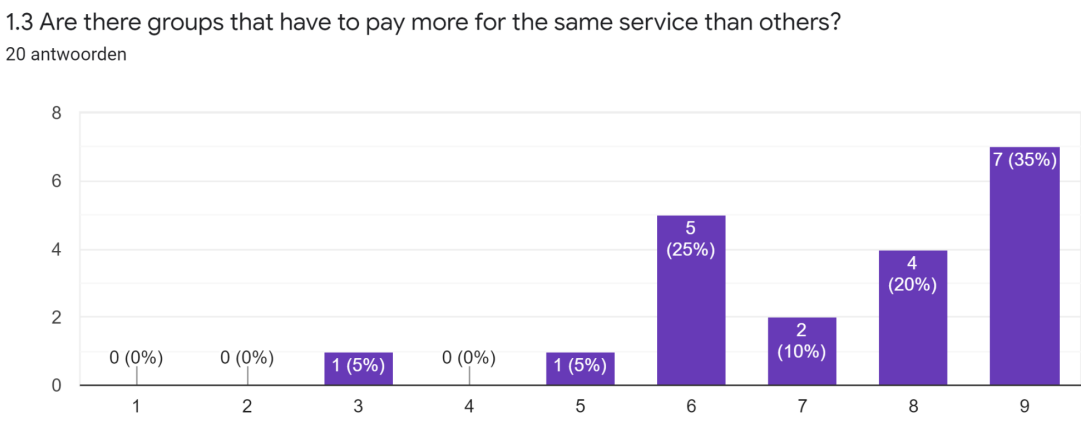

Figure C.65: Bar chart Question 64 regarding payment inequality between groups

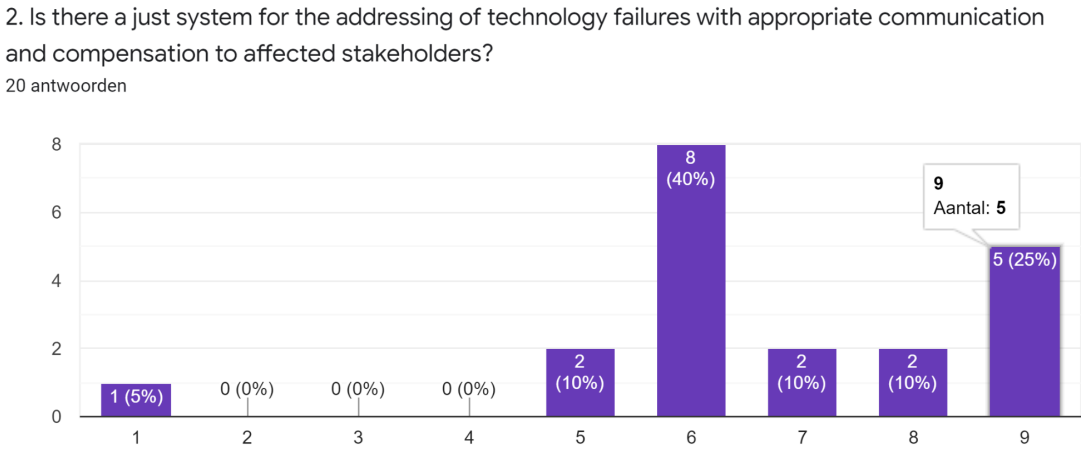

Figure C.66: Bar chart Question 65 regarding just procedures for system failures

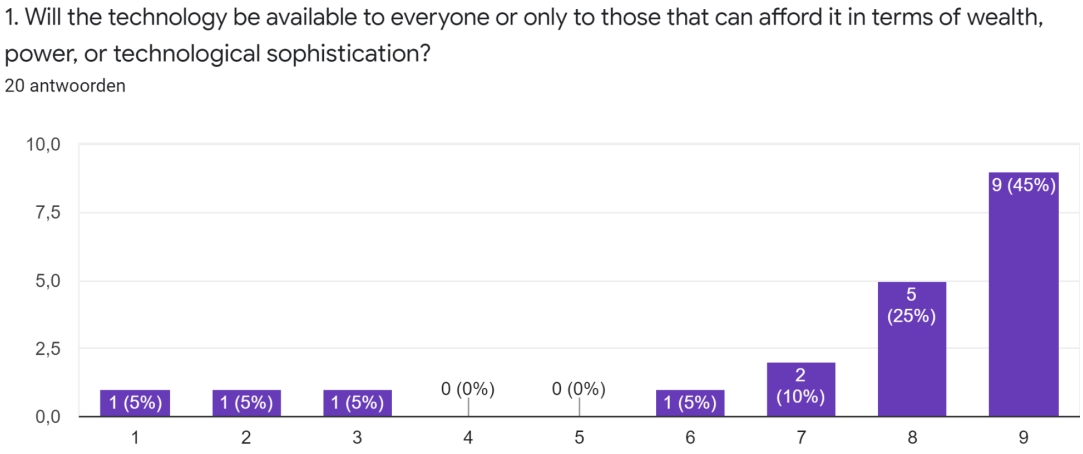

Figure C.67: Bar chart Question 66 regarding availability to everyone

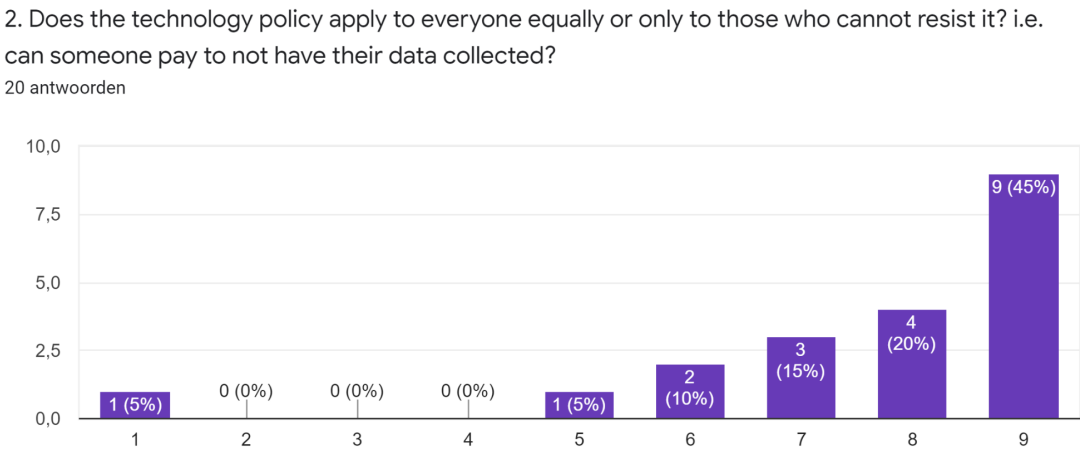

Figure C.68: Bar chart Question 67 regarding application of the policy to everyone

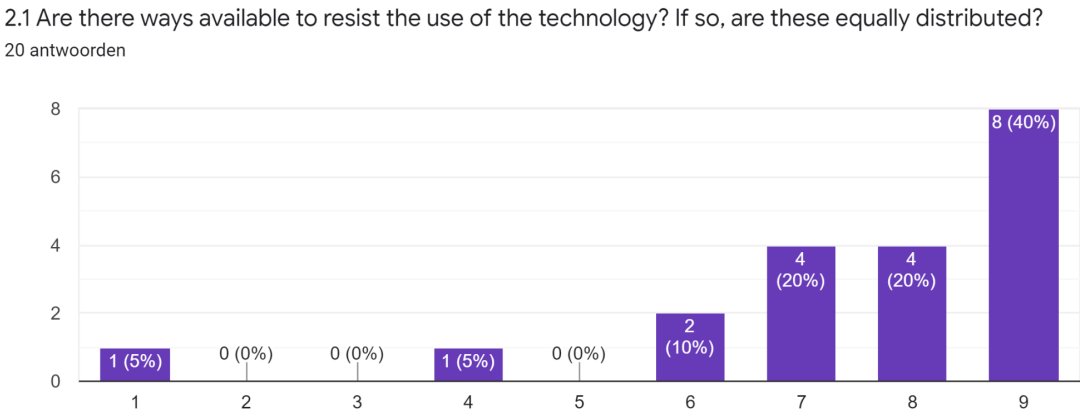

Figure C.69: Bar chart Question 68 regarding resisting the use of the technology

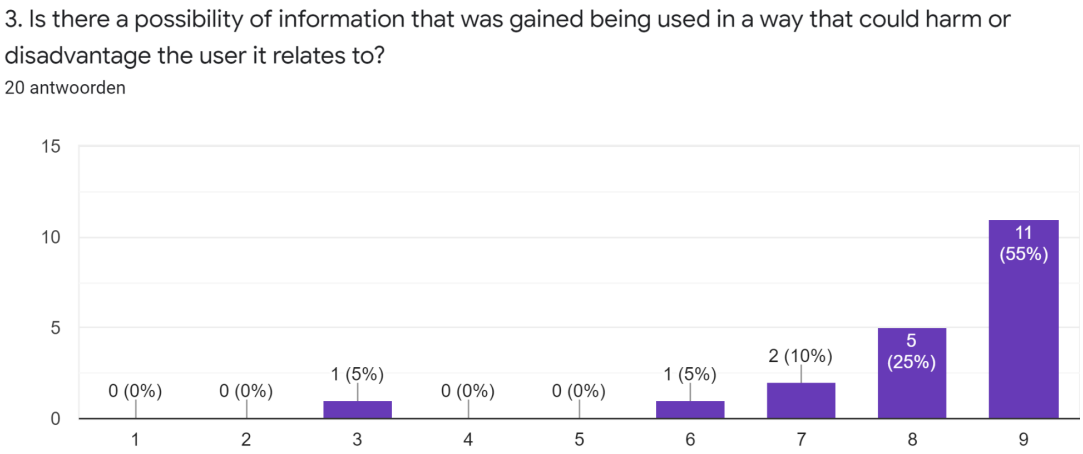

Figure C.70: Bar chart Question 69 regarding gained information that can cause a disadvantage to the user

If you answered "disagree" in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.
Do not disagree, some of the questions that were shown before fit better here I think
1.1 1.2 1.3 2 All of the above: not the governments job, up to the market. 1 2 2.1 All of the above: not the governments job, up to the market.

