JOANA MIGUEL CARDOSO

ROBO-ADVISORS: THE IMPACT ON INVESTOR PROTECTION IN THE EUROPEAN UNION

Dissertation to obtain a Master's Degree
in Law and Financial Markets

Supervisor:

Dr. Miguel de Azevedo Moura, Professor of the NOVA School of Law

September 2023

NOVA SCHOOL OF LAW

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I hereby declare that the work I present is my own work and that all my citations are correctly acknowledged. I am aware that the use of unacknowledged extraneous materials and sources constitutes a serious ethical and disciplinary offence.

Joana Cardoso

Lisboa, 4 of September of 2023

Declaration of Characters

I declare that the body of this dissertation, including spaces and notes, occupies a total of 166.305 characters.

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The present dissertation follows the OSCOLA (Oxford University Standard for Citation of Legal Authorities) rules for citations and bibliography.

“Não tenhamos pressa mas não percamos tempo”

– José Saramago

To my beloved grandfather.

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May a new chapter begin!

Abstract
In the context of financial markets, Financial Technology ("FinTech") has played a very prominent role. Robo-advisors are a prime example of this, providing investment advice and/or portfolio management services in a faster and more accessible way to investors. However, despite existing for over a decade, the regulation of robo-advisors appears to be somewhat insufficient, since the European legislation and soft-law issued to date – Directive on Markets in Financial Instruments II ("MiFID II") and European Securities and Markets Authority ("ESMA") Guidelines on certain aspects of the MiFID II suitability requirements – tend to be unclear about the risks and consequences of their use. This dissertation critically reflects on how the current legislation (or lack thereof) impacts investor protection from an *ex-ante* perspective (guaranteeing the completeness of information, a proper suitability and adequateness assessment and the absence of conflicts of interest) as well as an *ex-post* perspective (attribution of liability in the event of damage caused by the robo-advisor's performance and respective compensation). The recent legislative proposals – the Product Liability Directive ("PLD Proposal"), the AI Liability Directive ("AILD Directive") and the Artificial Intelligence Act ("AI Act") – aimed at harmonising an AI liability regime at the European Union level will also be briefly analysed, as well as their applicability and impact on the financial sector, more specifically with regard to the use of robo-advisors.

Keywords: Financial Markets – FinTech – Robo-advisors – MiFID II – AI Responsibility

Resumo
No contexto de mercados financeiros, a tecnologia financeira ("FinTech*"*) tem tido um papel bastante proeminente. Os *robo-advisors* são um exemplo disso, prestando serviços de consultoria financeira e/ou gestão de carteiras de forma mais rápida e acessível aos investidores. No entanto, apesar de existirem há mais de uma década, a regulação dos *robo-advisors* afigura-se algo insuficiente, uma vez que a legislação europeia e *soft-law* emitidas até à data – Diretiva dos Mercados de Instrumentos Financeiros II ("DMIF II") e as Orientações da Autoridade Europeia dos Valores Mobiliários e dos Mercados ("ESMA") relativas a determinados aspetos dos requisitos da DMIF II em matéria de adequação – tendem a ser pouco claras quanto aos riscos e consequências da sua utilização. Esta dissertação reflete criticamente de que forma a atual legislação (ou falta dela) impacta a proteção do investidor de uma perspetiva *ex-ante* (garantindo a completude da informação, um juízo de adequação apropriado e a inexistência de conflitos de interesse), bem como de uma perspetiva *ex-post* (atribuição da responsabilidade em caso de danos causados pela atuação do *robo-advisor* e respetiva compensação). Serão também brevemente analisadas as recentes propostas legislativas – Proposta de Diretiva relativa à responsabilidade decorrente dos produtos defeituosos ("Diretiva relativa à responsabilidade por produtos defeituosos"), Proposta de Diretiva relativa à adaptação das regras de responsabilidade civil extracontratual à inteligência artificial ("Diretiva da Responsabilidade da IA") e Proposta de Regulamento que estabelece regras harmonizadas em matéria de inteligência artificial ("Regulamento da Inteligência Artificial") – que visam harmonizar um regime de responsabilidade da IA ao nível da União Europeia, bem como será discutida a sua aplicabilidade e impacto no sector financeiro, mais especificamente, no que respeita à utilização de *robo-advisors*.

Palavras-chave: Mercados Financeiros – FinTech – Robo-advisors – DMIF II – Responsabilidade de IA

Introduction

The 2008 Global Financial Crisis highlighted the significance of more stringent financial markets' regulation and supervision, as well as improved investor protection.[1]

The traditional financial system, which was frail and insecure, was set to be transformed by technological innovation. With the advancement of Artificial Intelligence ("AI"),[2] the quality of the products and services offered has improved, faster and easier access to them for average investors has been promoted, contributing to levelling the playing field, and greater financial inclusion and transparency have been encouraged.[3]

One area where such an evolution has been noticeable is investment advisory and portfolio management, through the use of robo-advisors.[4] With robo-advisors, clients[5] are expected to receive investment advice and/or portfolio management services in a more timely, efficient and cost-effective manner than when resorting to financial human advisors.[6]

Despite robo-advisors' existence for over a decade, their regulation is significantly reduced. Markets in Financial Instruments Directive II ("MiFID II")[7] and the Commission Delegated Regulation (EU) 2017/565 ("MiFID II Delegated Regulation")[8] regulate, to a

[1] Gerald Spindler, 'Behavioural Finance and Investor Protection Regulations' [2011] Journal of Consumer Policy 315 <https://link.springer.com/article/10.1007/s10603-011-9165-6> accessed 5 July 2023.

[2] "AI systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions (…)". See High-Level Expert Group on Artificial Intelligence, 'A definition of AI: Main capabilities and scientific disciplines' (Directorate-General for Communication, European Commission 2018) 6 <https://ec.europa.eu/futurium/en/system/files/ged/ai_hleg_definition_of_ai_18_december_1.pdf> accessed 2 June 2023.

[3] Joseph Lee, *Crypto-Finance, Law and Regulation - Governing an Emerging Ecosystem* (1st edition, Routledge 2022) 129 ff.

[4] Panagiota Papadimitri, Menelaos Tasiou, and others, 'FinTech and Financial Intermediation' in Maurizio Pompella and Roman Matousek (eds), *The Palgrave Handbook of FinTech and Blockchain* (1st edition, Palgrave Macmillan Cham 2021) 363 ff.

[5] The terms "client" and "investor" will be used interchangeably.

[6] Lee (n 3) 127.

[7] Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments [2014] OJ L 173.

[8] Commission Delegated Regulation (EU) 2017/565 of 25 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council as regards organizational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive [2017] OJ L 87. This Regulation clarifies how competent authorities and market participants must comply with MiFID II requirements and densifies its obligations.

certain extent, the use of robo-advisors by financial intermediaries when providing investment advice and portfolio management. As a complement, the European Securities and Markets Authority ("ESMA") has issued guidelines that address robo-advisors in order to achieve greater densification and clarity.[9] In any case, since European legislation tends to equate the provision of such services by robo-advisors and human financial advisors, it is necessary to consider the extent to which this is detrimental to investor protection.

