



Network for Studies on Pensions, Aging and Retirement

**NETSPAR INDUSTRY SERIES**

# **Value considerations, ethical dilemmas, and resolving methods in automated financial advice**

**Qualitative study among industry experts**

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**DESIGN PAPER 241**

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## Summary

Financial advice can benefit consumers by guiding them in navigating the complexities of financial decision-making. At the moment, financial advice is mainly provided in traditional ways. However, automated financial advice is an upcoming and fast-growing technology that can change the way financial advice is provided. Its complex nature introduces several ethical and other issues. This research paper employs a qualitative research approach to investigate to what extent automated financial advice can create value for consumers and the financial advice industry, identifies ethical issues of automated financial advice, and explores potential methods for resolving ethical issues. Semi-structured interviews were conducted with nine experts. The results indicate that automated financial advice can provide value through improved accessibility, reduced costs, and increased objectivity. Complexity may influence value creation through lower accessibility and higher costs (see Table 3). Moreover, the research identifies five relevant ethical issues: human autonomy, prevention of harm, fairness, explicability, and trust (see Table 4). Potential methods to address ethical issues point to the need of legislation tailored to automated financial advice, changes in organizational governance, and improved algorithmic capabilities (see Table 5). Practical implications include the immediate development of rules and regulations tailored to automated financial advice, which incorporate ethical aspects.

## Samenvatting

Financieel advies aan consumenten kan hen helpen bij het navigeren door complexe financiële beslissingen. Momenteel wordt financieel advies voornamelijk op traditionele wijze verstrekt. Geautomatiseerd advies is echter een opkomende, snelgroeiende technologie die de manier waarop financieel advies wordt verstrekt kan veranderen. Het complexe karakter ervan brengt echter verschillende ethische en andere vraagstukken met zich mee. In dit paper wordt aan de hand van een kwalitatieve methode onderzocht in hoeverre geautomatiseerd financieel advies waarde kan toevoegen voor consumenten en de financiële adviessector. Daarnaast worden ethische kwesties van geautomatiseerd financieel advies in kaart gebracht en worden mogelijke oplossingsmethoden voor zulke kwesties onderzocht. Wij hebben negen semigestructureerde interviews gehouden met experts uit het veld. De resultaten laten zien dat geautomatiseerd financieel advies waarde kan bieden door verhoging van de toegankelijkheid van het advies, verlaging van de kosten en meer objectiviteit. Complexiteit kan de toegevoegde waarde van geautomatiseerd advies beïnvloeden door lagere toegankelijkheid en hogere kosten (zie Tabel 3). Daarnaast identificeert het onderzoek vijf relevante ethische kwesties: menselijke autonomie, schadepreventie, eerlijkheid, verklaarbaarheid en vertrouwen (zie Tabel 4). Mogelijke manieren om deze ethische kwesties aan te pakken zijn wetgeving die specifiek is toegesneden op geautomatiseerd financieel advies, veranderingen in het bestuur van organisaties en verbeterde algoritmische mogelijkheden (zie Tabel 5). Het zou verstandig zijn om wet- en regelgeving voor geautomatiseerd financieel advies onmiddellijk te gaan ontwikkelen en dat ethische aspecten hierin worden meegenomen.

## 1. Introduction

All through life, individuals need to make choices that significantly impact both their present and future financial situation and well-being. Buying or renting a house, changing from one profession to another, growing the family, adjusting one's working hours, and deciding when to retire are just a few examples of situations that can profoundly affect someone's financial circumstances. Additionally, over the last several decades, individuals have become increasingly responsible for their personal financial situation (De Jong & Oerlemans, 2018; Lapperre, Oerlemans & Dellaert, 2016). The current policy change in the Dutch pension landscape, for example, requires consumers to assume greater personal responsibility for their financial health in old age. These trends make it ever more important that consumers are well-informed about their own financial situation, and that they understand the choices they can make to influence their personal situation, as well as the potential consequences of these choices.

However, people often lack the necessary financial knowledge to understand complex financial products or are insecure when it comes to making major financial decisions (Alyousif & Kalenkoski, 2017; Bruhn & Asher, 2021; Calcagno & Monticone, 2015; Eberhardt et al., 2022). According to Nibud, the Dutch National Institute for Family Finance Information, around 40% of people in the 35–55 age category have no idea of their financial situation after retirement (Nibud, 2019). In addition, Netspar research has shown that nearly 30% of Dutch households are at risk of having insufficient financial resources after retirement (Knoef et al., 2016). Therefore, many consumers could benefit from financial advice regarding their financial decisions. However, half of Dutch citizens indicate that the cost of financial advice forms a barrier for them to seek financial advice, and one third indicates they are not sure whether a financial advisor would work in their best interest (Nibud, 2017). Still, research has shown that financial advice can really be worthwhile for one's financial situation and well-being (De Jong & Oerlemans, 2018). The AFM even argues that financial well-being often begins with sound financial advice, owing to the complexity of financial decisions and products (AFM, 2018).

Technological developments could enable individuals to gather personalized information more easily, and to receive choice guidance or advice in other ways than the relatively expensive traditional financial advice (Nibud, 2017). It is therefore not surprising that automation of financial advice is an emerging and fast-growing technology (Kaya, 2017; Maume, 2019). Automated financial advice already exists for various financial products, such as car insurance, health insurance, and portfolio

**Automated financial advice: what are we talking about?**

We define automated financial advice as an algorithm, which incorporates individual's sociodemographic characteristics, preferences, financial behaviors and goals to assess their current financial situation and, based on that assessment, recommend specific financial actions. Hence, when we use the term automated financial advice, we mean a machine-generated recommendation made for an individual or household in relation to a specific financial action or choice, on the basis of one's personal situation and preferences. We are not talking about product advice that falls under the Financial Supervision Act (*'Wet financieel toezicht'; Wft*). In the context of the new pension agreement in the Netherlands, for example, automated financial advice could be used to assist participants in choosing a fixed versus variable annuity; to decide on whether to take out a lump-sum amount at retirement; or, even more broadly, to assess their financial situation and get insight and advice on whether it is sufficient for the goals that participants have for retirement.

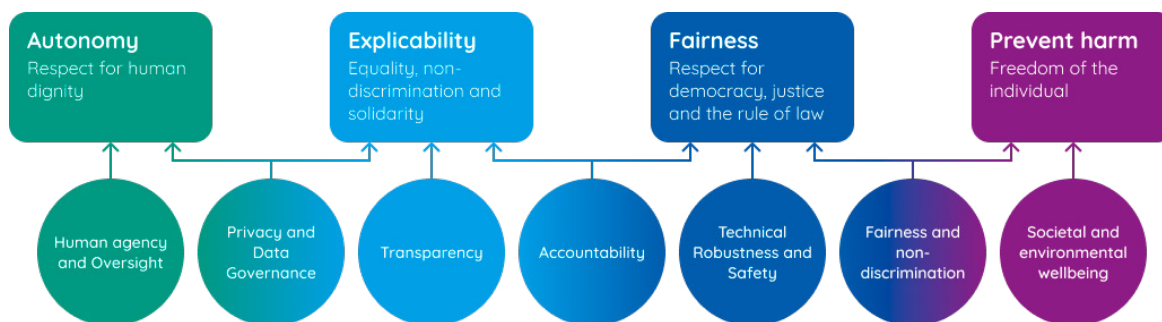
**N.B.** Even though we focus in this paper on holistic automated financial advice, most results also apply to traditional (i.e. human) financial advice, choice guidance, or the more automated financial advice that exists for specific financial products.

management, but more holistic automated financial advice does not yet exist. In a previous Industry Paper, 'Challenges of automated financial advice: Definition and ethical considerations' (Gianni et al., 2024), we addressed two challenges that prevent its development and implementation: a definition of good automated financial advice, and the ethical issues that play a role. We described the ethical issues from a theoretical perspective, based on existing literature and frameworks.

However, since automated financial advice is a relatively new phenomenon, literature on the topic is relatively scarce. For an evaluation of the ethical issues of automated financial advice, we relied on literature that evaluated and summarized multiple ethical guidelines and principles relevant to artificial intelligence by organizations, research institutions, and regulatory bodies (Hagendorff, 2020; Jobin et al., 2019; Mittelstadt, 2019). However, these documents primarily refer to the term "artificial intelligence" when proposing guidelines and principles (Hagendorff, 2020). Because the definition of "artificial intelligence" is still being debated, the working definition throughout this paper is the capability of an algorithm to mimic human cognitive functions, such as learning and problem solving, by combining math and logic to simulate human reasoning that is used to process new information and make decisions (Microsoft, n.d.).

This definition illustrates that artificial intelligence is a collective term applied to many technologies (Hagendorff, 2020). Therefore, not every ethical issue of artificial intelligence may be relevant to specific technologies that leverage artificial intelligence. To be useful, ethical principles relevant to artificial intelligence should be

*Figure 1: Visual representation of the values, principles, and requirements of the Ethics Guidelines of Trustworthy AI of the European Committee (2019)*



adapted for automated financial advice. In our previous paper, we sought to relate the values, principles, and requirements of the Ethics Guidelines of Trustworthy AI from the European Committee (2019; see Figure 1), by introducing a practical tool that triggers reflection on the ethical requirements of automated financial advice.

In this paper, we complement this desk research by conducting semi-structured interviews with industry experts. Through these interviews, we aim to identify ethical issues of automated financial advice that play a role in the field and explore potential resolving methods for these issues.