Figure C.71: Table Question 70 regarding disagreements on questions from the section Justice

Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.
1. Will the technology be available to everyone or only to those that can afford it in terms of wealth, power, or technological sophistication? I don't think this question is relevant nowadays when we can't even guarantee healthcare for everyone, let alone technologies.

Figure C.72: Table Question 70 regarding misunderstandings on questions from the section Justice

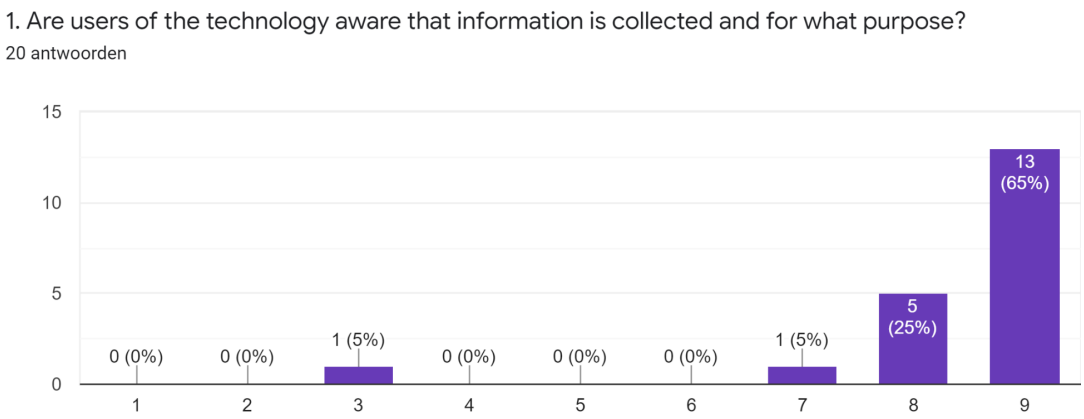

Figure C.73: Bar chart Question 72 regarding user awareness of the data collection

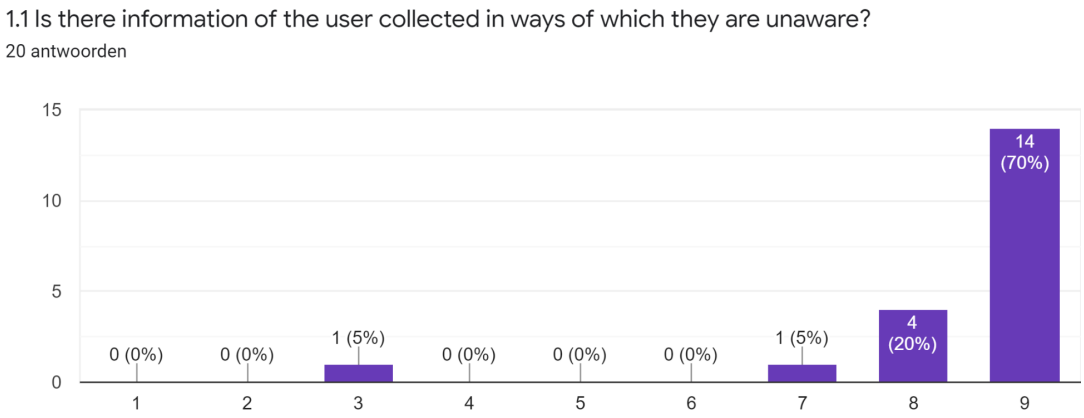

Figure C.74: Bar chart Question 73 regarding the user being unaware of any type of data being collected

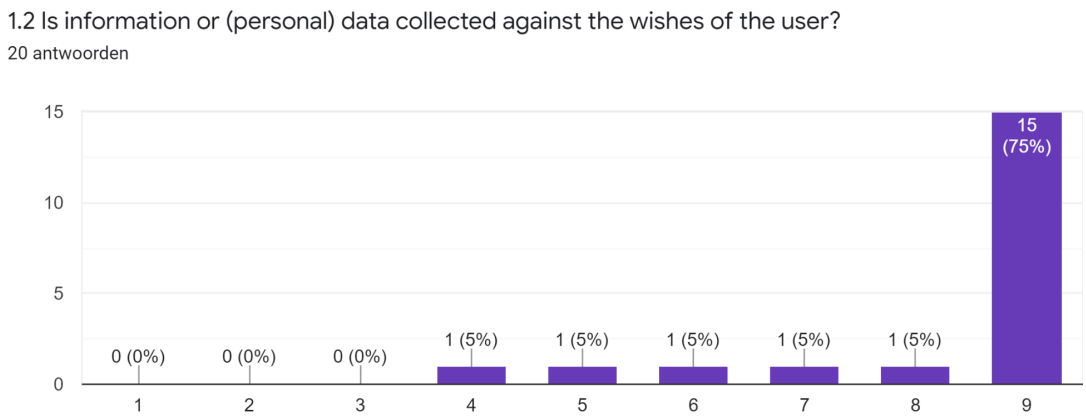

Figure C.75: Bar chart Question 74 regarding the collection of data against the wishes of the user

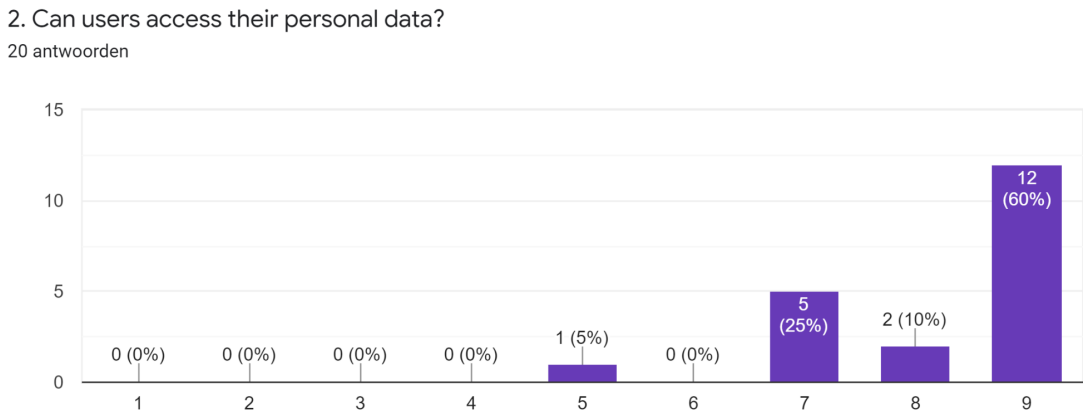

Figure C.76: Bar chart Question 72 regarding personal data access

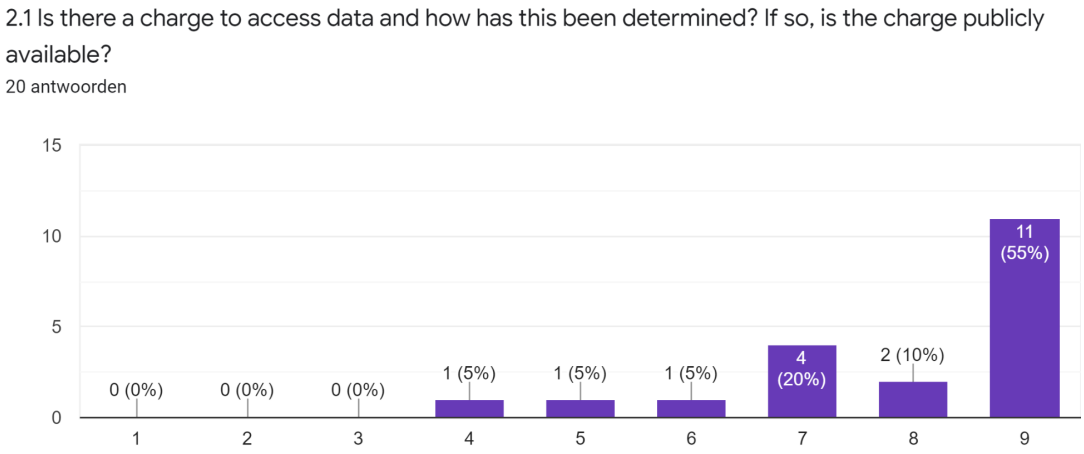

Figure C.77: Bar chart Question 72 regarding whether there are charges to data access

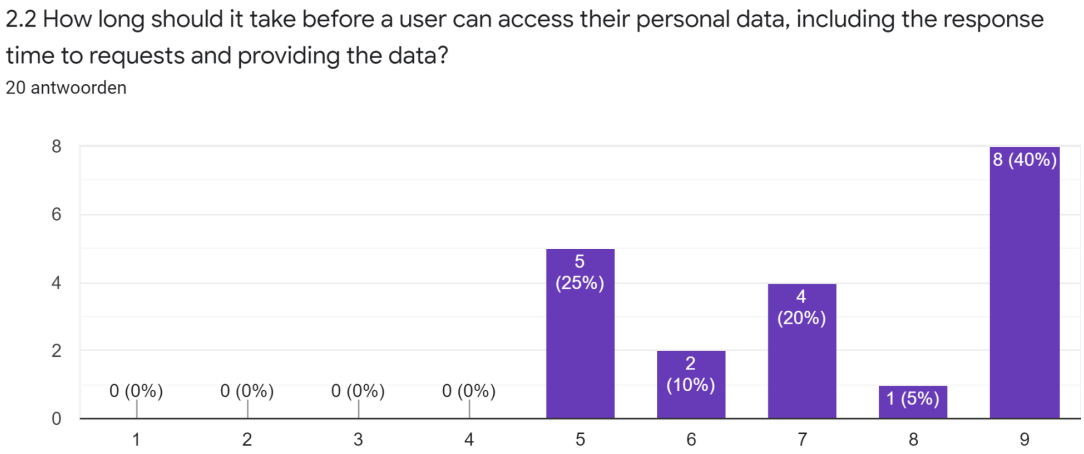

Figure C.78: Bar chart Question 77 regarding the time it should take before data access is granted