On the one hand, it is critical to consider how far European legislation takes into account the unique characteristics of robo-advisor, namely autonomy, complexity and unpredictability, as well as their functioning and structure. On the other hand, it is of the utmost importance not only to assess the impact of robo-advisors on client interaction but also the sufficiency of the duties set out in European legislation when semi or fully-automated systems are used to provide investment services, considering the need to ensure the system's transparency, the clarity of the information provided and the investor's consequent understanding of the risks, along with the suitability of the financial products recommended to the investor's preferences.

Furthermore, liability for damages caused by a robo-advisor must be considered. How can liability be established and effective compensation guaranteed if the damages caused to the investor are a result of a robo-advisor's performance? Who should be held accountable: the individuals who contributed to its conception, construction, and market commercialization or the robo-advisor itself? Do robo-advisors have the legal personality to be entitled to support a claim? If not, how can investors legally obtain compensation? These are all questions to which the European legislator does not give a clear answer. In an attempt to overcome such a legal void, two options will be analysed: the creation of a new specific legal status for robo-advisors or the adjustment and development of existing rules to this reality.

The growing development of AI has increased legal uncertainty in the European Union ("EU"). As there is no single harmonised legal framework for AI liability, the Member-States' various national laws have attempted to address it. Nonetheless, efforts

[9] European Securities and Markets Authority, 'Guidelines on Certain Aspects of the MiFID II Suitability Requirements' (2023) ESMA35-43–3172 <https://www.esma.europa.eu/sites/default/files/2023-04/ESMA35-43-3172_Guidelines_on_certain_aspects_of_the_MiFID_II_suitability_requirements.pdf> accessed 15 June 2023.

have been made to implement three major legislative proposals: the Product Liability Directive Proposal ("PLD Proposal"),[10] the AI Liability Directive Proposal ("AILD Proposal")[11] and the Artificial Intelligence Act ("AI Act").[12] But are these legislative proposals applicable to the financial sector and, more specifically, to robo-advisors? Since its application to financial matters is somewhat debatable, it is necessary to consider the legislator's intention and the investors' interests.

Therefore, Chapter I provides a brief historical overview of robo-advisors' origins and impact on the market. Chapter II will focus on the characteristics and functioning of the robo-advisor, namely the types of investment advice that can be provided and the steps of the robo-advisory process (from collecting information to issuing a recommendation tailored to the investor's risk profile).

In Chapter III, a critical analysis of the European legal framework for robo-advisors will be carried out, discussing whether it is possible to achieve the completeness of the information and the explainability of the decision-making process, adequate suitability and appropriateness assessment and the absence of conflicts of interest, when providing investment advice through robo-advisors. In addition, it will be assessed whether or not robo-advisors can be more efficient than human financial advisors and what can be improved from an *ex-ante* perspective to ensure that investors' needs are met.

Chapter IV will theorise about the liability of robo-advisors, how investors can defend themselves and what can be improved from an *ex-post* perspective. The legislative proposals aforementioned will also be briefly discussed, as well as their practical impact on the reality of robo-advisors.

[10] Proposal for a Directive of the European Parliament and of the Council on liability for defective products [2022] COM/2022/495.
[11] Proposal for a Directive of the European Parliament and of the Council on adapting non-contractual civil liability rules to artificial intelligence [2022] COM/2022/496.
[12] Proposal for a Regulation of the European Parliament and the Council laying down harmonised rules on artificial intelligence [2021] COM/2021/206.

I. Historical Evolution

1. The Robo-advisors' Advent

The 2008 Global Financial Crisis was a watershed moment for the banking and financial sectors, serving as a catalyst for regulatory changes and digital advancements.[13]

The Global Financial Crisis was precipitated by the subprime crisis in the United States housing market where two major investment banks, Lehman Brothers and Bear Stearns, collapsed as a result of their exposure to subprime debt – clearly demonstrating that since major financial institutions are too big to fail, their failure can spread to the entire financial system.[14]

In search of quick profits, investment banks created collateralized debt obligations ("CDOs") from mortgage-backed securities ("MBS"), i.e., financial products used to reallocate credit risk by repackaging a pool of mortgages of varying quality that would serve as collateral in the event of payment default and which would be resold to investors.[15] The CDOs were divided into tranches – where each one had a certain level of risk and, thus, a certain rate of return associated with it – and were being sold to investors with the overly optimistic assumption that even if some of the mortgages would not be paid, most of them would. However, subprime mortgages (i.e., loans granted to individuals with poor credit scores and, therefore, higher interest rates) were mixed with prime mortgages (i.e., loans given to high-credit and low-default risk homeowners and, thus, with lower interest rates) which did not allow for a clear perspective of the risks involved when purchasing the product. When house prices declined due to high supply and low demand, those financial products could not be sold in the market. The cascade of defaults was so severe and widespread throughout the financial system that it reached the point of financial collapse.[16]

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[13] Pablo Sanz Bayón and Luis Garvía Vega, 'Automated Investment Advice: Legal Challenges and Regulatory Questions' (2018) 37 Banking & Financial Services Policy Report 3–4 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3226651> accessed 3 June 2023.

[14] Bernardo Nicoletti, *The Future of FinTech - Integrating Finance and Technology in Financial Services* (1st edition, Palgrave Macmillan Cham 2017) 4; Mary Mellor, *The Future of Money: From Financial Crisis to Public Resource* (Pluto Press 2015) 109 ff.

[15] Zvi Bodie, Alex Kane and Alan J Marcus, *Investments* (11th edition, McGraw-Hill Education 2018) 459–460.

[16] ibid 15–22; Mellor (n 14) 109 ff.

There were several reasons that contributed to the Global Financial Crisis, particularly (i) excessive risk-taking, which occurred as a result of the widespread assumption at the time that house prices would continue to rise leading households to recklessly take out more loans to purchase and build more houses while many lenders failed to thoroughly assess borrowers' ability to repay, (ii) excessive leverage as banks and investors borrowed funds to purchase more financial products which ended up amplifying both potential returns and potential losses, (iii) lack of regulation and supervision that enabled the sale of complex and opaque financial products to investors without regard for their ability to repay them or even whether they understood what they were purchasing in the first place and (iv) conflicts of interest within rating agencies that inaccurately rated certain financial products as safe investments with good returns and little to no risk, since good ratings boosted product sales and profits.[17]

Given the existing uncertainty, unpredictability and growing sense of mistrust among investors toward traditional institutions, FinTech startups have begun to stand out as innovative market players.[18]

As the name suggests, FinTech corresponds to the term "Financial Technology" and it refers to the application of technology in financial services.[19] Such technological and innovative solutions, namely the use of robo-advisors in the fields of automated investment and wealth management, are most noteworthy in the financial sector, whose purpose is to connect savers with investors, by matching the needs of those seeking funding with the goals of those who have money and want to invest.[20]

[17] Reserve Bank of Australia, 'The Global Financial Crisis' (*Explainers*) 1–4 <https://www.rba.gov.au/education/resources/explainers/the-global-financial-crisis.html> accessed 1 March 2023.
[18] Bayón and Vega (n 13) 3.
[19] Johannes Ehrentraud and others, 'Policy Responses to Fintech: A Cross-Country Overview' [2020] FSI Insights, Bank for International Settlements 1 <https://www.bis.org/fsi/publ/insights23.pdf> accessed 16 April 2023.
[20] European Securities and Markets Authority, 'Discussion Paper on Automation in Financial Advice' (2015) JC/2015/080 6–7 <https://www.esma.europa.eu/document/discussion-paper-automation-in-financial-advice> accessed 3 April 2023.