#### **Why ethics?**

We purposely choose to take an ethical rather than a legal perspective. Legal compliance is automatically a key aspect when processing sensitive data (Carrillo, 2020), but it generally attends less to the ethical considerations related to automated decision-making or decision-support processes. Ethics can help evaluate potential resistance and preferred aspects of technological innovations that are not subject to dedicated regulations. Ethical frameworks take a broader perspective and focus on novelties and changes that improve societal well-being. If we apply an ethical perspective to potential issues arising from automated financial advice, we can then address aspects that might jeopardize the adoption of automated services beforehand, thereby increasing overall trust (Bedué and Fritzsche, 2021; Glickson and Woolley, 2020).



## **2. Methodology**

### **2.1 Research method**

Qualitative research is a valuable approach for gaining insights into emerging topics (Choy, 2014). Moreover, it allows researchers to develop a deeper understanding of emerging topics compared to quantitative research (Gill et al., 2008). Therefore, this research paper adopts a qualitative research approach to further explore ethical requirements of automated financial advice. We used expert sampling to select our participants. Expert sampling involves identifying participants based on their in-depth understanding of a topic; it is often used to explore emerging topics further (Etikan, 2016; Klenke et al., 2016).

Semi-structured interviews were conducted with experts in the field of automated financial advice to obtain theoretical insights. Semi-structured interviews allow for spontaneous exploration of topics (Arsel, 2017). Consequently, they can reveal themes not extensively covered in current literature. Furthermore, the inductive nature of semi-structured interviews led to the adoption of a coding process by Ryan and Bernard (2003). This process identified the main themes from audio data and transcribed interviews. In turn, sub-themes were derived from the main themes. Additionally, thematic analysis provided insights into ethical issues that experts considered relevant for automated financial advice and possible approaches to address them.

### **2.2 Participants**

Ten potential participants were contacted by email. Of these ten participants, one did not respond. Therefore, the semi-structured interviews were conducted with nine Dutch experts who are either knowledgeable about automated financial advice, work directly with a form of automated financial advice, or are knowledgeable about the ethical issues of artificial intelligence related to automated financial advice in the Netherlands. Experts from multiple sectors in the financial advice industry were included to ensure a holistic perspective of the subject. The relevant sectors are financial planning and investment, insurance, and pension advice. All experts have been working in the relevant sector for at least ten years. An overview of the participants and a general description of their area of expertise can be found in Table 1.

An interview consent form was sent to the participants before the interview. This document emphasized their rights during the interview and ensured participants that their data would be anonymized. As a result, the participants were labelled A to I in Table 1 and throughout the results section.

*Table 1: An overview of the participants and their areas of expertise*

Partici- pant	Gender	Areas of expertise
A	M	Previous experience in financial planning for organizations. Previous experience with an association focused on improving the quality of financial planning. Currently involved as a researcher with a focus on financial planning.
B	M	Academic background in econometrics and law. Previous experience with mediation in an insurance organization. Currently provides pension advice for the public sector and develops software for the insurance and pension sector.
C	M	Previous experience as business manager, advising consumers on financial products. Has also provided organizations with advice on compliance issues. Currently active in the financial planning sector, providing employees with financial insight, especially into career choices.
D	M	Active as compliance manager at an insurance organization. Main job is to ensure that operations align with consumer interests by complying with rules and regulations. Also involves aspects beyond regulatory compliance.
E	M	Academic background in cognitive artificial intelligence. Currently works as an IT and data specialist for an independent organization providing financial advice to consumers.
F	M	Active as business IT consultant at an insurance organization. Also involved in developing and implementing technological innovations.
G	M	Managing director at an organization that focuses on developing tooling to aid financial advisors in providing better financial advice. In the future, consumers may directly benefit from automated tools.
H	M	Active at a pension provider and focused on improving data-driven business solutions for the organization. Ethical considerations are an integral element.
I	F	Previous experience at a supervisory body that also focuses on financial advice. Has experience identifying relevant considerations for automated financial advice. Currently active in an organization focused on providing organizations with guidance to manage the challenges of financial markets.

### 2.3 Data collection, interview guide and transcription

The nine semi-structured interviews were conducted over a five-week interval and encompassed in total 6 hours and 55 minutes for all questions. On average, a semi-structured interview lasted 46 minutes and 7 seconds, excluding an introduction to the topic. Due to travel constraints, Microsoft Teams was the preferred communication medium for all but one semi-structured interview; this was conducted at the place of work of the participant.

The semi-structured interviews followed a design proposed by Arsel (2017). The first question served as an opening, in which the participants introduced themselves and their area of expertise. Their background could provide valuable insights into possible probing questions later in the interview. During the second question, a common understanding of the meaning of automated financial advice was established, as researchers and practitioners may use different terminology or view topics differently.

*Table 2: Steps in the coding process*

Steps in coding process	Goal
Repetitions	To identify reoccurring concepts. The more often a concept appears in a dataset, the more likely it is to be a theme.
Transitions	To identify naturally occurring shifts in a text that may indicate the presence of a theme, such as new paragraphs, pauses, changes in intonation, or a shift in phrasing.
Similarities and differences	To search for similarities and differences in the text to identify sub-themes.
Cutting and sorting	To cut and sort the semi-structured interview data, by combining analysis of previous steps by sorting similar arguments into piles, creating themes and sub-themes.

Therefore, a mutual understanding of topics is essential to prevent interpretation errors later in the interview or during the analysis. This line of reasoning was continued in the succeeding questions, which addressed the differences between traditional and automated financial advice, opportunities and challenges related to ethics, and the future development of automated financial advice. These questions were asked depending on what kind of probing opportunities arose. The final question asked participants whether there was anything that was not yet addressed but could be important for this research. In this way, participants were provided with the opportunity to discuss topics not previously considered. An effort was made, throughout the semi-structured interviews, to avoid leading questions so as to prevent reaffirming existing assumptions derived from the current literature. Appendix A contains the original Dutch interview guide (i.e., Dutch was the primary language used for all semi-structured interviews), and Appendix B contains the translated English interview guide used during the semi-structured interviews.

Following the interviews, a software called Sonix (2022) was used to transcribe collected audio data to text. Automating the transcription process allowed for more efficient transcription, with an average accuracy of 91.31%, according to Sonix (2022). However, the software often misinterpreted words that it believed to have transcribed correctly, resulting in significantly lower actual transcription accuracy. Therefore, each transcript was manually checked and compared to the audio data in accordance with the coding process.

#### **2.4 Coding process**

The identification of themes is a crucial component of qualitative analysis. Ryan and Bernard (2003) propose multiple coding methods to identify themes and sub-themes in relevant data. This research paper adopts a coding method relevant to rich

narratives, such as semi-structured interviews, to transform data into useful insights. This method consists of four steps: repetitions, transitions, similarities and differences, and cutting and sorting (see Table 2). Throughout the analysis, a qualitative data analysis and research software called ATLAS.ti (9.1.7.0) (2022) was used to manage these steps.

### 3. Results

#### 3.1 Value considerations of automated financial advice

The interviews started by talking about the potential value that automated financial advice can create for consumers and the financial advice industry, compared to traditional financial advice. The themes discovered during the analysis of the semi-structured interviews and relevant to this research question were accessibility, costs, and objectivity. Additionally, complexity was a recurring theme that influenced the extent to which automated financial advice can create value through accessibility and lower cost. These themes are discussed in detail in the following paragraphs, while Table 3 summarizes the main findings of this theme.

##### Accessibility

There is a consensus among participants (A, B, E, F, H, and I) that automated financial advice can provide value to consumers and organizations by lowering the threshold to obtain financial advice. Participant A highlighted the value to consumers by stating that searching for automated advice on the internet may be easier because it can provide an adequate solution right away, compared to searching for a suitable traditional financial advisor. This line of reasoning was corroborated by Participant H, who added that seeking out traditional financial advice often acts as a threshold for consumers that must be overcome. Automated financial advice can ease this burden so long as the organization offering the advice has a proven track record of positive reviews. Participant F further emphasized added value to consumers by stating: *"You can offer automated financial advice at any time instead of solely during the working hours of traditional financial advisors."* Participant B stated that this is especially relevant when organizations target a younger demographic. As he added: *"You [younger demographic] must make an appointment with these people [traditional financial advisors], and they [the younger demographic] are not interested in that. They want financial advice to be on-demand. Therefore, by definition, this must be achieved through an online application, and ideally without human intervention."* Participant C explained this further by stating that the younger demographic is accustomed to technology and, therefore, more comfortable interacting through a digital medium. Elderly persons, on the other hand, are less savvy when it comes to technology and may require extra assistance.

Further emphasis was put on the role of trust when interacting through a digital medium. Because younger demographics are often accustomed to using technology, they may trust the digital medium more easily than the elderly. Participant H also

mentioned this finding while adding that the elderly demographic is more inclined to enlist the help of a traditional financial advisor, who will guide them through the process of obtaining financial advice. Participant I furthermore stated that it is important to tailor the advice process to the specific target demographic. These findings highlight a decrease in the effort required to obtain automated financial advice compared to traditional financial advice. Moreover, the discrepancy between providing automated financial advice to different target demographics is emphasized.