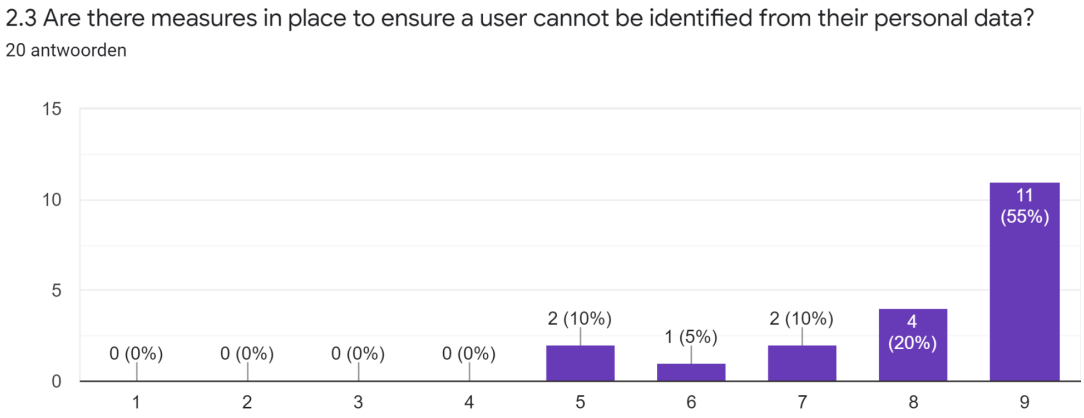

Figure C.79: Bar chart Question 78 regarding measures to ensure user anonymity

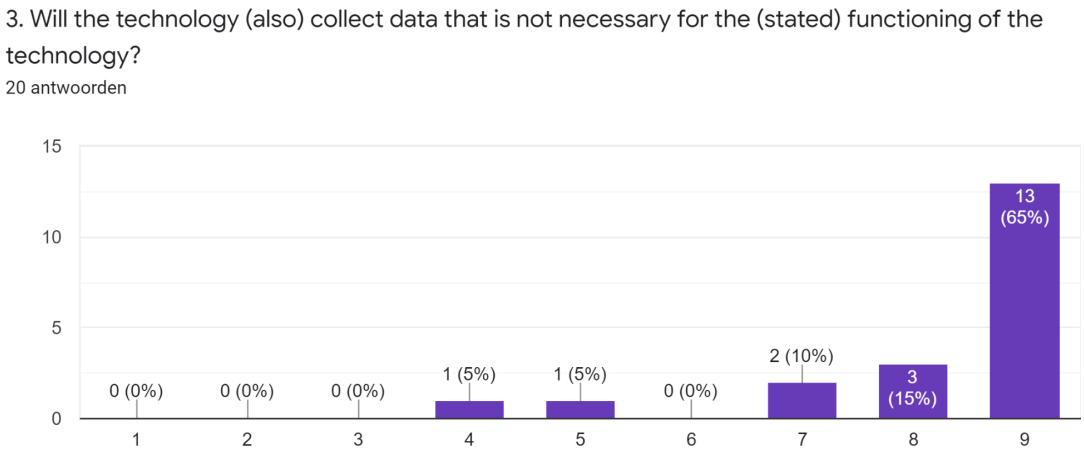

Figure C.80: Bar chart Question 79 regarding collection of data that is not necessary for the stated purpose

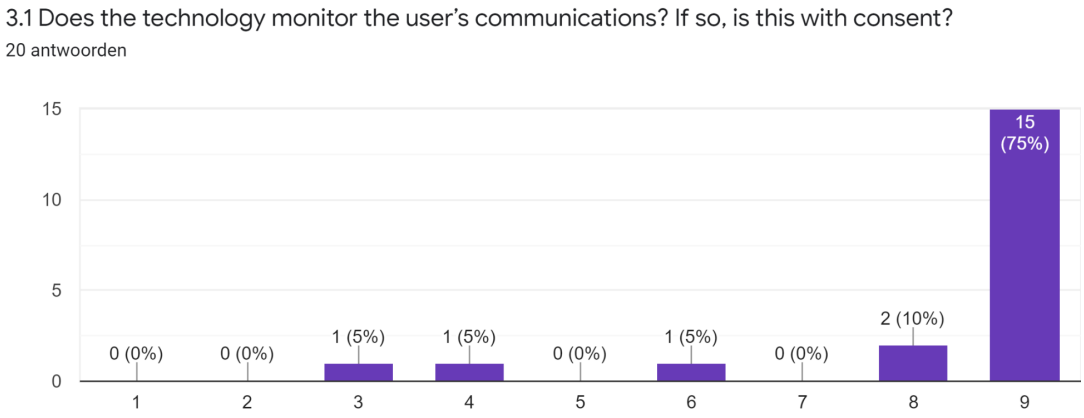

Figure C.81: Bar chart Question 80 regarding monitoring user communications

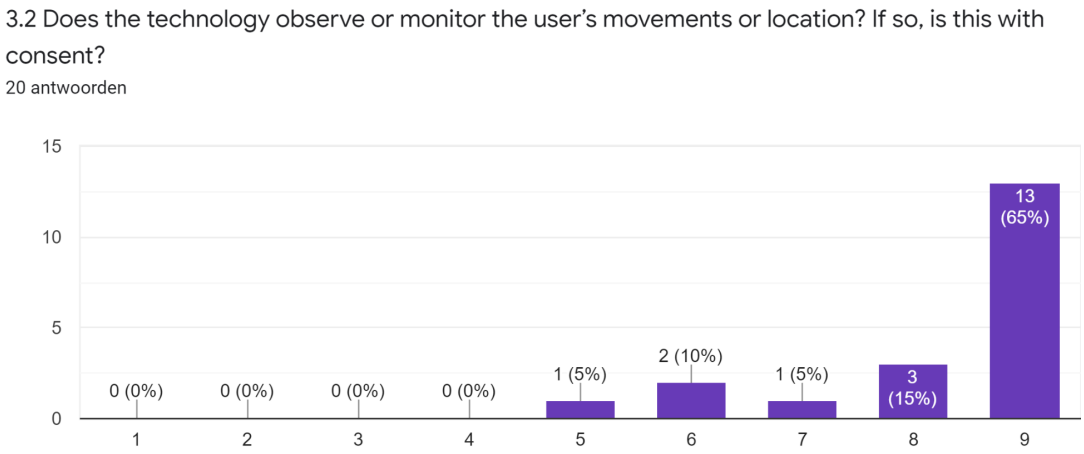

Figure C.82: Bar chart Question 81 regarding monitoring user movement or location data

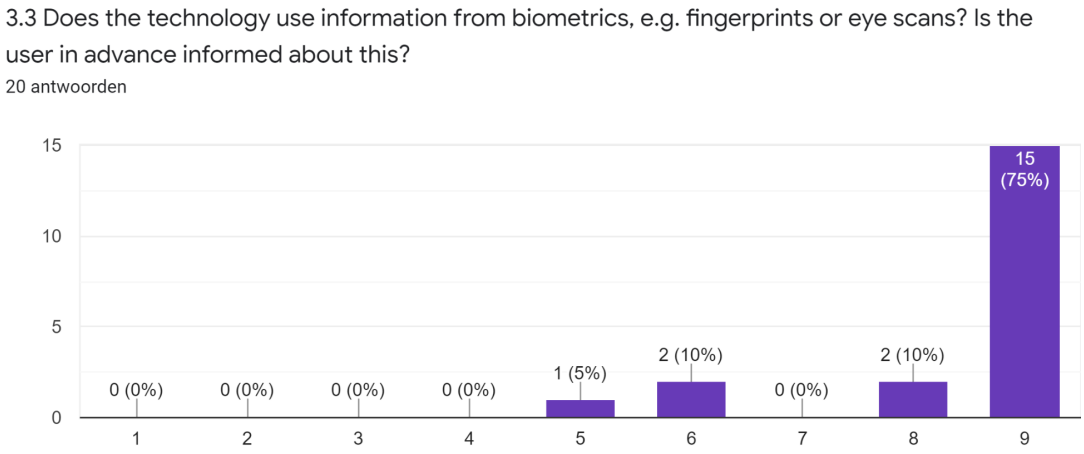

Figure C.83: Bar chart Question 82 regarding the use of biometric data

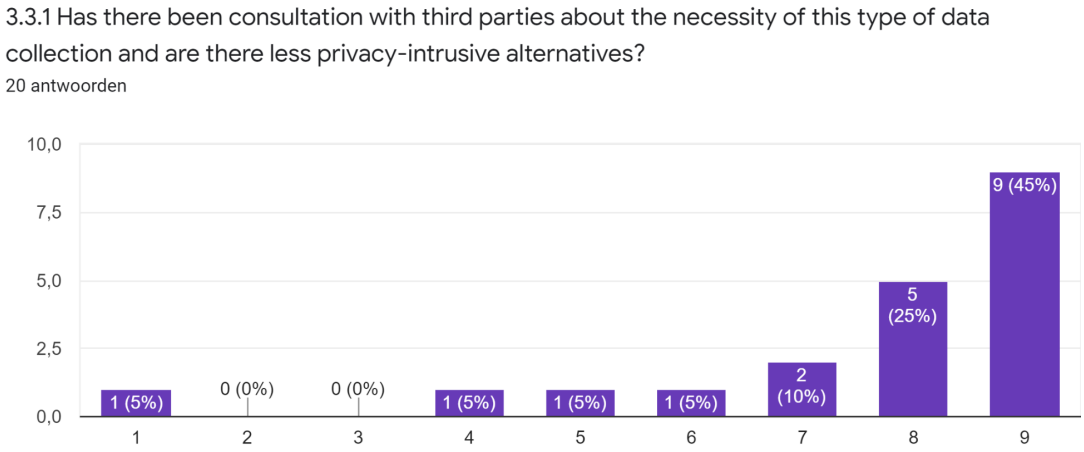

Figure C.84: Bar chart Question 83 regarding the necessity of using biometric data