The first robo-advisors were employed around 2008 in the United States by FinTech start-ups, such as Betterment and Wealthfront,[21] and then, in 2013, in the European Union, with the robo-advisor Quirion.[22]

Although large banks and wealth management firms continue to wield considerable influence in the financial markets, they appear to be reconciling their sovereignty with FinTech firms that have been developing these new technologies to provide services across the financial sector, thereby contributing to lower business operating costs, increase financial inclusion and improve investment decision quality and market efficiency.[23] If robo-advisors were initially viewed as a disruptive technology against human advisory services provided by banks, it now appears that the focus is mainly on the evolution and cooperation with financial institutions,[24] with the latter relying on FinTechs' robo-advisory services or developing their own to stay competitive in the market.[25]

In this context, a greater financial legislative initiative emerged at the European level, namely with the MiFID II and later on with the MiFID II Delegated Regulation, in order to address the weaknesses in the functioning of the financial system that were revealed by the Global Financial Crisis, thus helping retain confidence in the markets, ensuring greater transparency and compliance, as well as enhancing investors' protection.[26]

Since the emergence of robo-advisors in 2008, there has been no financial crisis that could put their performance to the test in a market downturn until the COVID-19

[21] It is important to note that these companies started their operations in 2008, but it was only in 2010 that they began directly providing financial advice to retail investors. See Jill E Fisch, Marion Labouré and John A Turner, 'The Emergence of the Robo-Advisor' [2019] Wharton Pension Research Council 8 <https://repository.upenn.edu/items/d6dab803-aec3-47b2-ae1a-9e8e49bfe3da> accessed 18 June 2023; Christoph Merkle, 'Robo-Advice and the Future of Delegated Investment' (2020) 51 Journal of Financial Transformation 22 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3612986> accessed 4 June 2023.
[22] Peter Scholz and Michael Tertilt, 'Robo-Advisory: The Rise of the Investment Machines' in Peter Scholz (ed), *Robo-Advisory - Investing in the Digital Age* (1st edition, Palgrave Macmillan Cham 2021) 7.
[23] Pedro Maia, 'A Robotização Do Mundo Financeiro: Reflexões Introdutórias', *Direito e Robótica* (Centro de Direito do Consumo, Faculdade de Direito da Universidade de Coimbra 2020) 276 <https://www.fd.uc.pt/cdc/pdfs/rev_16_completo.pdf> accessed 16 April 2023.
[24] Robo-advisors do not create new business models but rather improve and develop existing ones – investment advice and portfolio management. See Scholz and Tertilt (n 22) 7; Philipp Maume, 'Regulating Robo-Advisory' (2018) 55 Texas International Law Journal 9 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3167137> accessed 10 June 2023.
[25] Thomas J Chemmanur and others, 'Recent Developments in the Fintech Industry' (2020) 8 Journal of Financial Management, Markets and Institutions 3 <https://www.worldscientific.com/doi/abs/10.1142/S2282717X20400022> accessed 23 March 2023.
[26] Directive 2014/65/EU (MiFID II), Recitals 4 and 7.

pandemic in 2020.[27] Research has found that the potentiality of robo-advisors to adapt to market fluctuations and automatically readjust the risk of investors' portfolios has contributed to mitigating losses, compared to individuals with analogous characteristics who invested during this period without using a robo-advisor and tried to maintain their risk levels.[28]

In fact, the increasing digitalisation of financial services has positively impacted the use of robo-advisors, which is expected to continue to grow in the European Union.[29] Nonetheless, it is curious to note that according to ESMA's most recent analysis regarding the growing use of AI in EU securities markets, there has been no apparent increase in the use of AI in robo-advisors.[30] Increasing the use of AI in robo-advisors may cause more issues for firms than it would solve, as it would entail a more complex framework which, in turn, would diminish the explainability of the algorithms.[31] However, this does not preclude the impact of robo-advisors' use on investor protection, which must be addressed.

II. General Framework

1. What are robo-advisors?

In a broad sense, robo-advisors provide investment advice and/or portfolio management services, in which human intervention is fully or partly replaced.[32]

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[27] Lee Reiners, 'Regulation of Robo-Advisory Services' in Jelena Madir (ed), *FinTech Law and Regulation* (2nd edition, Elgar Financial Law and Practice Series 2021) 401.

[28] Chewei Liu, Mochen Yang and Ming-Hui Wen, 'Judge Me on My Losers: Does Adaptive Robo-Advisors Outperform Human Investors during the COVID-19 Financial Market Crash?' [2023] Production and Operations Management (POM) 1-4 <https://onlinelibrary.wiley.com/doi/full/10.1111/poms.14029> accessed 16 April 2023.

[29] 'Robo-Advisors - UE-27' (*Statistica*, 2023) <https://www.statista.com/outlook/dmo/fintech/digital-investment/robo-advisors/eu-27> accessed 14 June 2023.

[30] European Securities and Markets Authority, 'Artificial Intelligence in EU Securities Markets' (2023) ESMA50-164-6247 10 <https://www.esma.europa.eu/sites/default/files/library/ESMA50-164-6247-AI_in_securities_markets.pdf> accessed 15 June 2023.

[31] ibid.

[32] European Securities and Markets Authority (n 9) 4. Note that these Guidelines were published in April 2023 with effect from October 2023. Additionally, it can be distinguished between (i) full-service robo-advice (combining investment advice and portfolio management), (ii) half-service robo-advice (investment advice only) and (iii) self-service robo-advice (providing only information and not investment advice). See Philipp Maume, 'Reducing Legal Uncertainty and Regulatory Arbitrage for Robo-Advice' [2018] European Company and Financial Law Review 627 <https://ssrn.com/abstract=3420011> accessed 19 June 2023. For the purposes of this dissertation, although the focus is on the provision of investment advice by

Ever since the first robo-advisors were introduced to the market, their algorithms[33] have been improved. Initially, the advice offered was generic, focusing mainly on easing the buying and selling of financial instruments, but later, it started to consider the investor's preferences and needs, whereby the client – not the algorithm – makes an investment decision based on that advice.[34] As of today, robo-advisors may continuously assess and monitor investment strategies and present investors with transaction proposals, or alternatively, they may automatically readjust and rebalance the investor's portfolio to its original composition against market conditions, market volatility and asset performance.[35] In the latter case, the robo-advisor does not need the client's consent to execute the investment decision as it is understood that they are covered by the investment strategy initially chosen by the client.[36]

Nevertheless, on this last point, it should be underlined that in order to ensure investor protection, investors should be aware of the algorithm's decisions (for example, via daily reports) and have the possibility of intervening and accepting each option or preventing the robot from making them. While this idea may seem contrary to the underlying *rationale* of the absence of consent – the speed and convenience of leaving decisions to the algorithm without having to research the markets – it seems to be the most adequate solution so that investors are not at the mercy of a machine.[37]

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robo-advisors, there will be brief mentions of its relation to portfolio management, in which the robo-advisor operates on the basis of the client's initial investment decision (as opposed to when it assumes the role of portfolio manager, independent of such choices).