Accessibility can also be improved by further automating the collection of financial information from consumers to develop an overview of their financial situation. Participant B stated: *"We developed an app that lets you log in to governmental websites through DigiD [app to access sensitive personal information safely], and it will automatically scrape relevant data from these websites."* Moreover, it added: *"Because you are directly connected to the source of information, you are guaranteed that the data are transferred one to one."* Deciding which information to collect and how to interpret it can be a tedious step for consumers, depending on their financial knowledge. Automating this step can reduce potential difficulties experienced during this step while simultaneously reducing the likelihood of incorrect information being used in later steps of the financial advice process.

Despite the potential for adding value in terms of accessibility, participants A, E, and F also highlight concerns that can negatively impact the value created for consumers and organizations. Participant E stated: *"You can imagine that financial advice is, first and foremost, developed for people who can pay for it. These are not necessarily the same people who need financial advice the most."* They elaborated further on this by saying that organizations offering automated financial advice currently do not develop their advice process around targeting the needs of lower-income groups, who may struggle with requesting certain government subsidies. Instead, more affluent consumers, who, for example, are looking to buy a property, are targeted. Participant A further highlighted the relation between costs and accessibility by stating: *"The more complex I make it [the algorithm], the higher the development costs will be. Then you must also look at your target demographic. Is my target demographic large enough to recover the costs of the financial advice offered?"* It further emphasized this statement by stating: *"As soon as costs become a threshold that must be recovered, it will be at the cost of accessibility."* These findings highlight friction between providing financial advice to specific groups within the low-income population and the potential to recover the development costs of an algorithm.

A concern mentioned by participants (E and F) is the lack of emotion in automated financial advice. Participant F voiced a concern regarding the emotional intelligence

of automated financial advice: *"A traditional financial advisor sees the customer and can see whether the customer is unsure of an answer. To an extent, this can also be tested with a suitability test. However, despite this, the emotional side of the story [advice process] is partly lost for digital advice."* Participant E added that recognizing emotions is something that computers cannot currently do. He continued by saying that recognizing emotions may become a reality someday, but not in the short term. Participant F furthermore pointed to the lack of interpersonal connection in automated financial advice by comparing traditional financial advice to an experience: *"... you get a cup of coffee, and they make you feel welcome. This is where physical stores must excel over digital stores. It turns into an experience. Someone reserves time for you, even though you pay them to help you. This can make you feel special, as somebody cares for you and helps you. Digitalizing this experience is very challenging."* These statements emphasize the lack of emotion and interpersonal connection involved in automated financial advice in its current stage of development. Consequently, accessibility may be negatively impacted for customers who value this experience or the personal guidance of a financial advisor during the advice process.

### **Costs**

Directly related to accessibility is the aspect of costs. Participants (A, D, E, F, G, H, and I) agree that automated financial advice can create value through a reduction of the cost to obtain financial advice compared to traditional methods. For example, participant D stated: *"If you look at it from an economic point of view, it is a lot cheaper, of course. I mean, it is an algorithm that you develop once and then must maintain and tune, but of course, a lot cheaper than if you let a human do this repeatedly."* One explanation for this statement is the economy of scale that can be realized because automated financial advice is offered through a digital medium. Participant G explained this by stating: *"If we automate the advisor, we can make the advice cheaper."* Participant E corroborated this by stating: *"An organization like redacted is very small, and with our personalized budget advice tool we can serve hundreds of thousands of people per year."* This statement was emphasized further by stating: *"Because automated financial advice is cheaper in the end, it has the potential of reaching a much larger public."* Corroborating this, participant H stated that because automated financial advice can be cheaper, it can also remove a barrier for consumers to engage with it. These findings demonstrate how costs are interrelated with the aspect of accessibility. Reduction of the cost to obtain financial advice, which comes from reducing the cost of gathering and combining all relevant information, as well as replacing the advisor with technology, can make it more accessible to a broader target

group. Moreover, organizations can reduce their overall costs through automation of the advice process, while also being able to provide advice to more consumers compared to traditional methods.

While automated financial advice is viewed as a cheaper alternative to traditional financial advice, participant A voiced concern regarding complexity as a cost driver for automated financial advice, as it may obstruct additional value from being created for customers and organizations. This participant stated that an algorithm with low complexity would be easy to automate at relatively low cost. However, as mentioned under accessibility, increased complexity will exponentially heighten the development costs. He explained his reasoning further by stating: *"The Netherlands has a complex tax system. If you want to incorporate all exemptions and applications, the complexity [of the algorithm] will massively increase. This will, in the end, impact costs."* The following section will elaborate on these statements and discuss the aspect of complexity in more detail.

### **Complexity**

Directly related to costs and accessibility is the aspect of complexity. Participants primarily discussed complexity in terms of informational and emotional complexity. Moreover, a distinction was made between the capabilities of automated financial advice in its current stage of development and the future possibilities. Regarding informational complexity, the consensus was generally positive from participants (E, F, and G). When compared to traditional financial advice, participant G stated: *"With automated financial advice, you can take into account many more possibilities and calculate what would be best. You can branch out further and personalize advice more from the informational side."* Solely considering automated financial advice, participant E stated that objective financial information is easiest to capture. However, he emphasized the importance of further development to realize this fully. Participant F also saw no limitations in collecting objective financial information and the subsequent calculations using this information. Instead of emphasizing the importance of future development, he stated that whether automated financial advice is capable of complex calculations depends on the depth of the information required. Conversely, participants A and B voiced a negative opinion regarding informational complexity. The argument of participant A, which illustrated the relationship between increased complexity and costs, was discussed in the section on costs. Participant B used an example of the Dutch pension sector to illustrate his argument. The Netherlands has mandatory pensions, which consumers can add to with supplementary pension products. There are many varieties of additional pension products, but an adequate



overview of these products does not exist. He added that automated financial advice does not currently have the capability of accumulating and subsequently incorporating these products into a holistic overview. Instead, a traditional financial advisor can easily inform customers about supplementary product options.

As to emotional complexity, various participants (E, F, G, and H) agreed that this was a major challenge for automated financial advice. Both emotional intelligence and interpersonal connection were previously discussed in the section on accessibility. Additionally, participant H stated: *"I think it is relatively difficult to discuss and quantify goals in automated financial advice."* He next gave an example of a personal experience with a financial advisor, in which he wanted to achieve a goal. However, he was not entirely convinced about what the goal entailed. Through a conversation, they clarified these goals and adjusted the financial advice accordingly. It was hard to imagine having a prolonged conversation with an automated financial advisor in which goals could be discussed, leading to changes to the advice. While this also relates to the aspect of accessibility, the inability to quantify subjective information in an algorithm is a fundamental challenge of complexity. When asked about the integration of subjective variables, Participant G stated: *"There still is a very long way to go. What I just mentioned is not even offered yet. The complexity of this [subjective variables] is too great."* He added that organizations must also consider that advising someone on their entire net worth requires a different perspective than when the advice pertains to only ten percent of the person's net worth.

Considering both informational and emotional complexity, participant A stated that much further development of automated financial advice is required to lower the hurdles related to complexity adequately. Therefore, he sees complexity as a challenge rather than an opportunity. Participants I and G provided a more nuanced view of the matter. Participant I stated: *"I think that we may go into a phase where the standard cases, or the minimally complex cases, will be automated, serving as a backup for the more difficult cases or more challenging customers. As the technology develops further, more and more will be automated."* This statement was corroborated by participant G: *"You will see that it is a growth model. At first, you have the people who want to do it themselves, and their level of complexity is low. Once you start improving the customer journey and collect more data, you can increase the number of customers that can go through the advice process."*

These findings highlight the value-creating opportunities and value-inhibiting challenges of automated financial advice when it comes to informational and emotional complexity. Participants were generally optimistic about the opportunities for informational complexity, especially regarding opportunities that may arise from

future developments in this space. Contrarily, incorporating emotional intelligence into algorithms was viewed as a significant challenge. Participants had difficulty imagining automated financial advice being able to incorporate subjective variables. Overall, it seems that automated financial advice is currently limited to consumers with cases that involve low complexity. As development continues, providing advice to increasingly complex cases will become a reality. Whether emotional intelligence can be addressed in the future remains to be seen.

### **Objectivity**

There is a consensus among several participants (A, B, C, and D) that automated financial advice can create value by offering more objective advice than traditional financial advice. Participant A stated: *"You could say that the preferences of an advisor when advising an individual are not included in automated financial advice, which would make it more objective."* However, continued by saying that objectivity is relative and dependent on the developers of an algorithm. Continuing this reasoning, participant C stated: *"I am very cautious in claiming objectivity ... because the programmer is also a human. However, the risk is lower because it is a one-time activity that you can approach from different angles. You can incorporate socially accepted norms established by multiple humans, while a single traditional advisor must consider this awareness repeatedly. We are not equipped for that, while a machine or algorithm is."* Instead of stating the importance of establishing relevant social norms, participant D emphasized curating mathematical models: *"We take the input from multiple advisors and condense this information to a formula or multiple formulas through a mathematical model. Because of this, you can also capture multiple views and opinions. Thereby, an algorithm is less susceptible to the opinions of a single advisor."*

Ultimately, the goal is to try to capture what a traditional advisor thinks into an algorithm. Participant D did, however, state that this method will result in the algorithm being unable to accommodate outliers, who constitute a minority of consumers whose cases deviate from what the algorithm can comprehend based on these models. Applying more robust objectivity measurements through collective efforts, automated financial advice can provide a more standardized advice process than traditional financial advice. Participant B stated that, when developed correctly, every consumer will receive the same experience, and the resulting advice will be of higher quality than traditional financial advice. Moreover, as participant C mentioned, through collective efforts they strive to provide consumers with fully objective advice, which will always have the same result for customers in the same scenario. The

