

# ROBO-ADVISORS AND INVESTORS: ENHANCING HUMAN-ROBOT INTERACTION THROUGH INFORMATION DESIGN

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**Abstract:** *Automation is everywhere. Robots can become lawyers and nurses – as well as investment advisors. Investment advisors have a pedagogic role in making sure that investors can understand where they are putting their money. Human-to-human interaction, discussions between investors and advisors, often help to enlighten the features of the products better than just reading mandatory prospectuses lying on a couch at home. In robo-advising there are usually no discussions supplementing the written information. That is why information design and investor-friendly information will step into the footlights. In this paper, we explore the ways in which information design can be utilized in robo-advising.*

## 1. The Role of an Investment Advisor and Robots as Advisors

Investment advice is defined in the financial markets regulation as the provision of personal recommendations to a client concerning one or more transactions relating to financial instruments (art. 4 (4) MiFID II).<sup>1</sup> Investment advisors have the duty to know their clients, give enough information, and assess the suitability of the products they recommend. Investment advisors must gather enough information on each client's knowledge and experience concerning different investment products, their financial situation as well as their investment objectives. Based on these pieces of information, the advisor should make a recommendation that is suitable for each client, bearing in mind especially the client's risk tolerance and ability to bear losses. In addition to gathering information from clients, the advisor must give clients information on the investment firm and its services, the financial instruments and recommended investments, execution venues, and all costs and charges (art. 24–25 MiFID II). In practice, this requirement leads to the advisor providing the client with different types of documents and prospectuses.

However, providing the mandatory prospectuses and other material may not be enough – according to the forthcoming MiFID II regulation, information must be given in such a way that investors can *understand* it. Information is required to be provided in a comprehensible form in such a manner that clients are *reasonably able to understand* the nature and risks of the products they are being offered, so that they can make informed decisions (art. 24 MiFID II). In a human-to-human interaction, investors can ask questions if they do not understand something. Quite often investors actually base their decisions mainly on information given orally in a negotiation with their advisor. The big stack of papers may remain untouched.

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<sup>1</sup> Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (OJ 2014, L 173/349, 12 June 2014).

What if the investment advisor is not a human-being anymore? Are things getting worse? Automated investment services have some undisputable advantages over traditional services – 24/7 availability, among others. The main worries stem from the fact that people tend to skip and skim information and contract clauses, especially in online settings. Even if people do read the information, financial literacy studies indicate that they have quite modest skills to understand and use financial information when making decisions.

### 1.1. Fintech challenges the industry

The finance sector lives from trust. Investors have traditionally appreciated personal service and the confidence it generates. Banking markets have been mainly national and dependent on local agencies that customers are accustomed to visit. However, after the financial crisis, confidence on financial markets got a stain on its reputation. At the same time, the digi-natives, under thirty-year-olds, who have always lived around digital technology, are shaking the markets with their needs to have services independent of time and place.

Digitalization has already changed the way we watch movies or listen to music. The finance sector has encountered digitalization relatively late. Financial technology, or fintech, is now rapidly challenging old business models. We are already used to paying our bills online and using pay cards in grocery stores. We can also use different types of automated tools to plan our finances. If we are buying a new home we can use calculators to predict how big a mortgage we can get and anticipate its costs, or we can compare the costs of different banking products. These tools vary on their level of automation; some are not totally automated and after filling a questionnaire we might be asked to visit our local bank to see a human advisor. [ESAs (The European Supervisory Authorities) 2015, 5–6, 12] Although we have become used to these automated tools, fintech has now brought wholly new technological innovations to the finance sector. One of them is robo-advising, online-based services without human-to-human interaction.