[33] An algorithm can be deemed as the "mathematical process of incorporating inputs [investor assessment] to provide outputs [investment portfolio]". See Better Finance, 'Robo-Advisors: Breaking Barriers of Tradition Advice' (2022) 20 <https://betterfinance.eu/publication/Robo-advice-2022-Report-Breaking-Barriers-of-Traditional-Advice> accessed 15 June 2023.

[34] Philipp Maume, 'Robo-Advisors: How Do They Fit in the Existing EU Regulatory Framework?' [2021] Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament 11–12 <https://www.europarl.europa.eu/RegData/etudes/STUD/2021/662928/IPOL_STU(2021)662928_EN.pdf > accessed 15 February 2023.

[35] Wolf-Georg Ringe and Christopher Ruof, 'A Regulatory Sandbox for Robo Advice' [2018] European Banking Institute Working Paper Series 5 <https://www.ssrn.com/abstract=3188828> accessed 17 June 2023.

[36] Maume (n 34) 11–12. Nonetheless, financial intermediaries must mitigate the risks to which investors are exposed, avoiding losses that may occur as a result of the execution of orders. Financial intermediaries may even modify or revoke such orders when they become aware of facts detrimental to the investor. See Mafalda Miranda Barbosa, 'Robot Advisers e Responsabilidade Civil' [2020] Revista de Direito Comercial 10 <https://www.revistadedireitocomercial.com/robot-advisers> accessed 3 May 2023).

[37] "Robo-advising is a paradigm that lies in between pure libertarianism, in which individuals are left on their own to make investment decisions, and libertarian paternalism, in which individuals are defaulted into what economists believe is the best decisions for them based on standard economic theory, and individuals can only choose to opt out of the assigned defaults". See Francesco D'Acunto and Alberto G Rossi, 'Robo-Advising' [2019] CESifo 7 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3545554> accessed 11 July 2023. In terms of investor protection, a balance between the two realities must be achieved.

In more detail, investment advice consists of the provision of a personalised investment recommendation, i.e., a recommendation (i) to a specific investor (or a potential one), (ii) concerning transactions of financial instruments (e.g.: to buy, sell, hold a bond or to exercise or not to exercise a particular right conferred by a bond to buy, sell or redeem another financial instrument), and (iii) that addresses the client's specific circumstances, financial interests and objectives, level of financial literacy and expertise, risk profile, etc (Article 9 of the MiFID II Delegated Regulation).[38]

A recommendation implies a course of action, a strategy to sway investors' decisions, regardless of whether the investor eventually follows it or not. A recommendation can be deemed as one even when implied (e.g.: highlighting the advantages of a financial product over another). Although a recommendation may not be formally regarded as such, if the contours of the information provided are equivalent to advice, given its intentional and persuasive nature, then it must be materially deemed as a recommendation.[39]

Nonetheless, neither a simple analysis of a financial instrument without a suggested course of action would be regarded as a recommendation; nor would a suggestion to invest in a class of financial instruments, segment or market be considered a personal recommendation as it would represent generic advice.[40]

Investment advice can be one of two types, independently of which, firms must disclose to their clients upfront which one they will be providing. According to Article 24(4)(a)(i) of the MiFID II and Recital 52(1) of the MiFID II Delegated Regulation, the advice may be:

i. Independent investment advice: must be as impartial as possible[41] which presupposes that (i) a sufficiently diverse range of financial instruments available on the market is being offered, (ii) financial instruments other than those issued

[38] Such a definition can be found in Directive 2014/65/EU (MiFID II), art 4(1)(4) as "the provision of personal recommendations to a client, either upon its request or at the initiative of the investment firm, in respect of one or more transactions relating to financial instruments". In addition, according to Directive 2014/65/EU (MiFID II), arts 2 and 3, robo-advisors do not seem to be exempted from MiFID II as they hold their clients' funds and although they may receive and transmit orders, they also provide investment services, such as investment advice and/or portfolio management, on their clients' behalf.
[39] Maume (n 24) 17; Committee of European Securities Regulators, 'Question and Answers - Understanding the Definition of Advice under MiFID' (2009) CESR/10-293 14 <https://www.esma.europa.eu/sites/default/files/library/2015/11/10_293.pdf> accessed 5 June 2023.
[40] Maume (n 32) 631–632; Committee of European Securities Regulators (n 38) 6–9.
[41] Directive 2014/65/EU (MiFID II), art 24(7) and Recital 73.

by the firm itself or by entities with a close connection to the firm are being considered, and that (iii) no fees, commissions or benefits retained or provided by third parties or persons acting on their behalf are being accepted, with the exception of non-monetary benefits, whose dimension and nature is so trivial they do not hinder the impartiality of the service provided, although they must always be disclosed to the client;[42]

ii. Non-independent investment advice: does not meet the above requirements. There may be a propensity for self-promotion, i.e., for firms to claim that a certain financial product is beneficial for their clients as it was manufactured by them, for example, but they can also recommend other investment products of other companies, receiving third-party fees for it. This is not prohibited, although there are rules that must be followed to guarantee that the client is well aware of this reality (e.g.: by fully disclosing these circumstances prior to providing such services).

On the other hand, in portfolio management, the financial intermediary is required to administer the investors' financial assets with the aim of increasing their profitability,[43] namely by automatically managing and rebalancing their portfolios in accordance with a previously determined strategy.[44] Hence, the decisions concerning the acquisition or alienation of assets within the client's portfolio are up to the robo-advisor's algorithm, without the need to obtain (again) the client's prior approval.[45]

When performing portfolio management, robo-advisors are engaging in algorithmic trading.[46] They determine and execute the purchase and sale of financial instruments in

[42] The majority of the EU robo-advisors' business models do not usually involve receiving inducements. Robo-advisors are typically defined as "fees-only", i.e., their remuneration consists solely of the fees charged to clients, which indeed contributes to the elimination of conflicts of interest in the retail distribution chain, rather than "fees-based", i.e., their remuneration consists mainly of the fees charged to clients but additional commissions by third parties may also be received. Nonetheless, in practice, it is challenging to determine whether a platform is actually receiving commissions or not and whether it is acting independently by transferring all of them to the clients. See Better Finance (n 33) 21–39.

[43] Barbosa (n 36) 7.

[44] See Directive 2014/65/EU (MiFID II), art 4(1)(8), "managing portfolios in accordance with mandates given by clients on a discretionary client-by-client basis where such portfolios include one or more financial instruments". If a client wants to change its risk profile (e.g.: from a more conservative to a riskier portfolio) or the financial intermediary needs to modify it as a result of a market condition (e.g.: a financial crisis) that has substantially impacted the client's portfolio, new advice should be provided by the robo-advisor. See also Maume (n 34) 26.

[45] Maume (n 34) 23; Matthias Haentjens and Pierre Carabellese, *European Banking and Financial Law* (2nd edition, Routledge 2020) 94–156.