*Table 3: Summary of findings regarding value considerations of automated financial advice (AFA)*

Value consideration	Summary of findings
Accessibility	<ul style="list-style-type: none"> <li>– AFA can lower the threshold for obtaining financial advice by being accessible anytime and anywhere, and providing advice more quickly.</li> <li>– Better automation of collecting the right financial information lowers the barrier for financial advice.</li> <li>– It is important to tailor the algorithm to the right target demographic. A younger demographic is generally more comfortable interacting with technology and may develop trust more easily, while the elderly demographic may be more reluctant to use new technology and instead rely on the guidance of a traditional financial advisor.</li> <li>– AFA is often developed without low-income households in mind, which may negatively impact accessibility for lower-income groups.</li> <li>– An algorithm lacks the personalized experience and emotional intelligence of a human financial advisor, which may reduce the quality of the experience received by consumers and the accessibility for consumers who require guidance to comprehend financial advice.</li> </ul>
Costs	<ul style="list-style-type: none"> <li>– AFA requires development, tuning, and maintenance. Eliminating the human component from the advice process will significantly reduce overall labor cost.</li> <li>– AFA allows economies of scale to be realized, thereby reducing costs.</li> <li>– Complexity can lead to higher development cost, potentially reducing accessibility and affordability.</li> </ul>
Complexity	<ul style="list-style-type: none"> <li>– Most participants are positive about the informational complexity that AFA can handle. However, the capability of AFA to handle complex calculations depends on the depth of information required.</li> <li>– Emotional complexity is seen as a major challenge. There is a long way to go before this hurdle can be overcome.</li> <li>– Currently, AFA is best suited for cases with low complexity. Participants are optimistic about incorporating more complex cases in the future. Before that moment has arrived, AFA will require human intervention to address cases of higher complexity.</li> </ul>
Objectivity	<ul style="list-style-type: none"> <li>– AFA is seen as more objective, because an algorithm can consider the input from multiple advisors, thereby being less susceptible to the preferences and biases of a single advisor.</li> <li>– When developed correctly, the quality of advice will be higher than traditional, i.e. human, financial advice.</li> <li>– Despite this, full objectivity is nearly impossible since humans are inherently biased.</li> </ul>

participants stated that achieving full objectivity is nearly impossible because the input from advisors remains subjective. However, measures are taken to limit the risk of potential bias being incorporated into the algorithm, namely through collective feedback efforts. Consequently, the advice may become a more objective reflection of the financial situation of a consumer.

### 3.2 Ethical issues of automated financial advice

The second research question explores what the experts consider to be the main ethical issues of automated financial advice. Experts mentioned all ethical principles that are described in the Ethics Guidelines of Trustworthy AI published by the European

Commission (2019). However, the extent to which ethical issues were mentioned varied depending on the knowledge of the expert and the line of questions that were applied to explore topics within the agreed-upon time constraints of the semi-structural interviews. Table 4 provides a summary of the findings of the main ethical issues of automated financial advice.

### **Autonomy**

During the interviews, only participant C directly referred to human autonomy. However, participants stated several aspects relevant to individual and algorithmic autonomy. In terms of individual autonomy, participant C stated that autonomy pertains to paternalism in the sense that the financial advisor has a duty of care towards consumers. This perspective means that the participant, being an expert and talking to a consumer who is not an expert, must explain to a consumer what he considers the best advice, while taking into account possible reactions the consumer may have. A consumer can accept the advice, be skeptical about it, or completely disagree with it. Because autonomy touches on personal values, it is important to consider how the advice will be received. Participant C continued: *"Therefore, in communicating with the customer, I must ensure that he does not get the idea that he is being influenced and ensure that he makes his choices independently, or at least on a voluntary basis."* Moreover, according to participant C, a point of contention in receiving automated financial advice is that consumers may view themselves as better than machines: *"... who would do something that a machine tells them? We are superior to machines, so why would I accept advice from a machine? Despite this, they do often accept the advice from an authority."* However, as stated by participant G: *"The question is whether consumers understand what they are doing."* The participant provided an example that aid consumers in decision-making without touching their autonomy. If a consumer fills out a questionnaire and receives a neutral risk profile, multiple advice options can be considered ranging from a short-term to a long-term risk outlook. To help consumers understand why they made a particular choice, the participant emphasized the importance of including a feasibility percentage of reaching a goal. When this is the case, consumers can better decide whether they agree with the possible advice options or would prefer to deposit an additional amount of money into the investment portfolio. Depositing additional money would increase the likelihood of reaching a goal within the given risk parameters. Participant G continued: *"If you put people more in control and let them make more choices, they become the owner of the journey to their goal. Research shows that people are happier when*

*they are goal-oriented. Also, they become happier already during the journey, not only when the goal is realized."*

Additionally, participant I argued that there should be more awareness regarding the interdependent relationship between advisor and consumer, to ensure independent advice for consumers. Awareness can be achieved through proactive efforts from the compliance department within organizations to emphasize the importance of this relationship to advisors.

Algorithmic autonomy was also discussed by participants A, B, and G in the previous sections on complexity and objectivity in terms of the current capabilities of automated financial advice compared to its potential in the future. Regarding the current capabilities in practice, participant C stated that they can currently offer automated financial advice nine out of ten times. However, he added that this is possible because he solely offers advice based on selective variables instead of a holistic solution. This finding is corroborated by participant F, who stated that there currently are no real solutions that provide holistic automated financial advice. Moreover, the participant added that automated financial advice in its current stage of development cannot match the quality that traditional financial advice provides. Therefore, hybrid advice is often offered as an alternative to automated financial advice, to match the quality of traditional financial advice. Participant B continued that despite further developments in the future, there will always be consumers who prefer to speak to a human advisor, especially regarding decisions that are low-frequency events and have a high impact on the lives of consumers. Therefore, they argued that traditional financial advice will always continue to exist.

### **Explicability**

The importance of transparency was mentioned by multiple participants (C, E, G, H, and I). Varying explanations were stated of what transparency meant to them. Participant E mentioned transparency as the ability to justify why an algorithm came to a decision. This finding was elaborated on by Participant G, who emphasized the importance of data analysis to communicate choices and explain choices to a consumer, advisor, or regulator. The data can then be used to improve the algorithm further, such as by using anonymized data to determine why certain consumers deviate from the choices they are presented with. But the broadest explanation of transparency was given by participant H. Firstly, transparency considers adherence to legal rules and regulations, plus there is a difference between what is allowed and what organizations should do. Secondly, transparency entails always asking permission from consumers before using their data. Thirdly, transparency should provide

insights into which consumer data are used and what the data are used for. Fourthly, transparency is the ability to show and explain to consumers the consequences of their actions. Participant H completed his reasoning by stating that from an inter-organizational perspective, organizations should prioritize making their advice process transparent, to prevent the algorithm from becoming a black box. From a practical perspective, participant G stated: *"Transparency throughout the entire advice process, that is the most important, I think."* When asked why he considered transparency to be the most important ethical issue, participant G responded: *"If your aim is to deliver the best advice possible to a customer, you have to ensure that this consideration is fair and transparent, and that they understand why certain choices are made."* Moreover, participant C used the term "traceability" to describe a transparent advice process. The participant considered being able to demonstrate that he delivers trustworthy and consistent advice as part of his organizational values. This participant also stated that there are two components to realizing this. Firstly, adhering to legal rules and regulations. Secondly, being able to reconstruct advice: *"... when a customer returns and contacts us, I want to be able to reconstruct the advice based on their characteristics and explain how we came to certain decisions. It must be a logical story; I do not want to guess how the advice came to be."* Furthermore, as participant I stated, transparency as an ethical issue is crucial to consider for financial organizations. Compared to regular stores, financial organizations have a duty of care towards consumers who enlist their services. By incorporating the abovementioned aspects, transparency can ensure that consumers are not misled and are provided with independent advice.

The duty of care was mentioned by several participants (B, C, D, F, G, H, and I) and has several components. Participants C, D, G, H, and I stated that there is an important distinction between putting the customer first and putting the needs of customers first. According to participant C, organizations want to put the customer first from a commercial point of view. However, from an ethical point of view, they should prioritize the needs of customers. This prioritization can entail advice that is counter to the wishes of the customer. Participant D continued this reasoning by stating: *"Customer satisfaction does not always equate with customer needs. The fact that a customer can be very satisfied with your service does not necessarily mean that you did a good job."* Participant I gave an example to illustrate this point: Imagine that a customer is allowed to take out a loan against the maximum mortgage. He might be pleased about this, but to best serve the customer, you would recommend choosing a different product. This advice might go against their direct wishes, but it would be the most suitable for the person's financial situation. Because of scenarios like this,

participant C advocated a paternalistic approach, where the customer is proactively made aware of potentially suboptimal choices, also when the customer may not appreciate the input. The participant added that communication is vital in ensuring acceptance of a given advice, thereby reducing a potentially negative response from the consumer. Participant G proposed another perspective from an investment point of view. He illustrated how customers can be presented with several options that will generally be agreeable to both parties: *"As an advisor, you have a range of good solutions. We do not believe in a single optimal solution; there is always more than one. However, you can say that the solution must be within a certain range. Often there are two or three options. An example of this is the risk profile. You fill in a questionnaire, which results in a neutral risk profile. Now you get two scenarios. Defensive with a 95% feasibility and an equity of 100, or a neutral risk profile with a feasibility of 90% and an equity of 110. When it [the scenario] does not go according to plan, the consumer will get -10, but for the defensive profile only -2. Now, what is a good choice? Is the highest chance good? Is the highest potential equity within a given risk profile good? Or is the lowest downside risk in a year good?"* Being an expert, participant G stated that he often has a good indication of the best option for a given customer. However, the participant went on to say that the customer always decides which advice to take in the end, while it is the role of the advisor to fulfil his duty of care by providing honest insights into the potential risk to yield trade-offs during this process. Participant H stated that the duty of care is also represented in several legal documents. Participants H and I both specifically mentioned the Financial Supervision Act (*Wet financieel toezicht, Wft*), the law governing financial oversight in The Netherlands, as an example that includes elements of the duty of care. Regarding the legal rules and regulations, participant C added that the provision ban in 2013, which banned financial advisors from selling products on a commission basis, is an example of a regulatory change that is intended to provide more honest and objective advice to consumers. Participant I stated that, despite measures to ensure that the duty of care is incorporated in the financial advice process, organizations often prioritize economic incentives over abiding by the duty of care more than is legally permitted. While these examples refer to traditional financial advice, automated financial advice is bound to the same regulatory framework. Therefore, these findings extend to automated financial advice as well.