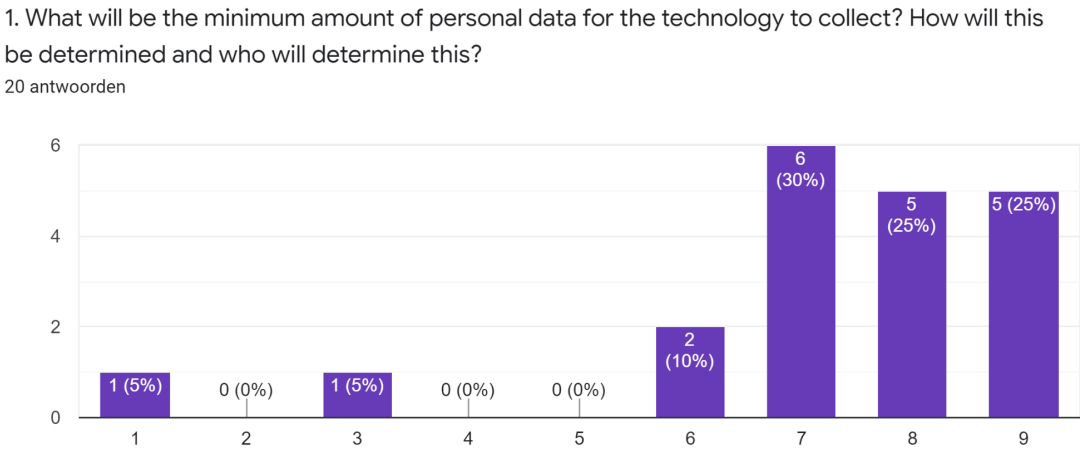

Figure C.85: Bar chart Question 84 regarding the minimum amount of data to be gathered

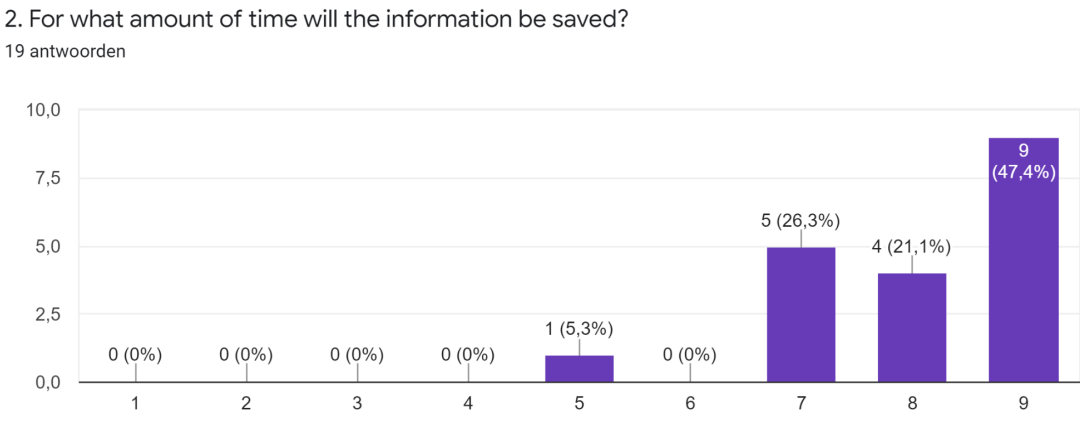

Figure C.86: Bar chart Question 85 regarding the amount of time data is saved

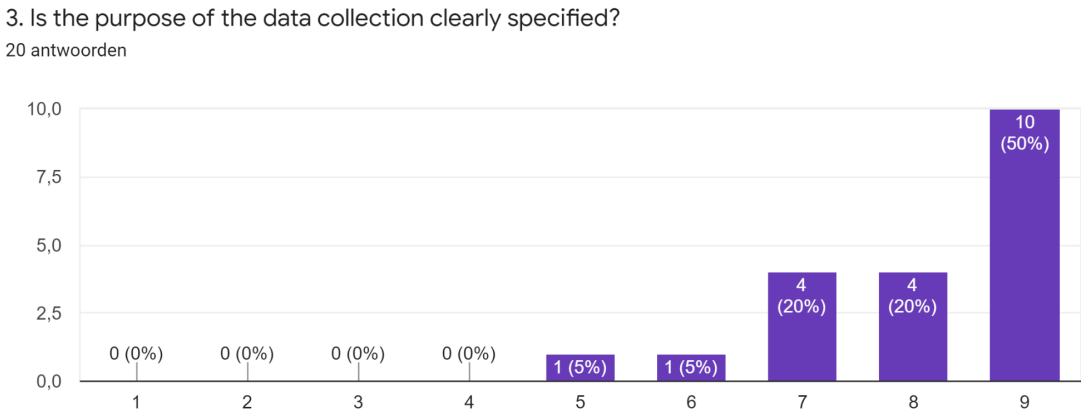

Figure C.87: Bar chart Question 86 regarding the stated purpose of data collection

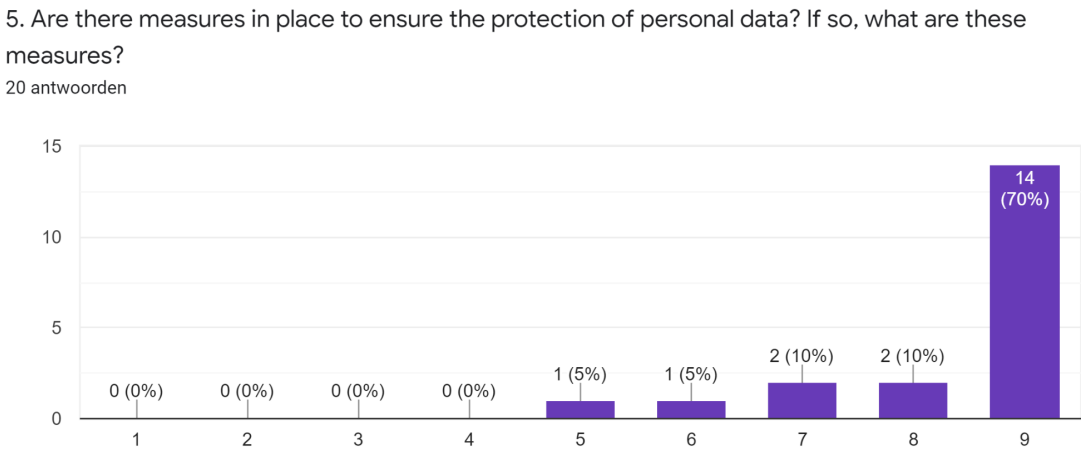

Figure C.88: Bar chart Question 87 regarding the measures in place to protect the data

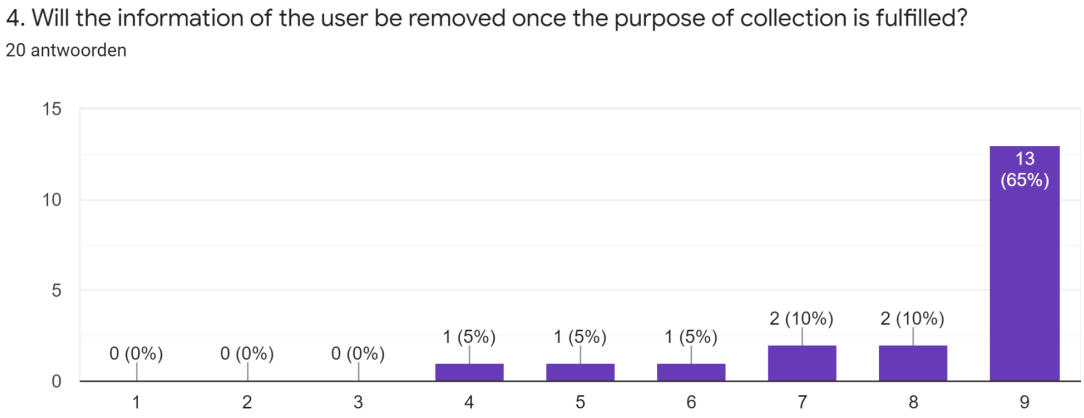

Figure C.89: Bar chart Question 88 regarding what happens to the data when the purpose is fulfilled