[46] See Directive 2014/65/EU (MiFID II), art 4(1)(39), "trading in financial instruments where a computer algorithm automatically determines individual parameters of orders such as whether to initiate the order,

order to rebalance the portfolios to their original composition (Article 17(1) of the MiFID II). Even if the transactions carried out by the robo-advisor have a minor impact and are of a small number, they still qualify as algorithmic trading and financial intermediaries must ensure that effective systems and risk controls are established in order to guarantee the stability and resilience of their trading systems through constant monitoring and testing.[47]

The use of an algorithm as well as the total or partial absence of human intervention distinguishes automated financial advice from traditional financial advice, in which human advisors offer investment advice and portfolio management services but with greater proximity and interaction with their clients.

As represented by **Figure 1**, robo-advisors are deemed a FinTech activity, due to their technology-related business model as they rely on AI to provide their services, i.e., by means of an algorithm embedded in the robo-advisor, which processes and analyses large amounts of information and recognises patterns, clients directly receive recommendations based on their financial needs and objectives.[48]

the timing, price or quantity of the order or how to manage the order after its submission, with limited or no human intervention (…)".

[47] Maume (n 34) 27; "[t]he fact that a person or firm undertakes trading activity by means of an algorithm which includes a small number of processes (e.g. makes quotes that replicate the prices made by a trading venue) does not disqualify the firm running such algorithm from being engaged in algorithmic trading". See European Securities and Markets Authority, 'Q&A on MiFID II and MiFIR Market Structures Topics' (2022) ESMA70-872942901–38 17 <https://www.esma.europa.eu/document/qa-mifid-ii-and-mifir-market-structures-topics-0> accessed 6 May 2023.

[48] Ehrentraud and others (n 19) 6–7.

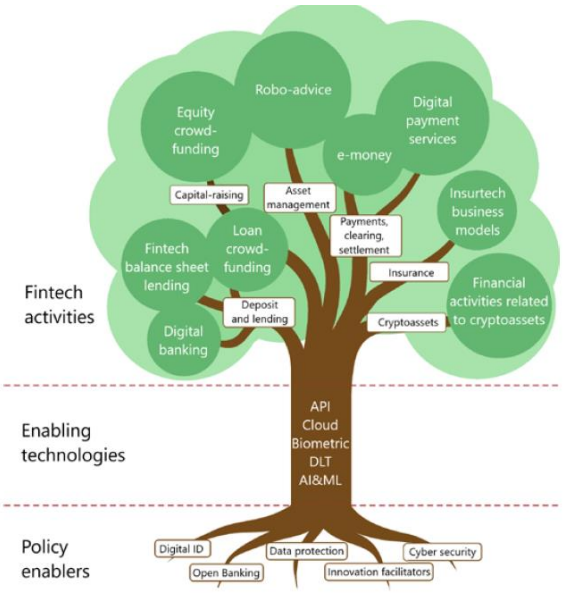

Figure 1 *– FinTech tree: A taxonomy of the FinTech environment*[49]

Robo-advisors' business model can be one of two types:[50]

iii. Hybrid robo-advisory: which combines the typical automated aspect through the collection and processing of information provided by the algorithm, with some degree of human interaction, that may occur at any point during the advisory process, namely with the possibility of investors resorting to additional clarification from human advisors;[51]

iv. Fully-automated robo-advisory: which envisages a completely automated performance, with no room for human interaction.[52]

Therefore, as demonstrated in **Figure 2**, there are several stages in the robo-advisory process:[53]

[49] ibid 7.
[50] D'Acunto and Rossi (n 37) 7–8.
[51] It should not be mistaken for the use of investment tools by human financial advisors to assist them in the analysis and making of investment decisions, since in these cases the software is used internally, without any contact with the client. See Maume (n 34) 12.
[52] Although there is no intervention of a human advisor during the procedure as it happens in hybrid robo-advisors, human involvement is still present, namely in a first phase, with the elaboration of the questionnaire and the software programming, and in a second phase, with the updating of the questionnaire and software monitoring. See Gonçalo Nogueira, 'Da Inteligência Artificial Na Intermediação Financeira: Excurso Sobre a Consultoria Para Investimento Automatizada' (Master's Degree, University of Lisbon 2020) 110 <https://repositorio.ul.pt/handle/10451/45817> accessed 28 May 2023.
[53] Comissão do Mercado de Valores Mobiliários, 'Inteligência Artificial e o Mercado de Capitais' (2022) 9–10 <https://www.cmvm.pt/pt/Comunicados/Comunicados/Pages/20220607n.aspx> accessed 4 June 2023.

i. Collection and processing of information on the client's financial background, knowledge and expertise, investment objectives and risk tolerance;
ii. Definition of the client's profile, according to the information previously collected;
iii. Analysis and selection of an adequate investment strategy that fits the client's profile;
iv. Recommendation of the investment strategy that best suits the client's profile;
v. Execution of other functionalities underlying robo-advisory, such as monitoring and rebalancing the client's portfolio, tax-loss harvesting, among others.

Figure 2 *- Stages of the robo-advisory process*

2. How do robo-advisors operate?

Investment advice is provided along the same lines as that offered by human advisors, i.e., through the completion of a questionnaire – which is only conducted in a preliminary phase – by the clients, concerning their financial background and their reactions to certain real or hypothetical financial situations. As expressed in **Table 1**, these questions aim to provide an understanding of what type of investor the client is, what their risk appetite is, and what their limiting beliefs are.

Category	Variables of the Customer Profile
General Information	Income, investment amount, job description, source of income, spending, time to retirement, type of account, working status
Risk Capacity	Dependence on withdrawal of investment amount, income prediction, investment amount / saving rate ration, investment amount / total capital ratio, investment horizon, liabilities, saving rate, total capital
Risk Tolerance	Age, association with investing, association with risk, choose portfolio risk level, comfort investing in stock, credit based investments, dealing with financial decisions, degree of financial risk taken, education, ever invested in risky asset for thrill, experience of drop / reaction on drop / max drop before selling, family and household status, financial knowledge, gender, investment experience, investment goal, investor type / self-assessment risk tolerance, preference return vs. risk

Table 1 *– Overview of the main categories for investors' assessment and profiling of robo-advisors*[54]

Formally, the only difference is that the algorithm allows for the processing and comparison of large amounts of data, at a much faster and more accurate rate. Each answer to the questionnaire is assigned a specific score and importance factor. A total score is awarded to the client that will correspond to one of the profiles pre-determined by the financial intermediary. The same mathematical logic applies to the classification of each product offered by the financial intermediary, considering their risk and complexity. In the end, the algorithm determines which products – selected from a limited range – best fit the client's profile and the client ultimately makes its final decision.[55]

Materially, it is discussed whether the lack of human interaction still allows for a complete collection of information, particularly with regard to more complex situations that may arise, and whether it is possible to detect inconsistencies between investor's answers, who may not be able to accurately express its preferences or be biased when doing so,[56] as will be developed further on.