To ensure that organizations reflect on the development of their algorithms, participant E furthermore argued that they must be held accountable for the consequences of faulty automated financial advice. Various errors, intended as well as unintended, can result in faulty advice. However, faulty advice reflects negatively on

consumers regardless of intention. Participant A stated that creating rules and regulations specifically geared to automated financial advice would be beneficial. However, he added that automated financial advice is in an early stage of development and that regulatory bodies generally only consider additional rules and regulations after an accident has occurred. As an example of faulty automated financial advice in practice, participant E mentioned the Dutch childcare benefit scandal, where a biased algorithm resulted in discriminatory consumer outcomes. Moreover, because the Dutch tax authorities failed to ensure inter-organizational transparency, the algorithm operated in a black box, resulting in the harm inflicted on consumers going undetected for a prolonged period.

### **Fairness**

During the interviews, participants D, E, and H referred to fairness in terms of potential bias in an algorithm. Participant D stated that there is current pressure on automated models because they may discriminate or act in unwanted ways. The participant continued his reasoning with: *"I think that it is often wrongly assumed that this is a problem with automated advice, while you can also wonder whether this issue is not bigger when it is not automated. I think that this would often lead to a surprising answer."* Participant D illustrated this view with an example regarding consumer credit scores. He stated that the most sensitive data that organizations use are consumer credit data, which can be bought. Some organizations rely heavily on consumer credit scores in deciding whether to accept or deny customers a loan. Generally, these data are reliable, but they can be old or polluted in individual cases, resulting in an undeserved negative credit score. To illustrate this further, participant D stated that this is possible when, for example, a previous tenant or your partner has unpaid debts, which subsequently get unjustly transferred to your credit score. Organizations should, in theory, perform a manual human check of these data. However, this is often neglected when a consumer gets flagged. For that reason, the participant thinks that a financial advisor would often not make better decisions than an automated financial advisor. Furthermore, participants D, E, and H agreed that bias in algorithms is a challenge that must be addressed. While it is subject to debate whether the input data in the previous example are biased, it illustrates that biased data can result in unfair treatment of consumers. Therefore, to address bias, examples were provided by participants E and H to mitigate bias at the data input stage. These examples illustrate that an algorithm can be prevented from learning from biased input data, which could result in repeatedly flawed output data. Participants E and H stated the importance of carefully organizing a dataset and relevant variables.



Moreover, personal data must be anonymized or removed to prevent historical data bias or non-representative sample bias. Participant H used gender as an example to illustrate this point. Suppose a dataset shows that men are historically promoted over women. In that case, it is important from an ethical point of view to remove this variable, to prevent the algorithm from potentially favoring men, depending on the case in question. When structured correctly, participant E mentioned, an algorithm without bias could in theory be developed. He added that this would be nearly impossible for a human financial advisor.

Additionally, several participants (F, H, and I) addressed fairness in terms of safeguarding consumer privacy. Participant H emphasized the importance of complying with the General Data Protection Regulation (*Algemene verordening gegevensbescherming*, AVG). He stated that, because the specific sector that they are active in has numerous supplementary data on hand, certain data could not be used without asking specific permission from the consumer. This participant moreover mentioned the importance of not keeping personal data indefinitely, but instead deleting them after having served the purpose for which they were collected. Participant F corroborated these findings and added that organizations should not collect more personal data than strictly necessary. The participant also stressed the importance of organizations paying attention to their back-end IT infrastructure, to reduce the risk of a privacy breach. Participant F voiced concerns for the future regarding privacy, for example, building a privacy dossier to track which data are collected and how they are used over time. This example was mentioned as relevant because companies should keep an account of how they collect and process data. However, no privacy rules and regulations are tailored to automated financial advice to enforce this. Therefore, they argued for regulatory bodies to get involved and develop new rules and regulations. From a consumer point of view, participant F stated that consumers are afraid of their personal data being breached. He stated: *"Look, an email address we share easily, a phone number slightly less easily, name and address are also still fine. About this, the majority [of consumers] agrees. However, to derive financial insights you also need insight into the current financial situation of a customer. In other words, how much money do you have in the bank, and how much do you earn? It also depends on cultural factors, but we are hesitant about submitting these data in The Netherlands. If our address gets leaked, it is a nuisance. If your entire financial situation gets leaked for the entire world to see, it will have a much bigger impact on the customer."*

Despite consumers being aware of the potential consequences of submitting personal data, they often forego the aspect of privacy when the incentive is high enough,

according to participant D. As an example, this participant mentioned the grip that giant tech companies have over consumers. While being aware that your personal data may be used for purposes that you do not agree with, you still use them because alternative solutions are often inferior. Moreover, as participant F stated, consumers often attach more value to the look-and-feel of a website than to whether the underlying technology is adequate. The reason stated for this is that consumers often lack the required knowledge or the interest to examine how the back-end operation of an algorithm works, despite this information being readily available in the privacy terms of agreement on a website.

Going beyond what is legally required under the GDPR, participant D stated that organizations should consider how data collection can be minimized while still being able to provide the best possible advice. Considering this would also reduce the extent of information being leaked in case of a privacy breach. However, the participant added that there is an ulterior motive behind this reasoning. Within his sector, he found that asking too many questions or questions that are too convoluted resulted in conversion rates dropping. Therefore, this situation was facilitated by an economic incentive.

### **Prevent harm**

The prevention of intended as well as unintended harm was mentioned by a single participant (A). Participant A emphasized why rules and regulations are necessary to prevent intended harm. The participant stated: *"If everyone would act with the right intention in mind, then rules and regulations would only be required to prevent accidents. So, unintended harm instead of intended. The protection of the consumer should be prioritized, regardless of whether we are talking about traditional or automated financial advice. When there is the intention to make consumers do something that they should not be doing under the guise of advice and mainly benefits, it is the advisor who should be regulated first."* Participant A continued by stating that his main concern is intended misbehavior on the part of actors, rather than unintended accidents by organizations with experience in automation that seek to develop automated financial advice for the masses as a low-cost alternative to traditional financial advice.

Furthermore, participants discussed the prevention of harm as a component of other ethical issues. For example, adherence to the duty of care, as mentioned by participants B, C, D, F, G, H, and I in the section on explicability, is a method of preventing intended or unintended harm. Moreover, the mitigation of bias in an algorithm to prevent potential discriminatory outcomes, as discussed by participants

D, E, and H in the section on fairness, is an alternative method to prevent unintended harm. Lastly, compliance with the GDPR to prevent potential data breaches, as will be discussed by participants F and H in the section on fairness, is another method to prevent intended or unintended harm.

### **Trust**

Among the ethical issues discussed, trust was referred to most often in direct terms. Participants A, C, D, F, G, and H identified three main factors that influence trust: interpersonal, individual, and external factors. Interpersonal trust relates to the relationship between a consumer and an advisor. Participant H stated that he considers advice from an independent source to be more trustworthy because it reduces the likelihood of the advice being influenced by ulterior motives. Larger organizations, such as banks, may tailor their advice to the products they offer and omit other suitable options. Participant G, on the other hand, stated that research has shown that consumers often consider organizations with an established market presence to be more trustworthy than an independent party. Additionally, participant H stated that automated financial advice promotes consumer trust by portraying an expert role through which consumer decisions are explained alongside the steps that led to those choices. Participant G added that the expert role could also be portrayed by an advisor confirming that a consumer chose a financially beneficial option.