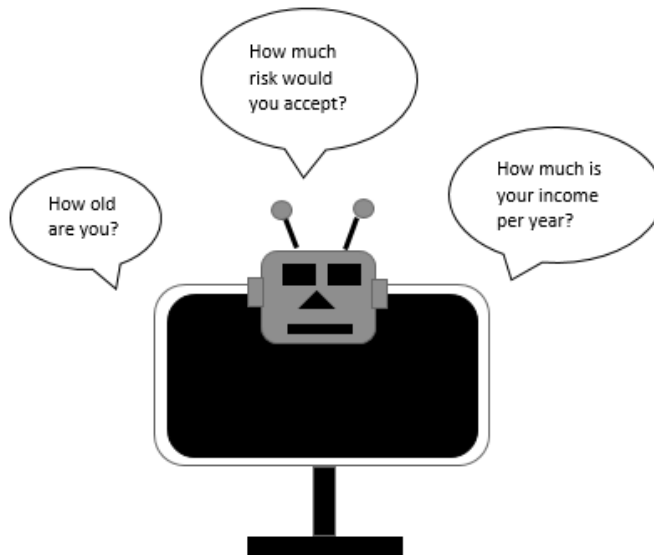


Figure 1: A robo-advisor at work, gathering information

The robo-advisor software asks investors questions about their financial situation and objectives, and based on the answers, algorithms are often used to produce a recommendation to buy, sell or hold some investment products. The resulting advice depends on the information input from the client and the logic of the algorithm which forms the recommendation based solely on the information given. The tool itself can be presented as a

decision tree where the client answers to a sequence of questions. Some robo-advisors are totally automated, while some enable human-to-human interaction at some stage of the advice process. [ESAs 2015, 7, 12–13] Robo-advising changes the investment advice process fundamentally. Apart from the type of interaction, it brings changes also to the format of information and contracts. When investment decisions are made online, there is usually no human making sure that the investor understands the information given or the questions asked in the suitability evaluation. Nor is there anyone summarizing the content of prospectuses in a nutshell.

### **1.2. Robo-advisors – a threat or a possibility?**

The word *robot* can evoke mixed thoughts in our mind – and not all positive. We might fear the consequences of poorly developed robots or worry about getting compensation if something goes wrong. However, not all robots – if any – will match our movie-like stereotype of robots. [SCHAFER 2016, 1–2] All fears may not be groundless, but robots can still serve us also with new possibilities. Robo-investment advising is free from time and place constraints. It can also enhance the possibility to serve international customers. The new MiFID II regulation restricts investment firms' possibilities to take commissions when selling investment products (*see* art. 24 MiFID II) and the profitability of investment advising may consequently decrease. This, in turn, can diminish the willingness of investment firms to provide advice to the least profitable customer segments. Robo-advising can provide a low-cost alternative to carrying on these services. [ESAs 2015, 16] But how successfully can robots manage the pedagogic role of an investment advisor: asking the relevant questions and answering questions, and, finally: giving information in an understandable manner? Information processing capabilities vary widely among clients, and advisors should take this into account when fulfilling their informing duties. How can a robo-advisor formulate information in such a way that clients will actually read *and* understand it?

The three European Supervisory Authorities (ESAs) have expressed concerns about the possible misunderstandings that clients might have when advice is provided without a human advisor to support the process. [ESAs 2015, 4] In the US, The SEC's Office of Investor Education and Advocacy (OIEA) and the Financial Industry Regulatory Authority (FINRA) have even issued an alert to investors concerning automated investment tools. It should be noted that these tools vary from different types of calculating tools to actual robo-advising. OIEA and FINRA have warned investors that the output from the automated tools depends directly on what information they ask and what information they are provided. How the questions are framed influences heavily on the answers – and accordingly on the output of the tool. If these tools do not enable contacting an actual person, investors lose the value of human judgment. [U.S. SECURITIES AND EXCHANGE COMMISSION 2015] On the other hand, if you would ask the Nobel laureate Daniel Kahneman, he might say that it is not such a bad thing: human judgment can be biased in so many ways. [KAHNEMAN 2011] Algorithms do not suffer from human errors or prejudices. However, robo-advisors can suffer from technical errors which can multiply the number of complaints, as the same error can impact many clients before it is identified and corrected. [ESAs 2015, 17, 26]