[54] Dominik Jung, Florian Glaser and Willi Köpplin, 'Robo-Advisory: Opportunities and Risks for the Future of Financial Advisory' in Volker Nissen (ed), *Advances in Consulting Research* (Springer International Publishing 2019) 411–412 <https://link.springer.com/10.1007/978-3-319-95999-3_20> accessed 26 April 2023.
[55] Veerle Colaert, 'RegTech as a Response to Regulatory Expansion in the Financial Sector' [2018] SSRN Electronic Journal 7 <https://ssrn.com/abstract=2677116> accessed 9 June 2023.
[56] Jung, Glaser and Köpplin (n 54) 412.

Once the client's risk profile has been determined, the investment portfolio has to be selected and designed accordingly. Robo-advisors typically employ Harry Markowitz's Modern Portfolio Theory ("MPT").[57]

MPT was developed in 1952 and demonstrates how diversification may help investors reduce the risk of their portfolios.[58] Investors must decide how much money to allocate to each asset in their portfolio depending on the return they wish to achieve. Each asset encompasses an expected return that inevitably entails some level of risk that must be endured by the investors. Naturally, there must be a trade-off between the return investors expect to receive and the risk they must bear.[59]

As the logic behind this theory is one of "the riskier the investment, the greater the required potential return",[60] it is assumed that investors are rational in their decision-making and that they will engage in a risky investment only if the expected return is sufficiently high to compensate the risk assumption.[61] If investors are willing to take on the risk, then they will demand a risk premium, i.e., compensation for engaging in risky investments.[62] Therefore, investors may demand a higher risk premium as the risk increases.[63]

By holding multiple asset classes, investors will have a diversified portfolio. A well-performing portfolio requires diversification as it allows it to include a variety of asset classes in one portfolio, spreading out the overall risk.[64] In order to effectively reduce the risk associated with a given investment while maintaining its potential expected returns, investors should aim to allocate their money to assets with low or negative correlation, so that adverse events in one asset class can be mitigated by another asset class. As assets tend to perform differently – asset A falls while asset B rises or vice-versa – the gains of one of the assets offset the losses of the other. The lower the

[57] This is the most common strategy used by robo-advisors, although there are others on the market, such as the Capital Asset Pricing Model (CAPM) and the Black-Litterman Model, which will not be addressed for this purpose.
[58] Myles E Mangram, 'A Simplified Perspective of the Markowitz Portfolio Theory' (2013) 7 Global Journal of Business Research 60 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2147880> accessed 13 February 2023.
[59] Bodie, Kane and Marcus (n 15) 157.
[60] Mangram (n 58) 62.
[61] ibid 60–62.
[62] Bodie, Kane and Marcus (n 15) G-11.
[63] Mangram (n 58) 62.
[64] Bodie, Kane and Marcus (n 15) 217.

correlation between them, the greater the efficiency gains.[65] Since the materialisation of a loss is uncertain, but its possibility of occurrence – the risk – is unavoidable, investors should not place all the eggs in one basket.[66]

According to MPT, the risk of an asset held in a diversified portfolio is quantifiable by its volatility, i.e., its level of risk and uncertainty.[67] For instance, as treasury bills are short-term investment products issued by the central government, which is an entity with higher creditworthiness, they tend to be more stable, with lower returns but also with a lower risk associated, whilst investments in bonds and stocks are usually more volatile (i.e., riskier) with the potential of reaching higher returns.

MPT determines that the investors should aim for portfolios on the efficient frontier, i.e., portfolios that carry the largest possible returns with the least amount of risk.[68] The position of portfolios on the efficient frontier depends on the investor's risk tolerance as demonstrated in **Figure 3**, given that the expected return achievable for an investor with a more conservative portfolio tends to be lower than that of an investor with a riskier portfolio.

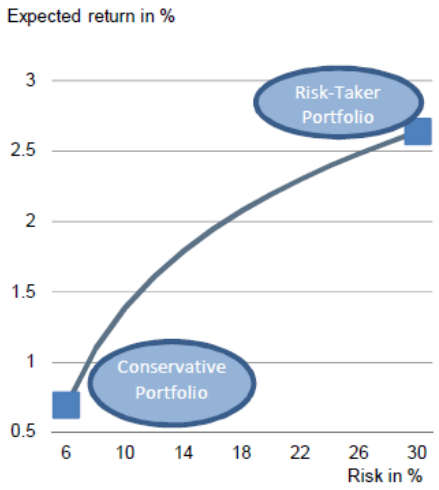

***Figure 3** - Efficient frontier of a hypothetical portfolio*[69]

It is important to note that diversification has its own limitations as not all risks can be minimized or eliminated.[70] One can distinguish between systematic risk, which

[65] ibid 198.
[66] Mangram (n 58) 66.
[67] ibid 62.
[68] ibid 67.
[69] Orçun Kaya, 'Robo-Advice - a True Innovation in Asset Management' [2017] Deutsche Bank Research, EU Monitor 6 <www.dbresearch.com> accessed 15 March 2023.
[70] Mangram (n 58) 66.

consists of the market risk inherent to all assets and that cannot be eliminated, such as inflation or interest rates, and unsystematic risk, which refers to the risk associated with individual assets that can be reduced within a portfolio through diversification, as demonstrated in **Figure 4**.[71]

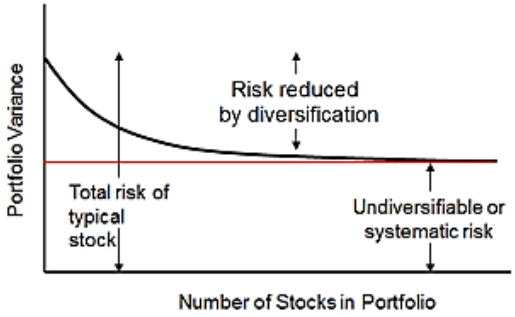

Figure 4 *– Portfolio Diversification Schematic*[72]

After the analysis and selection of an adequate investment strategy that fits the client's profile, the robo-advisor recommends it. If the client agrees to such a recommendation, the robo-advisor may invest on their behalf.

Robo-advisors tend to recommend investment funds, mutual funds and exchange-traded funds ("ETFs") intended to mimic market benchmarks, which result in significantly lower management fees when compared to actively managed funds and, consequently, allow investors to retain more of their profits.[73] For this reason, robo-advisors tend to be programmed to adopt a conservative strategy by recommending funds with extensive coverage, long operating history, market liquidity and a strong performance in the market.[74]

Robo-advisors tend to resort to passive investment strategies, assembling a well-diversified and stable portfolio of securities without endeavouring to attain any under or overvalued stocks.[75] By contrast, robo-advisors that adopt active investment strategies aim to achieve results that outsmart the market, namely by rebalancing the client's

[71] Bodie, Kane and Marcus (n 15) 195; Mangram (n 58) 62.
[72] Kathryn Kaminski, 'Return Dispersion, Counterintuitive Correlation: The Role of Diversification in CTA Portfolios' [2015] *Campbell White Paper Series* 3 <https://www.cmegroup.com/education/files/return-dispersion-counterintuitive-correlation.pdf> accessed 3 June 2023.
[73] Jung, Glaser and Köpplin (n 54) 412–413.
[74] Facundo Abraham, Sergio L Schmukler and José Tessada, 'Robo-Advisors: Investing Through Machines' [2020] World Bank Research and Policy Briefs 2 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3360125> accessed 14 June 2023.
[75] Bodie, Kane and Marcus (n 15) 341.