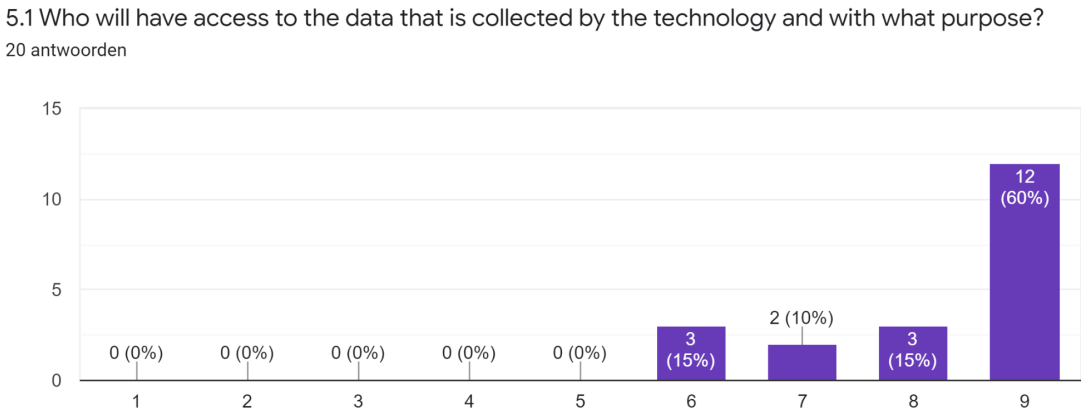

Figure C.90: Bar chart Question 89 regarding what parties have access to the data and with what purpose

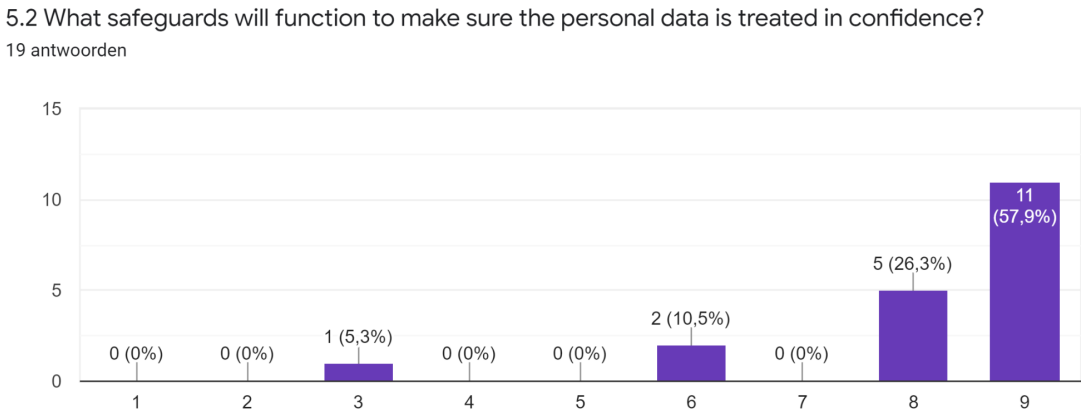

Figure C.91: Bar chart Question 90 regarding what safeguards are in place to ensure confidence

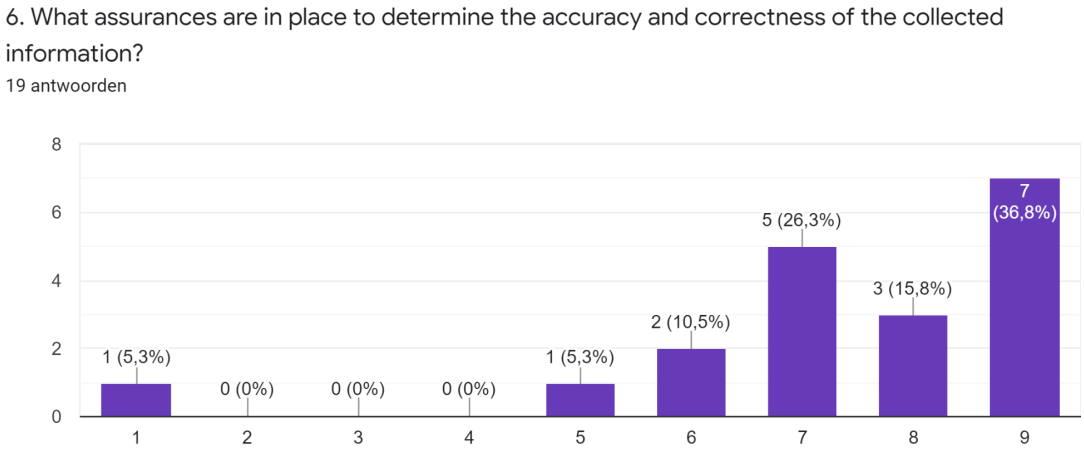

Figure C.92: Bar chart Question 91 regarding the assurance of the accuracy of information that is gathered

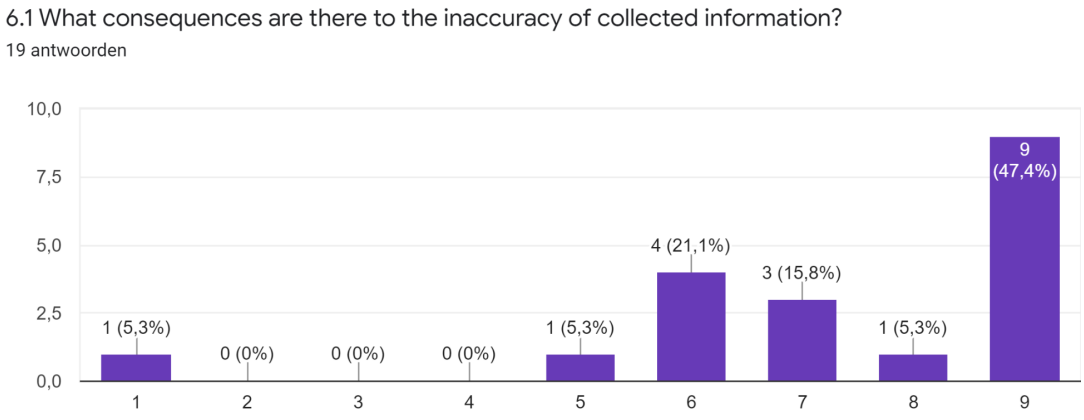

Figure C.93: Bar chart Question 92 regarding what the consequences of inaccurate data are

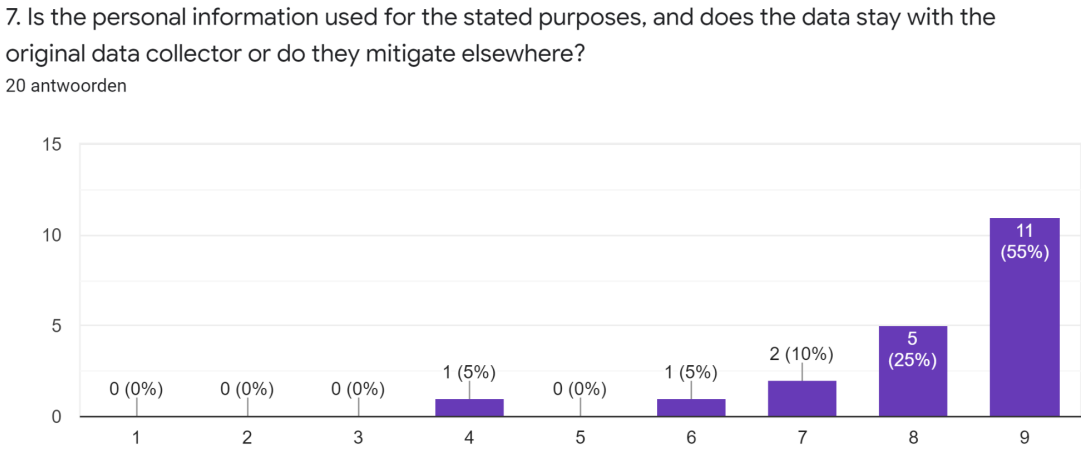

Figure C.94: Bar chart Question 93 regarding the purposes of data collection and the location of the data

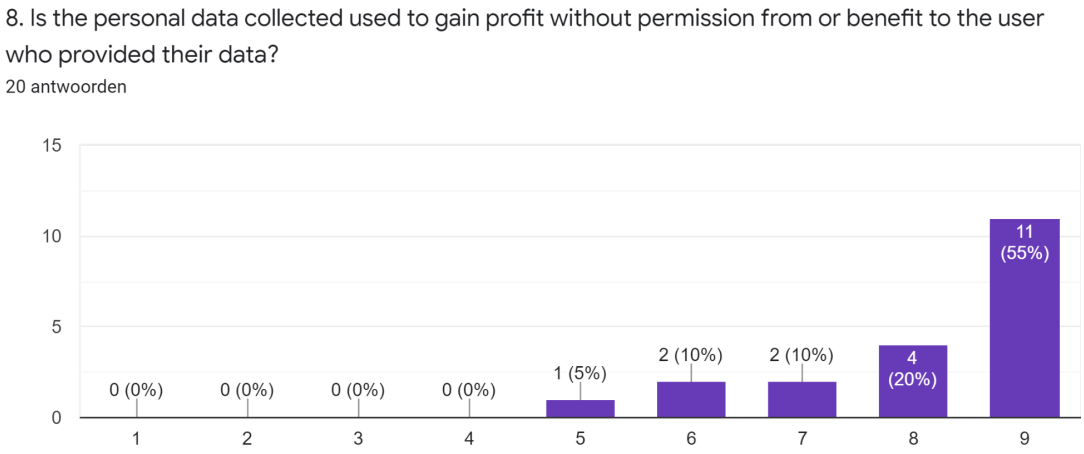

Figure C.95: Bar chart Question 94 regarding making profit without permission of the user