### **1.3. Online settings vs. a bank's desk – does it make a difference?**

Simultaneously with the rise of robo-advising, regulation on investment advice and other investment services is undergoing changes that strengthen investment advisors' duties to inform clients and responsibilities regarding, among others, suitability assessments. The responsibility to assess the suitability of the recommended transactions will not be reduced when investment advice is given via electronic system in comparison to traditional human-to-human advice [Commission delegated regulation C(2016) 2398 final, art. 54]. Nevertheless, the legislative framework is not conclusive when it comes to the meaning of *automation* in financial services that used to be carried out by human advisors. [ESAs 2015, 8]

According to art. 24 MiFID II all information an investment firm provides to its clients or potential clients must be *fair, clear and not misleading*. The delegated regulation clarifies this requirement and states, for instance, that investment firms shall ensure that:

- the information is accurate
- the information always gives a fair and prominent indication of any relevant risks when referencing any potential benefits of an investment service or financial instrument
- the font size used to indicate relevant risks is at least equal to the predominant font size used throughout the information provided
- the layout used ensures such indication is prominent
- the information is sufficient for and is presented in a way that is likely to be understood by the average member of the group to whom it is directed, or by whom it is likely to be received
- the information does not disguise, diminish, or obscure important items, statements or warnings
- the information is consistently presented in the same language throughout all forms of information, unless the client has accepted to receive information in more than one language
- the information is up-to-date and relevant to the means of communication used. [Commission delegated regulation C(2016) 2398 final, art. 44]

These information requirements must be satisfied in both robo-advising and human-to-human interaction. Robo-advising software rests on the assumption that people read and digest the relevant information and that they do not usually need any possibility to ask questions on them. [ESAs 2015, 21] However, the first problem may arise from the fact that people do not always *read* the information in online settings. LANNERÖ names this problem «the biggest lie on the internet». We all click «I agree» in different types of online services, as we have to do so in order to proceed. But how many actually read the information? As LANNERÖ says: almost nobody. [LANNERÖ 2013] Many disputes between investors and investment firms arise from the fact that investors do not read or understand the prospectuses or other material they are given. The ESAs<sup>2</sup> have raised a concern that important information intended to assist understanding – such as warnings, disclaimers, and contractual terms – might be skipped as «legal small print». Online settings can cause people to rush forward, as they may feel that automated tools are self-explanatory and quick to use. [ESAs 2015, 22, 26]

Besides the unwillingness to read, a further main concern is the understandability of information. Studies on financial literacy have indicated that many people have difficulties to understand even basic financial concepts, such as interest rate and inflation. The OECD has recently published new financial literacy results covering thirty different countries. The study indicated that the overall levels of financial literacy are relatively low. The most problematic areas relating to financial behaviour are budgeting, planning ahead, choosing products and using independent advice. Wide variation also exists between different countries. [OECD 2016, 7–9] This variation can be particularly challenging considering the more international financial product markets enabled by digitalization. The EU is currently heading at a Digital Single Market (DSM), where online goods and services can be accessed seamlessly and fairly across borders. One of the objectives of the DSM is to simplify consumer rules for online purchases. [[https://ec.europa.eu/priorities/digital-single-market\\_en](https://ec.europa.eu/priorities/digital-single-market_en); all Websites accessed on 9 January 2017]

In the US, where robo-advisors are already more common than in Europe,<sup>3</sup> the Massachusetts Securities Division has been concerned about the narrowness of the information that robo-advisors can take into account when making investment suggestions. As an example, how can they recognize clients with diminished capacity or clients who do not have sufficient skills to understand their financial picture to provide accurate answers to the questions that the robo-advisor asks? Concerns were also raised about the disclaimers used in robo-

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<sup>2</sup> The European Supervisory Authorities.