Despite automated financial advice being able to react to choices made during the advice process, it is still difficult to have a prolonged conversation, as participant H suggested in the section on complexity. Participants A, C, and F emphasized the importance of being able to ask questions to an advisor, because responses by the advisor can serve as an indicator of trustworthiness. Because automated financial advice does not currently offer this functionality, these participants found it difficult to determine whether it is more trustworthy than traditional financial advice. Participant A stated: *"The moment a machine tries to win my trust, I am inclined to think, that is nice, and you seem to understand me. You are programmed impressively, but do I really trust you? I do not know what drives the algorithm. I cannot ask the machine any questions to test whether I trust it. This is, however, possible with an advisor who sits across from me. I can ask him questions to determine whether I trust him."* Participant F emphasized the same aspects mentioned by participant A, adding that individual factors moderate the relationship between a consumer and an advisor. The personal experiences of consumers, their tech-savviness, and prior experience with financial products were mentioned as examples of individual factors. The participants went on to say that, when these aspects are absent, consumers

may see a traditional financial advisor as the more trustworthy option. Participants C and F stated that this might be because a traditional financial advisor can provide more guidance during the advice process and answer potential questions in more detail, which can positively influence trustworthiness. Moreover, participants C and H discussed how trust might be influenced by age – see the section on accessibility. The participants mentioned that the threshold of interacting with automated financial advice might be lower for the younger demographic because they are often more accustomed to technological tools. The elderly demographic, on the other hand, is generally less tech-savvy and may appreciate the additional guidance provided by a traditional financial advisor.

External factors such as influence from social circles, online reviews, and the perceived authority of an organization or advisor were furthermore mentioned by various participants (A, C, D, F, G, and H). Participant F stated that positive word of mouth and positive experiences of other consumers could grow trust in automated financial advice over time. Participant G mentioned that had had a conversation with an academic who stated that trust stems from two components: either an expert stating that the advice is correct, or confirmation from friends or family members with a financial background. However, research conducted by participant A found that consumers are more satisfied when the source of advice is a traditional financial advisor rather than friends, family, or an automated financial advice tool. Among the probable reasons for these findings, according to the participant, are a lack of trust in non-financial experts and insecurities related to previously discussed individual factors. He continued by saying that traditional financial advisors can be persuasive in alleviating potential concerns through conversational contact, but this is currently not possible with automated financial advice.

Another way to increase trust in automated financial advice is through positive online reviews. Participants F and H both stated the importance of having a proven track record of positive online reviews to foster trust. Moreover, participant F stated: *"If you are new to the market, without good reviews or experiences from others, then it will be difficult to win the trust of consumers compared to if you have an established name."* The perceived authority of an organization or advisor relates back to the influence of social circles and online reviews. Participant G stated that consumers perceive an organization with an established market presence to be more trustworthy. Moreover, participant H stated that consumers reach out to an advisor based on title and experience because these indicate how much they can rely on their advice. Despite these arguments following rational thinking, participant C argued that trust is an emotional instead of a rational choice. He illustrated this with the following

*Table 4: Summary of findings regarding the ethical considerations of automated financial advice (AFA)*

Ethical principle	Summary of findings
Autonomy	<ul style="list-style-type: none"> <li>- Automated financial advice must ensure that choices are made independently, or at least voluntarily. Nudging should be avoided.</li> <li>- If consumers evaluate themselves as being smarter than a machine, they may be reluctant to accept algorithmic advice.</li> <li>- Supplementary tools, such as including a feasibility percentage of reaching a financial goal, can give consumers more control over the decision-making process and maintaining their autonomy.</li> <li>- Algorithmic autonomy is not an issue yet, as AFA can only consider specific variables and is not able to provide holistic financial advice yet. Hybrid advice is currently the only feasible option that can come close to matching the quality of traditional financial advice.</li> </ul>
Explicability	<ul style="list-style-type: none"> <li>- A transparent algorithm should provide explanations of the how and why of decisions, and it should provide insight into how data are used and for what purpose.</li> <li>- Companies that provide automated financial advice have a duty of care towards consumers. Providing honest advice and making consumers aware of their choices and the consequences is key. Improving legislative frameworks, so that they take into account the increasingly complex nature of algorithms, is necessary to prevent something going wrong.</li> </ul>
Fairness	<ul style="list-style-type: none"> <li>- Bias in an algorithm should be mitigated. A dataset should be carefully curated before being processed by an algorithm. Personal data should be anonymized to prevent an algorithm from favoring particular groups.</li> <li>- GDPR compliance is essential but not enough. Privacy rules and regulations tailored to AFA are lacking. Organizations should go beyond what is legally required.</li> </ul>
Prevent harm	<ul style="list-style-type: none"> <li>- Preventing (un)intended harm considers aspects from multiple other ethical issues. Rules and regulations are required to address intentional misbehavior and good-natured accidents.</li> </ul>
Trust	<ul style="list-style-type: none"> <li>- Many factors can influence trust in AFA. For example, the provider of the advice, being able to ask questions, reviews, and individual factors such as tech-savviness and financial knowledge.</li> </ul>

example: *"I find this a very nice example of how things went during the financial crisis [in 2008]. You had the bank in Iceland that everyone trusted and offered a 5.5% yield. It went bankrupt. In Turkey, they offered an 11% yield, and you could get your money without a problem. In a way, and this is also our brain doing weird things: northern countries are trustworthy and southern countries are untrustworthy. Based on this, we decide and subsequently forget to consider the entire picture or to take other aspects into account."* This emotional instead of rational decision-making was corroborated by an example from participant D. An organization he was involved in was subject to a bad press on several media outlets, including the national news. The organization was accused of manipulating customers through its algorithm. Even though the allegations were unfounded, this caused an uproar among consumers. However, the unjustified bad press and consumer reactions resulted in hardly any

revenue drop. Consumers did not withdraw from using the organization's products and services because it offered a quicker and easier solution than traditional methods. The participant concluded that consumers often forego their morals and values as long as the incentive to benefit is high enough.

### **3.3 Considerations for the future development of automated financial advice**

The third research question explores how developers of automated financial advice can best address ethical issues encountered during the development or after the deployment of the algorithm. All participants responded to the questions relevant to this question. Firstly, experts were asked whether they consider the integration of ethical norms and values to become more important in the future. Secondly, they were asked how organizations can prepare themselves for potential challenges regarding ethical issues in the future. Depending on their answer, follow-up questions were asked. Table 5 provides a summary of the findings of the ethical considerations that should be taken into account when developing automated financial advice.

#### **Outlook on the integration of ethical norms and values**

Participants A, C, D, E, F, H, and I differed in their outlook on whether it will become more important to incorporate ethical norms and values into automated financial advice in the future. Participants A, H, and I stated that ethical norms and values would become a more significant aspect of automated financial advice in the future. However, they failed to clarify whether their outlook was positive or negative. Participant E was optimistic so long as the technology is used correctly. He clarified this further by stating that organizations often develop automated financial advice based on an economic incentive. Therefore, regulations need to be in place since organizations will not implement ethical components voluntarily. When ethical norms and values can be enforced, it will provide many opportunities for consumers. Other participants (C, D, and F) had a pessimistic outlook on incorporating ethical norms and values. Participant D stated that there is pressure to deliver efficient and quality advice to consumers. While this can be a positive development, it may result in ethical norms and values not being prioritized. Moreover, organizations are often driven by economic instead of ethical incentives, and there currently are few incentives for organizations to incorporate ethical norms and values.

Two incentives mentioned were codifying ethical norms and values into rules and regulations, and the possibility of an organization losing face. Despite these incentives, the participants went on to say that organizations should not forego a focus on

ethical practices regardless of whether it is mandatory by law or could result in a negative organizational image. Participant C stated that, as an optimist, you always get disappointed, and as a pessimist, the result is often better than expected. Therefore, it is better to be a pessimist regarding automated financial advice. His leading cause of concern was the lack of a conversation about values. The participant stated: *"The ethical discussion is key for the future of automated financial advice. Currently, there is a crisis of trust. This also relates to the nitrogen crisis and all other aspects that we clash with as a society. One of the main causes of this crisis is that we do not engage in conversation about values. When you start talking about values, the conversation changes to another level and can result in a better understanding and acceptance of each other."* In addition, participant F feared that consumers would attach more value to the reputation of an organization and the look and feel of its platform than to whether the organization prioritizes ethical norms and values. Two reasons were stated as to why this is the case. Firstly, consumers often do not care enough to read the terms of service, let alone that they would research how an organization operates from within. Secondly, when this information is available and sometimes explained, consumers often lack the knowledge to comprehend it. While participant C expects consumers to become more knowledgeable about automated financial advice in the future, he cautioned that this will, in practice, only benefit a small percentage of consumers, namely those who want to better understand the terms of service or the organizational governance structures.

### **Addressing ethical issues of automated financial advice**

Regarding how organizations can best prepare for ethical issues in the future, participants identified aspects related to legal rules and regulations, algorithmic capabilities, and organizational governance. Participants A, C, E, F, and I emphasized the need for rules and regulations tailored to automated financial advice. Participant F argued that regulatory bodies should develop new rules and regulations in the section on privacy. Participant A discussed this aspect, related to intended and unintended harm, in the previous section on prevention of harm. He continued this reasoning by stating that rules and regulations, such as regarding a mandatory algorithmic audit, will mainly impact actors with bad intentions and will not matter much to those with good intentions. Moreover, as participant C argued, organizations should collaborate with regulatory bodies to open a conversation regarding potential regulatory improvements. Because automated financial advice is not currently subject to rules and regulations, he added: *"I think that if financial institutions want to win the trust of a customer and consumers, they should not only follow legal rules and*

*regulations, but should maybe break the law to conduct business according to the right ethical path.*" Participant E stated that rules and regulations are important for the future of automated financial advice because, otherwise, organizations would prioritize economic incentives over ethical considerations. Correspondingly, participant I argued that most ethical issues can be incorporated in rules and regulations. As a result, organizations can ensure ethical business practices by developing algorithms around these rules and regulations. Also, frequent audits of the algorithm can prevent intended or unintended deviations from what is codified in these rules and regulations. The participant added that, despite the potential benefits of regulations, ethical norms and values change over time and updated regulations frequently lag the development of ethical norms and values: "*What was acceptable two years ago might not be so two years from now.*" Traditional financial advisors can quickly adapt to changing ethical norms and values, despite rules and regulations not yet requiring this. Because of its complex nature, efficient implementation of these changes is more difficult for automated financial advice.