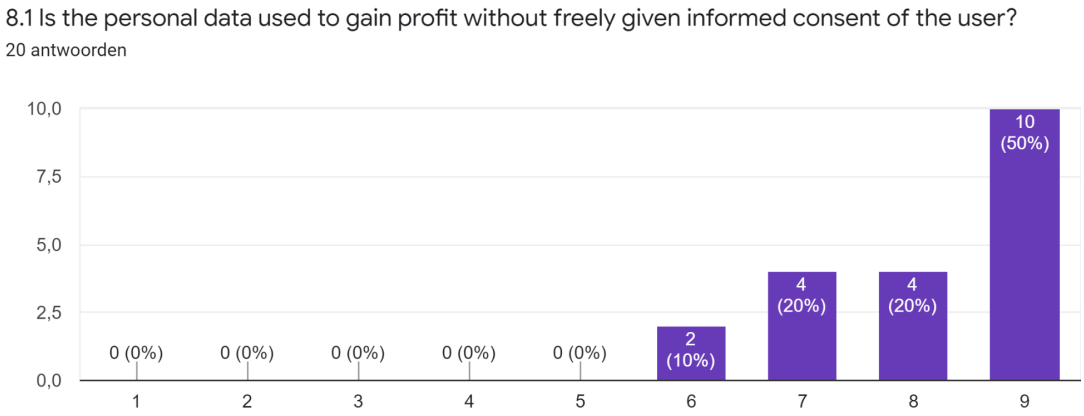

Figure C.96: Bar chart Question 95 regarding making profit without freely given informed consent of the user

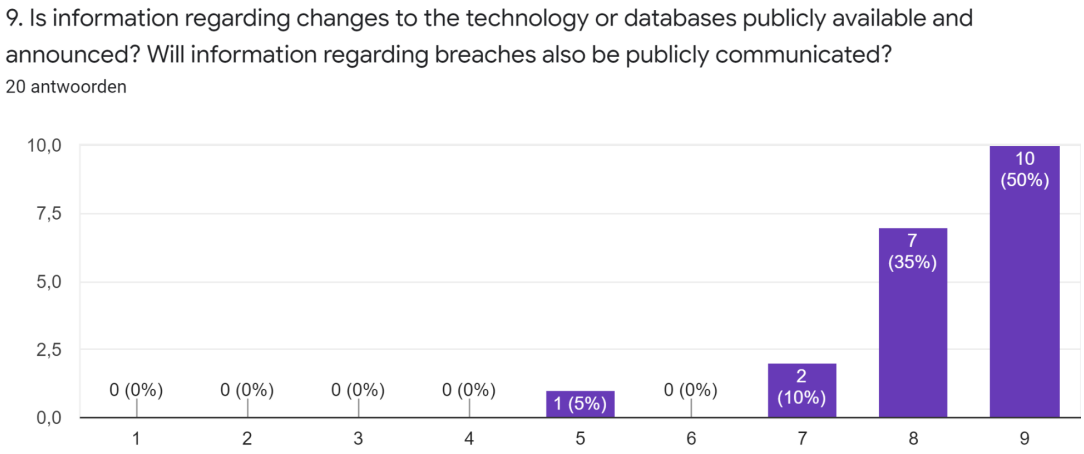

Figure C.97: Bar chart Question 96 regarding information availability for database changes

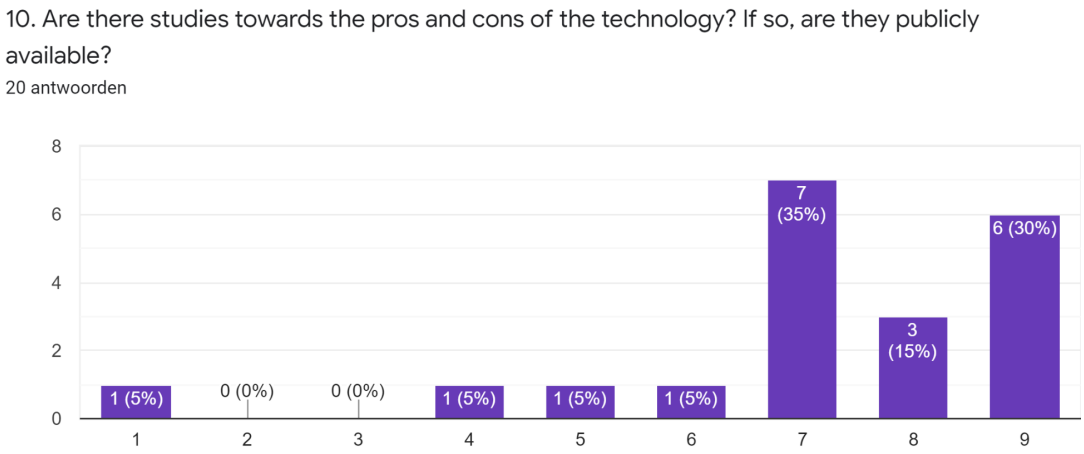

Figure C.98: Bar chart Question 97 regarding whether studies towards pros and cons have been performed

If you answered "disagree" in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.
10. Pros and cons will be discussed by a lot of people when it is launched. Other questions are more important and should be prioritised over this one.
1.2 question hard to answer and I think 1 and 1.1 answer enough i this direction. Also 3 is kind of contained in 1 (of the privacy part)
3.3.1, 1, 6.1, 10: not the governments job.

Figure C.99: Table Question 98 regarding disagreements on the questions of the section privacy and data protection

Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.

Figure C.100: Table Question 98 regarding misunderstandings on the questions of the section privacy and data protection, empty as no answers were given but included for completion

What do you think of the ethical issues that were introduced by the ethical questions?
If corporations are mandated to show these concerns, it will increase their paperwork. They will hire more people to file this paperwork. Even such a necessary regulation can attack free market. Attacking free market is never healthy for the economy in the long run. People say capitalism needs to trust the market to self correct. However, we can't do that, can we? Profit is such a great greedy driving force, it won't ever, EVER, lead to self-correction. This line is simply a lobbying technique. Also, I have never thought about these ethical issues. I'm glad to have filled this survey. Made me more aware
Some of them might be slightly redundant
Quite aligned with what popular discourse in the field of technology and ethics. A good incorporation of questions concerning perception of legislative agencies, third-party companies, creator/owner of data collection, and individuals.
Very interesting, good that they are brought up!
I think the last part is the must relevant, data issues are big
I think all of the ethical issues addressed here (some that I had not considered before) play an important role and should/need to be considered with any variation of human monitoring algorithms.
Harm to privacy is inevitable for the benefit of improving these technologies, it's mainly about decreasing the risk of harm and not removing it entirely
I personally find that when it comes to possible issues with HMA it generally comes down to privacy. All ethical issues I can think of come forth of a lack of privacy, of less anonymity of users of a technology. Also I know more about privacy issues. Therefore this category was easier to evaluate for me. The other issues that were introduced all seemed important to me, for some of the questions under them however I would question how this could be reviewed when taken into a framework.
I like them, however, I made the assumption that a government will be in charge of the ethical framework. Would be useful to understand if this was indeed your intent.
Alot of the ethical issues fall in line with what I would think of as ethical issues. However, from a user perspective I could care less about stakeholders because I am rarely one of them.
Most of them were very viable and important questions. Some not as much, but perhaps they have benefits not known to me.
Very pressing matter
I think it is a good step in developing a framework
Important, versatile and thorough.
I think the issues are all important for the framework.
Thought of a wide range of subjects that are influenced bij the technology, although these questions are yet to answer if the purpose of the specific technology is clarified . sometimes not all the subjects are in the circle of influence of the used technology

Figure C.101: Table Question 100 regarding the participants' thoughts on the ethical issues

Were there any ethical issues you were missing and believe should be added to the ethical framework?
I don't think so
Not right now
Sounded pretty complete to me :)
No
The type of actor being the data controller may have implications in what is considered 'ethical' and not, compare e.g a commercial, privately funded industry actor with an actor operating in the public interest such as a research group (should these actors and their processing of data be treated differently?)
I think the important factors are covered, the umbrella issues as were are in here
The impact of technology on nature, the earth and climate. So questions related to sustainability. Because, after all we also have an ethical accountability to the earth.
no1
Future perspective. Are we going towards a world in which 'Internet' can be seen as an ocean or a swimming pool. Say we need 'rules/code of conducts' when online the approach can be different when Internet is an ocean or a swimming pool. UN/EU/Constitutions can be applicable in the ocean view....consumer rights could be applicable in the swimming pool view. It could be interesting for the framework which in being developed to adopt where the Internet is heading ... Will we live in a connected society in which we do not want humans to be aware constantly that they are online (the ocean view) or do we envision that the Internet will 'remain' a swimming pool meaning that by entering the ground / jumping into the pool you agree to the terms/house rules.
The obligation to install an easily accesible helpdesk for users to turn to with any question about the technology.
No
None

Figure C.102: Table Question 101 regarding the participants' thoughts on missing ethical issues

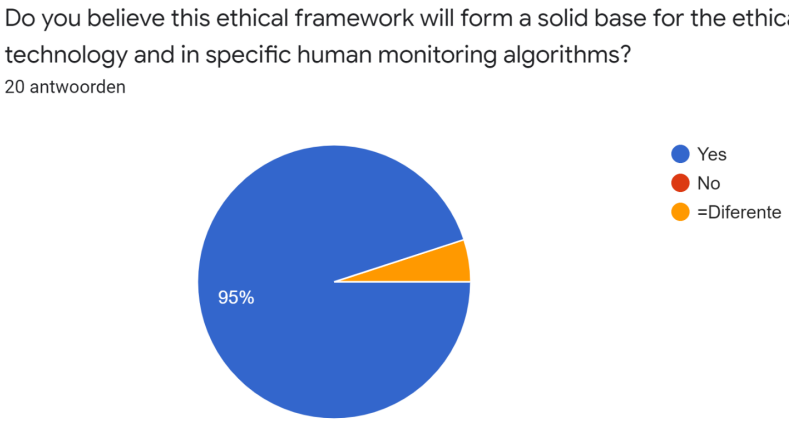

Figure C.103: Bar chart Question 102 regarding whether the participants think of the ethical framework as a solid base for technology evaluation

Appendix D

Full questionnaire

Below the full questionnaire that was used to gather the data for this project can be found. The questionnaire is provided in printed form, as this most accurately shows the types of questions that are asked.