portfolio more frequently to exploit more profitable opportunities. However, according to the efficient market hypothesis, since stocks are fairly priced it does not compensate to buy and sell securities on a regular basis as the transaction costs are too high for the profits they can confer overall.[76]

Throughout the life of the investment, the robo-advisor may also intervene, notably by optimizing investors' risk-return trade-offs by continuously monitoring, managing, and rebalancing their portfolios.[77] By tracking market fluctuations and reallocating the composition of portfolios accordingly, as well as adjusting the portfolios automatically to reflect investors' changing preferences in terms of risk tolerance and investment perspectives, the portfolios are always aligned with the investors' financial objectives.[78]

The portfolio can be rebalanced on a regular basis (e.g.: once a week or once a month) and/or when a certain threshold is reached (e.g.: if investor A's initial portfolio consisted of 30% of stocks and 70% of bonds (30/70) and due to market fluctuations, the composition of the portfolio changed to 35/65, then the portfolio would have to be automatically rebalanced to a 30/70 composition by selling equity and buying debt instruments).[79] Robo-advisors tend to rebalance the portfolios at least once a year and use a 3-5% as a threshold, considering that the lower the threshold value, the more often the portfolio has to be rebalanced because even the slightest change in the portfolio will impact its target value.[80]

Another functionality of robo-advisors is assisting investors with tax planning by minimizing their annual tax liability through tax-loss harvesting, i.e., by purposefully incurring losses, investors can offset their capital gains and reduce their tax obligations – which differs from human advisors in that instead of doing it manually, algorithms constantly monitor the market and find opportunities more quickly.[81]

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[76] ibid.
[77] Milo Bianchi and Marie Briere, 'Robo-Advising: Less AI and More XAI?' in Agostino Capponi and Charles-Albert Lehalle (eds), *Machine Learning in Financial Markets: A Guide to Contemporary Practice* (Cambridge University Press 2021) 3 <https://www.ssrn.com/abstract=3825110> accessed 18 June 2023.
[78] ibid.
[79] Maume (n 34) 16–17; Jung, Glaser and Köpplin (n 54) 413–414.
[80] Kaya (n 69) 7.
[81] Adam Grealish and Petter N Kolm, 'Robo-Advisory: From Investing Principles and Algorithms to Future Developments' in Agostino Capponi and Charles-Albert Lehalle (eds), *Machine Learning in Financial Markets: A Guide to Contemporary Practice* (Cambridge University Press 2021) 15-16 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3776826> accessed 12 June 2023. Nevertheless, this strategy has some drawbacks, namely the market risk that the investor may have to bear if the price of the assets sold fluctuates sharply during the implementation of this strategy, difficulty in finding highly

III. Legal Framework

1. Investor protection framework under MiFID II

There is no European harmonised framework created to specifically regulate robo-advisors. Nonetheless, MiFID II and MiFID II Delegated Regulation have been applicable to them, in light of technological progress and developments in the financial markets. Such provisions must be applied with caution to robo-advisors as they were originally intended for human-to-human interaction.[82]

As previously mentioned, MiFID II emerged after the Global Financial Crisis, in order to address the financial system's lingering vulnerabilities and to improve its efficiency, resilience and integrity, which can be achieved namely by increasing transparency and confidence in the financial markets, as well as by strengthening investor protection.[83]

Although there is no definition of "investor" in MiFID II, this Directive focuses on the legal relationship between investors and financial intermediaries, from a client relationship perspective.[84] MiFID II covers institutional/qualified investors with greater experience and economic power (e.g.: professional investors *per se*, such as credit institutions or professional investors by request)[85] and non-institutional/non-qualified

correlated alternative assets similar to those that were sold, the associated transactions costs, and the existence of regulatory frameworks prohibiting tax arbitrage, such as rules imposing deductible limits on different asset classes or timeframes, in order to dissuade investors from selling assets at a loss only to claim a tax benefit indefinitely. See Kaya (n 69) 8.

[82] Maume (n 24) 34–35. As an example, the Author compares the applicability of driving rules for human drivers (such as having a driving license and being prohibited from driving while intoxicated) to fully automated cars, which would be pointless. Quite pertinent is also the example of a 2009 amendment to German financial services law that included a provision requiring providers of financial services to provide clients with written records of their advisory services. These records had to be signed by the advisor (that would be the person to whom the advice would be attributed in the event of litigation) and the person to whom the advice was given. Thus, as long as it was signed by both parties, BaFin would not confirm who was the one providing advice in practice. When applied to robo-advisors, this provision may not be effective as the advice is not given by a person, but by algorithm-based software, which cannot sign documents and is not subject to liability. The advice would ultimately be attributed to the individuals behind the algorithm, who are unable to make a conscious statement about the advice's validity, considering the lack of human involvement in the advice-giving process.

[83] Directive 2014/65/EU (MiFID II), Recitals 4 and 7.

[84] Directive 2014/65/EU (MiFID II), art 4(1)(9).

[85] Retail investors who request financial intermediaries to be treated as professionals, waiving the legal protection inherent to their status (see Directive 2014/65/EU (MiFID II), Section II, Annex II). In such cases, the clients must undergo an evaluation as to their expertise, experience and knowledge and if they do not meet the required levels or if a wrong judgement has been conducted on them, they remain retail clients. See Haentjens and Carabellese (n 45) 95.

investors (e.g.: retail investors), with the latter benefiting from enhanced protection, considering their scarce expertise and knowledge in the field (Article 4(1)(10) and (11) of the MiFID II).

MiFID II follows a principle of technological neutrality, through which the European legislator does not specify which technologies should be employed within the scope of the Directive, leaving it to market participants' discretion.[86] Thus, this principle accommodates future technological innovations, such as the use of robo-advisors when providing investment advice and managing portfolios.

Moreover, the application of MiFID II requirements follows a "function-based" approach, i.e., they are applicable to all entities that materially perform the functions that those rules are intended to regulate, regardless of whether they are carried out by a human being or an algorithm.[87]

If, on the one hand, one should take into consideration the legal uncertainty inherent in this principle that could be solved with an amendment to MiFID II adding clarity regarding its application to robo-advisors, on the other hand, doing so would assume that all other technologies that have been considered under MiFID II and which are not expressly regulated, as well as future technologies that may arise in this context should be subject to similar inclusion in this Directive.[88]

Therefore, as MAUME suggested – and with one should agree – specific rules on robo-advisors could be established via Delegated Regulations by the European Commission or via Guidelines developed by ESMA, given the greater flexibility and responsiveness of such an approach to new technological developments in the market, which also allows MiFID II to accommodate future realities that may arise.[89]

[86] Autoridade da Concorrência, 'Inovação Tecnológica e Concorrência No Setor Financeiro Em Portugal' (2018) 63 <https://www.concorrencia.pt/sites/default/files/imported-media/Vers%C3%A3o%2520preliminar%2520Issues%2520Paper%2520Fintech.pdf> accessed 15 February 2023.
[87] Ringe and Ruof (n 35) 29.
[88] Maume (n 34) 23.
[89] ibid.