In terms of algorithmic capabilities, participant C proposed an algorithm that would allow dynamic adjustments down the line. Developing this would allow consumers to add additional financial information after the initial advice, so as to improve upon it. While this was not specified directly, a similar reasoning may apply to implementing changes in rules and regulations. Moreover, participant B proposed an idea to update the financial situation of a consumer in real-time. A consumer would permit an app to allow an application programming interface (API) access to financial information. When changes in the consumer's financial situation take place, the API will detect this and send the updated financial situation to the app. Current methods only provide consumers with a snapshot of their financial information. Accessing updated financial information in real-time would help them to provide the most current information when obtaining financial advice and allow them to address potential financial issues proactively. However, participant B went on to say that legal hurdles currently prevent this idea from becoming a reality. In addition, various participants (C, D, G, H, and I) addressed changes required in terms of organizational governance. Participants H and I stated that companies must first consider what type of organization they want to be. Participant H stated that there are three components to consider. Firstly, the legal aspect of what organizations are allowed to do. Second, the aspect of what you can do in terms of technology: now or in the future. Thirdly, what do you want to do as an organization to integrate ethical norms and values? Participant I corroborated this finding by stating that organizations must consider ethical norms and values most relevant to them. Also, organizations must translate



*Table 5: Summary of findings on how the ethical issues that can arise in automated financial advice can be addressed*

Addressing ethical issues	Summary of findings
Rules and regulations	<ul style="list-style-type: none"> <li>- There are currently few incentives for organizations to incorporate ethical norms and values.</li> <li>- Ethical guidelines and principles should be codified into rules and regulations, to ensure that organizations implement ethical considerations.</li> <li>- Frequent audits of the algorithm would prevent (un)intended deviations</li> </ul>
Organizational governance	<ul style="list-style-type: none"> <li>- Implementing rules and regulations may require changes in organizational governance.</li> <li>- Change must be initiated from the top, with upper management taking a proactive approach to translate strategic ethical norms and values to the business.</li> <li>- An ethics board should be installed to monitor and provide feedback on future projects.</li> </ul>
Algorithmic capabilities	<ul style="list-style-type: none"> <li>- Algorithms should allow consumers to add additional financial information down the line to improve upon the initial advice provided, thereby providing them with more control over the decision-making process.</li> </ul>

these strategic choices more proactively to the business side. Currently, they often act reactively instead of proactively. A reactive strategy can result in considering in hindsight what could have been improved from an ethical perspective, while ethical norms and values may have already changed at that point. Therefore, organizations need to anticipate changes better and act accordingly. The participant continued by saying that these changes start with vision and guidance from top management, which would subsequently influence the entire organization from top to bottom. Participant H added that creating awareness about the importance of ethical norms and values is key to achieving this. From this point onwards, participants C and D stated that organizations must develop a consensus on ethical norms and values with relevant guidelines for future projects. To ensure that organizations will comply with this ethical compass, participant D added, an ethics board should be introduced to monitor and provide feedback on future projects.

#### 4. Discussion and conclusion

The aim of this research paper is twofold. Firstly, to develop a comprehensive assessment of how ethical issues influence the development of automated financial advice within the financial advice industry. Secondly, to identify methods that can address the ethical issues of automated financial advice. The findings show that automated financial advice – compared to traditional, i.e. human financial advice – creates value by providing more objective advice, by increasing the accessibility of financial advice, and by reducing cost. However, the complexity of financial advice influences the extent to which accessibility and cost can provide value to the financial industry. More complexity in the algorithm leads to increase of the developmental costs and consequently to less accessibility. Automated financial advice is currently limited to cases consisting of limited complexity, which also negatively influences accessibility. As automated financial advice develops, advice can be tailored to a wider range of consumers with increasingly complex cases.

As to the ethical issues related to the development of automated financial advice, the findings from the interviews overlap with the four ethical principles of the Ethics Guidelines of Trustworthy AI from the European Commission (2019): human autonomy, explicability, fairness, and prevention of harm. In addition, the experts mentioned trust as an important ethical issue for automated financial advice. The interviews point out that these ethical issues can be addressed by codifying ethical guidelines and principles into rules and regulations to ensure that organizations implement ethical standards. Additionally, frequent audits of the algorithms would be necessary. Implementing these rules and regulations may require changes in organizational governance. Change must be initiated top-down, where upper management takes a proactive approach to translate strategic ethical norms and values to the business. After that, a consensus on ethical norms and values should be developed. After the algorithm is developed, an ethics board should be installed to monitor and provide feedback. When it comes to consumers, the interview findings suggest that an algorithm should allow them to add additional financial information down the line to improve upon the initial advice offered, providing consumers with more control over the decision-making process.

**Practical implications**

This research paper contains several implications for organizations that currently offer automated financial advice or are looking to provide such advice in the future. And even though we focus on holistic automated financial advice in this paper, the conclusions also apply to organizations that offer automated choice guidance, automated financial advice for specific products, or traditional financial advice. Human financial advisors, for example, should also try to prevent bias or (un)intended harm, and they should also ensure that choices are made independently and voluntarily. However, the ethical challenges of automated financial advice are amplified because of the vocal and automated role of data and algorithms. Additionally, this paper provides recommendations for regulatory and supervisory bodies.

This research paper has identified and elaborated upon ethical issues relevant to automated financial advice. The call from the interviewees, that ethical guidelines and principles should be codified into rules and regulations, is clear. As automated financial advice is a nascent and fast-growing technology, few regulatory guidelines guide organizations in what is allowed and ethical in terms of development. Most regulators have published their views on robo or automated advice (AFM, 2018; CFA, 2020; European Parliament, 2021), but an explicit role for ethical guidelines is lacking. Regulatory bodies should start developing rules and regulations tailored to automated financial advice that incorporate ethical guidelines, in order to be prepared when automated financial advice develops further. This preparedness is essential because the increasingly complex nature of automated financial advice can result in organizations overextending their capabilities too hastily.

Providers of automated financial advice should furthermore be provided with incentives to go beyond strict adherence to legal rules and regulations. This includes implementing ethical considerations from the start of development. Because ethical norms and values change over time, these organizations must consider a proactive approach to ethics in automated financial advice. A proactive approach allows organizations to anticipate changes in ethical norms and values and to guide their decisions with a vision for the future. By contrast, a reactive approach can result in actions being considered only after the fact. Enacting positive organizational change requires aligning relevant strategic goals with business objectives. This alignment includes, but is not limited to, balancing economic incentives with a focus on ethical norms and values. One objective does not have to exclude the other. Therefore, organizations should seek a compromise wherein ethics and economic incentives coexist at their respective optimums. Developing automated financial advice in accordance

with ethics-by-design methodologies<sup>1</sup> can aid organizations in fulfilling their duty of care towards consumers, even though this is currently not legally required.

### **Limitations and future research**

Despite the relevant insights that the semi-structured interviews conducted for this research paper provide, future research should consider expanding expert interviews to different countries, so as to provide perspectives on ethical challenges from different perspectives (e.g., cultures, financial systems, or regulatory framework). As ethical norms and values depend very much on the context, the results should not be transferred to different culture or systems without prior investigation. However, this study can be used as inspiration on how to interview experts about the topic in other countries, and also in other sectors in which automation and AI play a role (e.g., medical advice, job advice). In addition, when the developments around holistic AI are more tangible, it would be good to broaden the scope of the discussion about the ethical norms and values of automated financial advice, by also including end-users in the conversation.

Finally, it is important to stipulate that automated financial advice is a nascent technology, which will become increasingly complex as newly found capabilities propel future development. Ethics is also time-sensitive, as it is context-sensitive. Therefore, collective efforts by ethicists, researchers, financial advice providers, regulatory bodies, and supervisory bodies are necessary to address the current ethical issues of automated financial advice, and ethical issues that may arise in the future. Hence, the conversation about ethics should not only happen at the start but be cyclical in nature. Thus the conversation should come back constantly, especially when new developments occur. Also, a focus on ethical development and deployment of automated financial advice is crucial to ensure benefits for stakeholders, both now and in the future.

1 Ethics-by-design methodologies prioritize ethical questions from the beginning, engaging diverse stakeholders in discussions, and attempt to embed and operationalize values that are salient to a broad range of stakeholders throughout the design, development, and deployment process. This approach aims to align technology with desirable goals and to improve its societal acceptability.