Ethical framework for Human Monitoring Algorithms

Dear sir/madam,

You are hereby invited to participate in this questionnaire “Ethics in technology”. This questionnaire will collect data from three different sources and will aim to collect data from at least 30 participants of every source. The participants of this survey will be asked to answer questions regarding ethics in technology. More specifically, human monitoring algorithms will be discussed. This term will be explained in more detail later in the questionnaire. It will take approximately 20 to 30 minutes to complete the questionnaire.

The participation in this study is completely voluntary. There are no foreseeable risks associated with this project. Though, if you are not comfortable answering a question, you can withdraw from the questionnaire at any point. To this study, it is very important to learn the opinions and thoughts of participants regarding ethics for human monitoring algorithms and technology in general.

The survey responses will be strictly confidential. The data that is gathered from this research will only be reported in the aggregate. The information that is provided will be coded and will also remain confidential. If you have any questions at any time about the questionnaire, participation, or procedures, you may contact Jiska Warmels at j.g.warmels@students.uu.nl.

Thank you in advance for your time and support for this research. If you wish to participate in this study, please check the box with “I Agree” and then use the Continue button below.

*Vereist

1. *

Vink alle toepasselijke opties aan.

- [ ] I Agree

Ga naar vraag 2

Personal knowledge

This section will ask a few questions about your knowledge regarding the fields of technology and ethics.

2. Did you ever receive education in the field of technology or ethics?

Markeer slechts één ovaal.

- ◯ Yes, in the field of technology
- ◯ Yes, in the field of ethics
- ◯ Yes, in the fields of technology and ethics
- ◯ No, in neither of those fields

3. Did you ever study the topics of technology or ethics by yourself? i.e. did you read papers, books, online articles or other (preferably scientific) sources on these topics?

Markeer slechts één ovaal.

- ◯ Yes, in the field of technology
- ◯ Yes, in the field of ethics
- ◯ Yes, in the fields of technology and ethics
- ◯ No, in neither of those fields

4. Which of the following groups do you consider yourself to be a part of? *

Markeer slechts één ovaal.

- ◯ I work in a field with technology and/or ethics
- ◯ I am a student in the field of technology and/or ethics
- ◯ I don't work or study in the fields of technology or ethics, but do have a personal interest in at least one of these fields
- ◯ None of the above

5. Do you believe you have sufficient knowledge regarding these fields to participate in this study? *

Markeer slechts één ovaal.

- ◯ Yes
- ◯ No

Human monitoring algorithms

Human monitoring algorithms are usually small algorithms that gather data from human individuals to monitor or track their behaviour. In this case, the term monitoring will be used as follows: "To keep track of systematically with a view to collecting information" and "To keep close watch over, supervise". Examples of these algorithms include the algorithms that are used by step counters, location devices, and vitals sensors. Other examples also include the monitoring of online human behaviour, like shopping behaviour on websites, or word-choice algorithms used by studies.

6. Do you feel like you have ever encountered any of these human monitoring algorithms either physically or online?

   Markeer slechts één ovaal.

   - ◯ Yes
   - ◯ No
   - ◯ Maybe

7. If you answered yes or maybe to the last question, what types of human monitoring algorithms have you encountered?

8. Do you think that these monitoring algorithms can cause any ethical issues? If you think ethical issues can occur, please describe the most problematic ethical issue in your opinion and in what scenario this would occur?

The principles of the ethical framework

The principles that will be used as a base for this research are the following:

Non-maleficence: Obligations relating to doing no harm, including obligations to minimize risks, or to take precautions against possible risks or harms from the experiment,

Beneficence: Obligations to do good, including obligations to take away existing harm, or to prevent harm or risks that do not originate in the experiment. *to produce more good than harm, to create or increase benefits,

Respect for autonomy: Obligations relating to protecting and guaranteeing the autonomy, including the autonomous choice, of individuals and groups,

Justice: Obligations relating to issues of distributive justice, to special protection of vulnerable groups, to avoiding exploitation, but also to procedural justice (just procedures).

Additionally, a section on privacy and data protection was added due to the application of ethics to technology. These principles were introduced to introduce you to the principles that were used as a base for the ethical framework.

First, some introductory questions will be formulated. Please rate these statements on the following scale.

1 = Completely disagree
2 = Largely disagree
3 = Moderately disagree
4 = Slightly disagree
5 = Neither agree nor disagree
6 = Slightly agree
7 = Moderately agree
8 = Largely agree
9 = Completely agree

9. I feel like the principle of Non-maleficence is applicable to the field of technology ethics and specifically human monitoring algorithms.

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

10. I feel like the principle of Beneficence is applicable to the field of technology ethics and specifically human monitoring algorithms.

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

11. I feel like the principle of Respect for autonomy is applicable to the field of technology ethics and specifically human monitoring algorithms.

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

12. I feel like the principle of Justice is applicable to the field of technology ethics and specifically human monitoring algorithms.

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

13. I feel like the additional principle of Privacy and Data protection is a relevant ethical field to discuss regarding technology ethics and human monitoring algorithms.

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

The ethical framework

The following sections will each introduce the questions that were constructed for the first version of the ethical framework. For each ethical question the question will be to rate the question on the same scale as before on whether or not this question is a valuable addition to the ethical framework. Furthermore, an open question will be included at the end of each section regarding the questions that were answered disagreeing. You will be asked to explain why you think the ethical question is not a valuable addition to the ethical framework.

The term "the technology" is used to refer to any technology you want to evaluate with the ethical framework; to keep it broad and to avoid using the same term (human monitoring algorithms) over and over again.

Again, the idea is that all questions are answered on a scale from 1-9 from completely disagree to completely agree to measure the opinion of the participants on whether they think this question should be in the ethical framework! This means you do not answer the ethical question. You simply rate it on whether you think the subject or theme of the question should be discussed when evaluating human monitoring algorithms!

Non-maleficence

This section is on the principle of Non-maleficence.

Non-maleficence: Obligations relating to doing no harm, including obligations to minimize risks, or to take precautions against possible risks or harms from the experiment.

The questions that were constructed belong to the sections Safety and Social Safety. When a question is numbered with a digit, this means that the question is a follow-up question to the question above it. So, 2.1 is a follow-up question to question 2. The same goes for a question labelled 2.4. Please rate the questions according to the following scale regarding whether you think they should be discussed regarding the ethical evaluation of technology and in specific human monitoring algorithms.

1 = Completely disagree
2 = Largely disagree
3 = Moderately disagree
4 = Slightly disagree
5 = Neither agree nor disagree
6 = Slightly agree
7 = Moderately agree
8 = Largely agree
9 = Completely agree

Safety

The section Safety talks about the general safety of the user of the technology.

14. 1. Does the technology comply with consumer legislation?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

15. 2. Does the technology influence consumer protection?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

16. 2.1 Are there measures in place to make the user aware of the technology?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

17. 3. Is there a possibility of the technology causing either physical or psychological harm to the user? If so, is there a way to reduce this risk and what measures can be adopted to avoid the risk?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

18. 3.1 Have the risks already been studied to address the safety of the technology, or are there plans to study these risks? Will the study be made public?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

19. 3.2 Are there measures in place for the technology to ensure that users will be protected from harm? i.e. the user will not be exposed to risks that might not occur in everyday life?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

20. 4. What unanticipated breaches can occur during or after data collection and storage by the technology and in what harm could this result?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

Social safety

The questions for the section Social Safety will start by ensuring the protection of the users in their social environment. The user's social safety depends on the social contacts they can nurture.

21. 1. Is there a possibility that the technology may lead to greater social isolation of users? Are there measures that could be adopted to avoid that risk?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

22. 2. Is the technology connected to profiling technologies?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

23. 2.1 Is there a possibility that the technology could stigmatise the user?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

24. 3. Does the technology enable social sorting?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

25. 3.1 Has there been grouping of users using the technology? And if so, are these groups targeted by certain parties?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

26. 3.2 Could the technology be used to discriminate against any groups? What measures could be applied to avoid this?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

27. 3.3 Will any of the groups have to pay more for services the technology is connected to than other groups?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

28. 4. Can the information gathered by the technology be used to harm or disadvantage a user or group of users?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

29. 5. Are there possibilities for stakeholders and users of the technology to bring up concerns regarding the technology?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

30. If you answered “disagree” in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.

31. Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.

Beneficence

This section is on the principle of Beneficence.

Beneficence: Obligations to do good, including obligations to take away existing harm, or to prevent harm or risks that do not originate in the experiment. *to produce more good than harm, to create or increase benefits.

The questions that were constructed belong to the sections Personal beneficence and Societal beneficence. When a question is numbered with a digit, this means that the question is a follow-up question to the question above it. So, 2.1 is a follow-up question to question 2. The same goes for a question labelled 2.4. Please rate the questions according to the following scale regarding whether you think they should be discussed regarding the ethical evaluation of technology and in specific human monitoring algorithms.

1 = Completely disagree
2 = Largely disagree
3 = Moderately disagree
4 = Slightly disagree
5 = Neither agree nor disagree
6 = Slightly agree
7 = Moderately agree
8 = Largely agree
9 = Completely agree

Personal beneficence

First of all, the basic term of beneficence is important to address when it comes to the section Personal Beneficence.

32. 1. Will the technology provide one or more benefits from the use of the technology to the user? If so, in what way can users benefit from the use of the technology?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

33. 1.1 Will the technology have a positive influence on dignity, personal safety, independence or sense of freedom?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

34. 1.2 Does the use of the technology facilitate the self-expression of users?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

35. 1.3 Does the technology empower users? If so, in what way is this achieved?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

36. 1.4 Does the use of the technology expect a certain level of knowledge that some users may not have?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

37. 2. Are there alternative ways of providing the same service with the technology that are less privacy intrusive?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

38. 3. What stakeholders benefit from the technology and in what way?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

Societal beneficence

The section Societal Beneficence is regarding the benefits society might receive from the existence of the technology.