<sup>3</sup> See, e.g., MYPRIVATE BANKING 2016, 8. In terms of numbers of robo-advisors, one third of them are from the U.S.

advising agreements. According to the Division, these disclaimers are typically embedded in a lengthy client agreement, and this agreement must be «signed» before any services can be provided. [THE MASSACHUSETTS SECURITIES DIVISION 2016, 5–6]

In the European context, the ESAs have also been worried about the possible risks that may result to clients when robo-advising is used. In addition to the risk of not understanding the information provided by the robo-advisor, there can be significant difficulties to understand the questions – the input – requested, when there is no human advisor checking it and clarifying misunderstandings. Clients may not be aware of how the given information is taken into account by the underlying algorithm: does it notice only one of the financial goals and disregard some future plans? Given the multitude of different types of online tools, it might even be unclear whether there is any personal recommendation compared to general information. There can be obscurities also about who is actually providing the advice if different financial institutions are producing different parts of the process, such as collecting information and making the recommendation. [ESAs 2015, 22–24]

#### 1.4. Wanted: User-friendly information and data protection

How will people cope with robo-advisors whose role will be closer to being an information mediator than really helping clients to process the information? One thing is sure: the significance of user-friendly information will grow. The central role of data protection cannot be left unnoticed, either. The more people are accustomed to give personal financial information on the internet, the more common cybercrimes can become. [ESAs 2015, 25] Actually, according to the EU, web-based attacks rose by 38% only during 2015 in the EU and around the world. [<https://ec.europa.eu/digital-single-market/en/cybersecurity-privacy>] The finance and insurance sectors are among the main targets of cybercrimes. [EUROPEAN BANKING FEDERATION 2015, 5]

Digital services can make use of Big Data, for example client data, which can lead to contributions on product development and more personalized services. The other side of the coin are the worries of cybersecurity. The new generations are more willing to share information in exchange of more personalized services. [EUROPEAN BANKING FEDERATION 2015, 3–5] But do clients know how their personal data will be used? The understandability of privacy policies is necessary to maintain and enhance trust in the finance sector.

## 2. The Possibilities of Information Design

The challenges encountered in robo-advising and related information requirements are not new. Similar challenges frequently occur, and not only in the financial industry, of course. Information design is an emerging stream of research and practice that seeks to respond to exactly these kinds of challenges. The underlying assumption of its practitioners is different from that of many legal drafters, who seem to think that meaning and control are in the words; if the content and wording is right, the appropriate behaviors will follow. [SLESS 2015, 195] However, it is not realistic to assume that once something is in a prospectus or a document (or in legislation), it is automatically read and understood. Experience and research suggest otherwise: controlling content does not necessarily control people's behavior. Information design seeks to make it easier for people to read, understand, and comply.

Information design scholars have developed research-based criteria for clear documents and benchmarked documents for clarity and usability. [See WALLER 2011, EVANS 2011, and other Technical Papers available on the Simplification Centre's website <http://www.simplificationcentre.org.uk/resources/technical-papers/>] The Simplification Centre uses the following four basic criteria: [EVANS 2011, 3]<sup>4</sup>

- **Content:** the selection of information to be communicated
- **Structure:** how the information is organized, sequenced and linked

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<sup>4</sup> The criteria used by the Simplification Centre have been further divided into sixteen sub-criteria; see WALLER 2011. – For similar criteria for good contracts, see HAAPIO 2013, with references.

- **Language:** how the information is expressed in words
- **Design:** the typography, layout and graphic design of the document

The ultimate goal of information design is clear communication and enabling users to interact with the information. The selection of methods is based on what is suited to express the particular information to the particular user group in a particular context. For easier reading, more prominence needs to be given to what is more relevant to the user. [See, e.g., ALBERS 2007, HAAPIO 2013 and 2014] Text alone can seldom provide prominence or salience to a piece of information. Visualization – adding icons, charts, tables, and images to supplement text – can be used to do this.

Information designers apply user-centered design to all aspects of communication – to the language as well as the visual appearance. [See, e.g., WALLER/WALLER 2015, 190] Research and case studies carried out in the context of contracts demonstrate how changing their design and the ways in which they are communicated can lead to better comprehension and enhanced usability. [See, e.g., PASSERA 2015, PASSERA ET AL. 2016, HAAPIO/BARTON 2017] In our previous work, we have explored the use of simplification and visualization – typical tools used by information designers – in communicating complex information to non-expert readers who may be reluctant to read, for example in the context of financial [SALO/HAAPIO/PASSERA 2016] or contractual [HAAPIO 2013 and 2014, PASSERA 2015, PASSERA ET AL. 2016, HAAPIO/BARTON 2017] communication.