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## Appendix A | Dutch interview guide (original)

### Traditioneel en geautomatiseerd financieel advies:

1. Zou je me een korte introductie willen geven van wie je bent en wat je vakgebied is?
2. Heb je ooit eerder gehoord van geautomatiseerd financieel advies?
  - Ja: Hoe zou je geautomatiseerd financieel advies (in het kort) omschrijven?
    - i. Geef onze definitie van (holistisch) geautomatiseerd financieel advies om te vergelijken.
  - Nee: Geef onze definitie van (holistisch) geautomatiseerd financieel advies.
3. Wat zijn volgens jou de verschillen tussen traditioneel financieel advies en geautomatiseerd financieel advies?
  - Welke kansen voor consumenten die gebruik maken van geautomatiseerd financieel advies zie jij ten opzichte van traditioneel financieel advies?
    - i. Probeer door te vragen naar verdere kansen voor maatschappij: wat zijn maatschappelijke kansen die geautomatiseerd financieel advies biedt ten opzichte van traditioneel financieel advies?
  - Welke aspecten van geautomatiseerd financieel advies moeten worden verbeterd om vergelijkbaar te zijn in kwaliteit met traditioneel financieel advies?
    - i. Probeer door te vragen naar verdere problemen en uitdagingen.
  - Zijn er aspecten van traditioneel financieel advies die niet vervangen kunnen worden door geautomatiseerd financieel advies?

### Vragen over ethiek:

4. Wat zijn de sociale waarden van jouw bedrijf? – vaak geschrapte vraag.
5. Wat is jouw definitie van sociale waarden? – vaak geschrapte vraag.
  - Waar denk je aan bij sociale waarden?
    - i. Indien niet in de goede richting: voorbeeld noemen (bijvoorbeeld: Cambridge Analytica-schandaal en maatschappelijke gevolgen hiervan).
    - ii. Vermijd voorbeelden uit de literatuur om suggestieve vragen te voorkomen.
6. Hoe kunnen mensen deze sociale waarden terugzien in de producten en/of diensten die jullie leveren?
  - Indien gebruik van geautomatiseerd financieel advies en nog niet duidelijk gemaakt: hoe is geautomatiseerd financieel advies geïntegreerd in jullie producten en/of diensten?

7. Indien bedrijf een dienst heeft die in de richting gaat van geautomatiseerd advies: Welke rol spelen sociale waarden in de ontwikkeling van jullie geautomatiseerde advies?

- Nee: Waarom worden sociale waarden niet geïntegreerd in de ontwikkeling van jullie geautomatiseerd financieel advies?
  - i. Vraag als antwoord "niet belangrijk" is: Is er over nagedacht wat eventuele gevolgen zijn van het niet-integreren van sociale waarden in de ontwikkeling van geautomatiseerd financieel advies?
  - ii. Zijn er sociale waarden die (bedrijf) in de toekomst wilt integreren, of meeneemt in de ontwikkeling van geautomatiseerd financieel advies?
  - iii. Zijn er sociale waarden die jij persoonlijk graag terugziet in geautomatiseerd financieel advies? Zowel nu als in de toekomst wanneer geautomatiseerd financieel advies zich verder ontwikkelt.
- Ja: Je benoemt dat een focus op het aspect (bijvoorbeeld transparantie) belangrijk is voor de ontwikkeling van geautomatiseerd financieel advies. Kan je hier wat verder op ingaan?
  - i. Zijn nog andere sociale waarden belangrijk voor de ontwikkeling van geautomatiseerd financieel advies?
  - ii. Na uitleg: wat zijn volgens jou kansen voor de maatschappij die (in de toekomst) benut kunnen worden door het integreren van sociale waarden in geautomatiseerd financieel advies?
  - iii. Buiten de genoemde sociale waarden, zijn nog andere waarden relevant voor de ontwikkeling van geautomatiseerd financieel advies?

8. Indien bedrijf geen dienst heeft die in de richting gaat van geautomatiseerd financieel advies: Welke sociale waarden denk jij belangrijk te zijn voor de ontwikkeling van een geautomatiseerde financieel adviseur?

- Je benoemt dat een focus op het aspect (bijvoorbeeld transparantie) belangrijk is voor de ontwikkeling van geautomatiseerd financieel advies. Kan je hier wat verder op ingaan?
  - i. Herhaal sub-vragen van vraag 7 onder stukje "Ja".

#### **Vragen over toekomstige ontwikkeling van geautomatiseerd financieel advies:**

9. Kijkend naar toekomstige ontwikkelingen in geautomatiseerd financieel advies: Denk je dat het overwegen of integreren van sociale waarden in geautomatiseerd financieel advies belangrijker wordt in de toekomst ten opzichte van nu?

- Waarom denk je dit?
  - i. Ben je het ermee eens dat sociale waarden belangrijker worden?



- Welke uitdagingen voor consumenten zie je naarmate geautomatiseerd financieel advies zich verder ontwikkelt in de toekomst?
    - i. Zie je ook andere uitdagingen ontstaan naarmate geautomatiseerd financieel advies zich verder ontwikkelt?
    - ii. Doorvragen naar sociale waarden die genoemd worden bij deze sub-vragen.
  - Welke kansen voor consumenten zie je in de toekomst naarmate geautomatiseerd financieel advies zich verder ontwikkelt?
    - i. Zie je ook kansen voor de maatschappij die op het moment (vanwege staat van ontwikkeling) nog niet gerealiseerd kunnen worden?  
Zo ja, welke?
    - ii. Doorvragen naar sociale waarden die genoemd worden bij deze sub-vragen.
10. Indien (bedrijf) wel een dienst heeft die in de richting gaat van geautomatiseerd financieel advies: In hoeverre bereidt (bedrijf) zich nu al voor op mogelijke maatschappelijke uitdagingen in de toekomst?
11. Indien (bedrijf) geen dienst heeft die in de richting gaat van geautomatiseerd financieel advies: Hoe denk je dat bedrijven zich het beste kunnen voorbereiden op toekomstige maatschappelijke uitdagingen?
- Ben je bekend met (non-)technologische oplossingen die nu of in de toekomst gebruikt kunnen worden om maatschappelijke uitdagingen aan te pakken?
  - Waarom denk je dat het lastig is voor bedrijven om zich voor te bereiden op toekomstige maatschappelijke uitdagingen?

**Slotvraag:**

12. Is er iets waar ik nog niet naar gevraagd heb, maar wel van belang kan zijn voor het onderzoek, waar je me graag over zou willen vertellen?

## Appendix B | English interview guide (translated)

### Traditional and automated financial advice:

1. Please provide me with a short introduction of who you are and your area of expertise.
2. Have you ever heard of automated financial advice?
  - Yes: How would you describe automated financial advice (in short)?
    - i. Provide our definition of (holistic) automated financial advice to compare.
  - No: Provide our definition of (holistic) automated financial advice.
3. What, in your opinion, are the main differences between traditional financial advice and automated financial advice?
  - What opportunities do you see for consumers when using automated financial advice compared to traditional financial advice?
    - i. Try to dig deeper by asking about opportunities for society: What are societal opportunities that automated financial advice provides compared to traditional financial advice?
  - What aspects of automated financial advice must be improved to be of comparable quality to traditional financial advice?
    - i. Try to dig deeper into additional issues and challenges.
  - Are there aspects of traditional financial advice that cannot be replaced by automated financial advice?

### Ethical questions:

4. What are the social values of your organization? – Often removed question.
5. What is your definition of social values? – Often removed question.
  - What do you think about when considering social values?
    - i. If the answer fails to address the question: name an example (e.g., Cambridge Analytica scandal and societal consequences).
    - ii. Avoid examples from literature to prevent leading questions.
6. How can people recognize these social values in the products or services that you deliver?
  - If the use of automated financial advice has not been made clear: How is automated financial advice integrated in your products and/or services?

7. If the organization does offer any service revolving around automated financial advice: What role do social values play in the development of your automated financial advice?
- No: Why are social values not integrated in the development of your automated financial advice?
    - i. If answer is "not important": Have the potential consequences of not integrating social values in the development of automated financial advice been given any thought?
    - ii. Are there social values that your organization wishes to integrate in the future or consider for the development of automated financial advice?
    - iii. Are there social values that you personally would like to see integrated in automated financial advice? Both now and after automated financial advice develops further.
  - Yes: You mention that a focus on aspect (example: transparency) is important for developing automated financial advice. Can you elaborate on this?
    - i. Are any other social values important for the development of automated financial advice?
    - ii. After explanation: In your opinion, what societal opportunities can be utilized (in the future) after integrating social values in automated financial advice?
    - iii. Apart from the previously mentioned social values, are any other values relevant to the development of automated financial advice?
8. If the organization does not have a service revolving around automated financial advice: What social values do you consider to be important for the development of an automated financial advice tool?
- i. Repeat sub-questions from question 7 under "yes".

**Questions about the future development of automated financial advice:**

9. Looking at the future development of automated financial advice, do you think that considering or integrating social values in automated financial advice will become more important compared to now?
- Why do you think so?
    - i. Do you agree that social values are becoming more important?

- What challenges do you see for consumers in the future as automated financial advice develops further?
    - i. Do you also see other challenges emerge as automated financial advice develops further?
    - ii. Dig deeper into social values mentioned for these sub-questions.
  - What future opportunities do you see for consumers as automated financial advice develops further?
    - i. Do you also see opportunities for society that currently (because of development stage) cannot be realized? If yes, what opportunities?
    - ii. Dig deeper into social values mentioned for these sub-questions.
10. If (organization) does have a service revolving around automated financial advice: To what extent does (organization) prepare for potential societal challenges in the future?
11. If (organization) does not have a service revolving around automated financial advice: How do you think that organizations can best prepare for societal challenges in the future?
- Are you familiar with (non-)technological solutions that can be utilized now or in the future to address societal challenges?
  - Why do you think that it is difficult for organizations to prepare for future societal challenges?

**Final question:**

12. Is there anything you wish to tell me about that I have not yet asked, but which could be of importance for this research?

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