39. 1. Does the technology serve society or only the goals of the data collector? Additionally, what are the goals of the data collector and how are they served?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

40. 1.1 To what extent is scientific or other objective evidence used in decision-making regarding the use of this technology? If this information is used, what party benefits from this information, i.e. the user or the data collector?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

41. 1.2 Will the outcome of the technology be available to everyone, the user in particular, or only to the data collector? What benefits does the data collector gain from the outcome of the technology?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

42. 2. Does the technology take values such as human well-being, justice, dignity, trust, human rights, welfare, privacy and autonomy into account?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

43. 3. Have technologists and developers discussed the technology with ethicists to ensure value-sensitive design?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

44. 4. Does the technology have obsolescence built-in? If so, is this or can this be justified?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

45. If you answered “disagree” in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.

46. Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.

Respect for autonomy

This section is on the principle of Respect for autonomy.

Respect for autonomy: Obligations relating to protecting and guaranteeing the autonomy, including the autonomous choice, of individuals and groups.

The questions that were constructed belong to the sections Right for autonomy and Informed consent. When a question is numbered with a digit, this means that the question is a follow-up question to the question above it. So, 2.1 is a follow-up question to question 2. The same goes for a question labelled 2.4. Please rate the questions according to the following scale regarding whether you think they should be discussed regarding the ethical evaluation of technology and in specific human monitoring algorithms.

1 = Completely disagree
2 = Largely disagree
3 = Moderately disagree
4 = Slightly disagree
5 = Neither agree nor disagree
6 = Slightly agree
7 = Moderately agree
8 = Largely agree
9 = Completely agree

Right for autonomy

After the right to autonomy is discussed, this section will discuss the dignity of the person in more detail.

47. 1. Does the technology decrease an individual's right to security and liberty? If so, what could be done to avoid this?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

48. 1.1 Will the technology decrease a user's freedom of association? If so, what is the justification?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

49. 2. Will the technology be implemented in a way that allows users to live a life of dignity and independence and also to participate in their preferred social and cultural life?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

50. 2.1 Does the technology compromise or violate human dignity? Can users decline to use the technology or, if not, what measures can be taken to minimise or avoid compromising dignity?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

51. 2.2 Does the technology mark users as cognitively or physically disabled in some way? If so, are there measures to ensure these users do not stand out among other users?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

Informed consent

Informed consent is an important aspect of the rights of users as it introduces a way of communication about the technology.

52. 1. Does the technology obtain the free and informed consent of the users of the technology?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

53. 1.1 Does the user of the technology have a meaningful choice, i.e. are there viable alternatives of not using the technology? If not, what measures could be taken to provide a meaningful choice?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

54. 1.2 Is the informed consent truly freely provided? i.e. does the person have to give consent to use a service that can otherwise not be used or is not replaceable by a service that does not gather the same types of data?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

55. 1.3 Is the informed consent that is asked of the user complete concerning the inclusion of the necessary information as is stated in the GDPR?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

56. 1.4 Will the user be allowed, and informed of their right, to withdraw their informed consent?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

57. 2. How is it ensured that the user can give informed consent when users that cannot give informed consent (i.e. children or elderly with dementia) can also use the technology?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

58. 3. Does the technology gather data from children and how are their rights protected?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

59. 4. Does the user have to make an extra effort to not use the 'service' the technology provides?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

60. If you answered "disagree" in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.

61. Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.

Justice

This section is on the principle of Justice.

Justice: Obligations relating to issues of distributive justice, to special protection of vulnerable groups, to avoiding exploitation, but also to procedural justice (just procedures).

The questions that were constructed belong to the sections Justice and Social justice. When a question is numbered with a digit, this means that the question is a follow-up question to the question above it. So, 2.1 is a follow-up question to question 2. The same goes for a question labelled 2.4. Please rate the questions according to the following scale regarding whether you think they should be discussed regarding the ethical evaluation of technology and in specific human monitoring algorithms.

1 = Completely disagree
2 = Largely disagree
3 = Moderately disagree
4 = Slightly disagree
5 = Neither agree nor disagree
6 = Slightly agree
7 = Moderately agree
8 = Largely agree
9 = Completely agree

Justice

The principle of justice as explained above aims to provide every user with treatment in the way of what is owed to them.

62. 1. Are all the (vulnerable) groups that may be affected by the technology identified?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

63. 1.1 Can the technology be used for or by all groups in society?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

64. 1.2 Does the technology provide benefits to some, but not all groups? If so, how is this justified?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

65. 1.3 Are there groups that have to pay more for the same service than others?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

66. 2. Is there a just system for the addressing of technology failures with appropriate communication and compensation to affected stakeholders?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

Social justice

The section Social justice will talk about justice when it comes to unequal treatment of users or groups of users.

67. 1. Will the technology be available to everyone or only to those that can afford it in terms of wealth, power, or technological sophistication?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

68. 2. Does the technology policy apply to everyone equally or only to those who cannot resist it? i.e. can someone pay to not have their data collected?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

69. 2.1 Are there ways available to resist the use of the technology? If so, are these equally distributed?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

70. 3. Is there a possibility of information that was gained being used in a way that could harm or disadvantage the user it relates to?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

71. If you answered “disagree” in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.

72. Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.

Privacy and Data protection

This section is on the principle of Privacy and Data protection

Due to the project relating closely to technology and the collection of data, in particular, the concerns regarding privacy and data protection must be taken into consideration for this ethical framework as well.

The questions that were constructed belong to the sections Privacy and Data protection. When a question is numbered with a digit, this means that the question is a follow-up question to the question above it. So, 2.1 is a follow-up question to question 2. The same goes for a question labelled 2.4. Please rate the questions according to the following scale regarding whether you think they should be discussed regarding the ethical evaluation of technology and in specific human monitoring algorithms.

1 = Completely disagree
2 = Largely disagree
3 = Moderately disagree
4 = Slightly disagree
5 = Neither agree nor disagree
6 = Slightly agree
7 = Moderately agree
8 = Largely agree
9 = Completely agree

Privacy

By the Charter of Fundamental Rights, privacy is a guaranteed right. Additionally, the European Convention of Human Rights, as well as the UN’s Universal Declaration of Rights and the e-Privacy Directive talk about privacy as a human right.

73. 1. Are users of the technology aware that information is collected and for what purpose?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

74. 1.1 Is there information of the user collected in ways of which they are unaware?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

75. 1.2 Is information or (personal) data collected against the wishes of the user?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

76. 2. Can users access their personal data?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

77. 2.1 Is there a charge to access data and how has this been determined? If so, is the charge publicly available?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

78. 2.2 How long should it take before a user can access their personal data, including the response time to requests and providing the data?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

79. 2.3 Are there measures in place to ensure a user cannot be identified from their personal data?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

80. 3. Will the technology (also) collect data that is not necessary for the (stated) functioning of the technology?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

81. 3.1 Does the technology monitor the user's communications? If so, is this with consent?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

82. 3.2 Does the technology observe or monitor the user's movements or location? If so, is this with consent?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

83. 3.3 Does the technology use information from biometrics, e.g. fingerprints or eye scans? Is the user in advance informed about this?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

84. 3.3.1 Has there been consultation with third parties about the necessity of this type of data collection and are there less privacy-intrusive alternatives?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

Data protection

The last section of the ethical framework will be on data protection. Data protection is guarded by the OECD guidelines as well as the EU's Data Protection Directive.

85. 1. What will be the minimum amount of personal data for the technology to collect? How will this be determined and who will determine this?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

86. 2. For what amount of time will the information be saved?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

87. 3. Is the purpose of the data collection clearly specified?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

88. 4. Will the information of the user be removed once the purpose of collection is fulfilled?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

89. 5. Are there measures in place to ensure the protection of personal data? If so, what are these measures?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree										Completely agree

90. 5.1 Who will have access to the data that is collected by the technology and with what purpose?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

91. 5.2 What safeguards will function to make sure the personal data is treated in confidence?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

92. 6. What assurances are in place to determine the accuracy and correctness of the collected information?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

93. 6.1 What consequences are there to the inaccuracy of collected information?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

94. 7. Is the personal information used for the stated purposes, and does the data stay with the original data collector or do they mitigate elsewhere?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

95. 8. Is the personal data collected used to gain profit without permission from or benefit to the user who provided their data?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

96. 8.1 Is the personal data used to gain profit without freely given informed consent of the user?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

97. 9. Is information regarding changes to the technology or databases publicly available and announced? Will information regarding breaches also be publicly communicated?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

98. 10. Are there studies towards the pros and cons of the technology? If so, are they publicly available?

Markeer slechts één ovaal.

	1	2	3	4	5	6	7	8	9	
Completely disagree	◯	◯	◯	◯	◯	◯	◯	◯	◯	Completely agree

99. If you answered “disagree” in any variant for any of the questions, could you please explain for each question why you disagree with that question being a valuable addition to the ethical framework? This can be done by adding the number of the question followed by an explanation.

100. Additionally, if you feel like you did not understand any of the questions correctly due to the use of terms, please indicate the numbers of these questions here.

Additional thoughts

These are the last three questions of the questionnaire. If you made it this far, thank you so much for your contribution. The last three questions are all regarding additional opinions you might have regarding anything that has to do with technology ethics and this ethical framework in specific.

101. What do you think of the ethical issues that were introduced by the ethical questions?

102. Were there any ethical issues you were missing and believe should be added to the ethical framework?

_____

_____

_____

_____

_____

103. Do you believe this ethical framework will form a solid base for the ethical evaluation of technology and in specific human monitoring algorithms?

Markeer slechts één ovaal.

- ◯ Yes
- ◯ No
- ◯ Anders: _____

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