The EU has promoted or required the use of simpler information even before the recent requirements on MiFID II. In 2001, the EU introduced simplified prospectuses (SPs) intended to provide investors with *key information* on transferable funds. However, SPs were still found to be too long and not understood by investors. [EUROPEAN COMMISSION 2007, 5] In 2012, shorter and more illustrative key investor information documents replaced them. [SALO/HAAPIO/PASSERA 2016, 4–5] In the future, these types of documents will expand to more complex products. The regulation on key information documents – simplified documents on packaged retail investment products and insurance-based products – will be applied from the beginning of 2018. [EUROPEAN COMMISSION, Press release 2016] The consumer studies conducted before the regulation was issued found that simpler formulations were associated with better understanding of the information and visuals were also appreciated. [EUROPEAN COMMISSION 2015, xii, 194]

### 3. Combining Information Design and Robo-advising

We see a number of ways in which information design and visualization can be utilized in robo-advising. To make the information engaging for its readers, icons can be used to highlight the most important characteristics of investment products, such as their riskiness, or whether there is capital protection or not. Comparison lists or tables could summarize the main features of the recommended products. Simplification, visualization, and plain language offer ways to make information more accessible. Additionally, online services and contracts can be equipped with further features that cannot be utilized in traditional contracts or information sheets.

Online settings enable the display of different views for different customers, ranging from more precise information to simplified versions. Certain financial terms seem to be especially difficult to understand for average clients. These terms – if they must be used – could be equipped with links to plain language explanations. Likewise, the terms of the contracts or privacy policies could be explained in a simpler way next to their contents or behind a link, or a *layered approach* could be used. [See, e.g., WALLER ET AL. 2016] This means designing a document so that it can be read first at a summary level that gives an overall understanding, with additional information available if needed. [See, e.g., HAAPIO 2014 and WALLER ET AL. 2016] Creative Commons licenses [See CREATIVE COMMONS] rely on a three-layer design: apart from simple, recognizable icons, the structure includes the so-called Legal Code layer (the «lawyer-readable» version, the full license), the Commons Deed (the «human readable» version summarizing the most important terms), and then a «machine

readable» version: a summary of the key terms written into a format that software systems, search engines, and other kinds of technology can understand.<sup>5</sup>

In the future, the development of AI can offer further useful enhancements to robo-advisors. While we are accustomed to communicating with computers by typing text with a keyboard, AI enables communicating by speech. [CASTRO/NEW 2016, 5] Digital assistants, such as Apple's Siri and Amazon's Alexa, already exist whom we can ask, for instance, who won the Eurovision Song Contest last year, or where the nearest bus stop is. Future robo-advisors may learn to speak with their clients and, for those who are reluctant to read prospectuses, they may well tell about the products in the language of the client's choice.

#### 4. Conclusion

Robo-advising has brought new challenges to the finance sector. As there is usually no human-to-human interaction in robo-advising, investors are wholly dependent on written information, such as the prospectuses of the investment products. Studies on financial literacy, for instance, show that investors often have difficulties to understand even quite basic financial terms. Information design and visualization offer robo-advisor builders and document drafters a number of methods they can use to serve the needs of their audiences and communicate the core message effectively to the different readers. Information design can help robo-service providers engage their audience, draw attention to what is important, and enhance human-robot interaction. In this way, they can be better equipped to not only comply with what is required by regulation but also to provide better advice and better experience to their customers. The benefits can be great for both investors and investment firms, for whom disputes can cost not only money but also their reputation.

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<sup>5</sup> «Taken together, these three layers of licenses ensure that the spectrum of rights isn't just a legal concept. It's something that the creators of works can understand, their users can understand, and even the Web itself can understand.» CREATIVE COMMONS.

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