1.1. The financial intermediaries' (or robo-advisors'?) authorisation

Investment firms are the entities legally authorised under MiFID II to provide investment services – such as investment advice and portfolio management – and/or perform investment activities laid down in Annex I, Section A of the MIFID II (Article 4(1)(1) of the MiFID II).[90] Nevertheless, there are other entities, such as credit institutions, that operate as financial intermediaries in financial markets and that can also provide both these investment services. Therefore, they should also be covered by this client relationship when authorised to provide investment activities or investment services (Article 1(2) of the MiFID II Delegated Regulation).[91]

But to whom should the authorisation be granted? The financial intermediary that operates the robo-advisor or the robo-advisor itself? From a teleological perspective of Article 5(1) of the MiFID II, financial intermediaries are the ones that are subject to the authorisation as they operate in the market (Recitals 37 and 48, as well as Article 21, all of the MiFID II). Such logic applies even when they resort to robo-advisors to provide investment advice and portfolio management services (Recital 86 of the MiFID II and Article 54(1) of the MiFID II Delegated Regulation). Additionally, if it is considered that robo-advisors do not have legal personality – which one should agree – they should be considered mere instruments employed by the financial intermediary when performing investment services.[92] Moreover, for the purposes of Article 9(3) of the MiFID II, robo-advisors would not be able to have a management body that would define, supervise and be accountable for the implementation of the governance arrangements, nor have employees. Therefore, the recommendations to the investors resulting from the algorithm will ultimately be ascribable to the financial intermediary.

It is crucial to note that even though financial intermediaries are the subject of the authorisation, in order to comply with Article 9(3) of the MiFID II, they must ensure, for

[90] The primary distinction between the two is that investment services are performed on behalf of and in the interests of the client, whereas investment activities are carried out in the interests of the investment firm. See Haentjens and Carabellese (n 45) 155.
[91] The term "financial intermediary" will be used instead of "investment firm", given its broader scope.
[92] Although there is doctrinal divergence regarding this topic, which will be addressed in Chapter IV, it will be considered for the purpose of this study that robo-advisors do not have legal personality, as it appears to result from the interpretation of the current legislation and in accordance with the majority of the doctrine.

instance, that their employees' qualifications include computer training and that there is a support team for system maintenance.[93]

After being authorised, financial intermediaries are still subjected to the ongoing supervision of the national competent authorities and must remain compliant with MiFID II's provisions (Article 22 of the MiFID II).

If the authorisation conditions are not met, the authorisation can be revoked, and the financial intermediary is removed from the market (Article 8 of the MiFID II).

1.2. Relationship with the investors

MiFID II is regarded as a full harmonisation Directive, due to the limited number of open clauses that allow for the EU Member-States to implement more stringent national rules, i.e., deviating rules are only permitted when expressly mentioned in the Directive, which does not imply that all possible aspects of regulation are necessarily addressed as there may be regulatory gaps for the EU Member-States to fill in.[94]

Without prejudice, some Authors[95] contend that the standard of investor protection required of human advisors should be the same as that required of robo-advisors, at the risk of not guaranteeing a level playing field. Hence, a higher standard should not be required of robo-advisors for now, with the mere justification that they are machines, considering that they also bear a certain level of fallibility just like human financial advisors.

Notwithstanding, it does not seem that a similar standard is sufficient to protect the investor's position and the market in general, since a fallibility level is certainly common in both robo-advisors and human financial advisors, but the impact of their errors is substantially different. For instance, it is possible to estimate the time an average human advisor spends collecting information on the client (considering that in terms of interaction, there is greater proximity with the client – e.g.: meetings or phone calls naturally tend to take longer than the processing of data by an algorithm, even when

[93] Maume (n 24) 28.
[94] Maume (n 32) 642–643.
[95] Maume (n 24) 36–37; Tom Baker and Benedict Dellaert, 'Regulating Robo Advice Across the Financial Services Industry' [2018] Institute for Law and Economics, University of Pennsylvania Law School 716–717 <https://ssrn.com/abstract=2932189> accessed 16 March 2023.

dealing hybrid robo-advisors, where there may be some level of human interaction), outlining the investment profile, analysing the financial instruments that best fit that profile and issuing a recommendation accordingly is much longer than what the robo-advisor, as a semi or fully-automated system, spends.

The same can be said for the number of people the robo-advisor can reach simultaneously as opposed to a human financial advisor. Thus, an error or malfunction of a robo-advisor can affect many investments at the same time and more easily create market imbalances than those caused by a human financial advisor. The demand for greater efficiency and speed in the service provided inevitably carries with it a greater risk and responsibility, and it is exactly for this reason that as far as robo-advisors are concerned, increased control, compliance and monitoring measures should be implemented.

As a result, it appears that investors are being ineffectively protected. Despite the fact that there have been no serious implications on the market thus far, it makes sense to adopt a preventive rather than a reacting approach and start developing additional protection mechanisms before such problems occur. Until now, the presence of robo-advisors does not seem significant enough to have such a pronounced impact on the market; however, the greater its widespread use, the greater the risk of this happening.[96]

Investor protection does not imply that the investors are exempted from losses; rather, it means that given their limited financial knowledge and experience compared to other market participants, higher levels of disclosure and loyalty guarantees should be imposed, allowing for better expectation management and the possibility of recourse when such losses occur.[97] Nevertheless, this does not preclude the fact that investors themselves should act in good faith towards other market players (e.g.: investors must provide accurate and complete information when contracting a service).[98]

Investor protection should be ensured by both *ex-ante* (e.g.: by explaining the decision-making process to clients) and *ex-post* measures (e.g.: by establishing liability mechanisms when clients receive poor advice).[99] Nevertheless, the enforcement of MiFID

[96] Carlotta Rinaldo, 'Automation in Investment Advice - A European Perspective' [2023] Revista de Derecho Privado, Universidad Externado de Colombia 333 <https://revistas.uexternado.edu.co/index.php/derpri/Article/view/8707/14370> accessed 20 July 2023.
[97] Maume (n 34) 37.
[98] European Securities and Markets Authority (n 9) 14–15.
[99] Lee (n 3) 127.

II's rules and sanctions for breaches is not governed by the Directive, but rather subject to the national laws of Member-States (private enforcement).[100]

1.2.1. Completeness of the information

One of the concerns of MiFID II is that the client should be in possession of all the relevant information for a clear and informed decision (Recital 72 of the MiFID II). Nonetheless, it is also the client's duty to provide all essential and up-to-date information in an accurate and truthful manner to assist in determining its risk profile and, consequently, the best investment strategy.

Financial intermediaries should disclose to their clients all relevant information to enable them to make a clear and informed decision, namely if the advice is being provided on an independent basis, the range of financial instruments being considered, the existence of periodic assessments of the suitability of the financial instruments recommended, what are the total costs associated with the investment service before providing it (Recital 44 of the MiFID II Delegated Regulation and Article 24(3) and (4) of the MiFID II).

With regard to the financial intermediaries' duty to inform, ESMA Guidelines emphasise (i) a clear identification and disclosure of the degree of human involvement in the provision of the service, and in cases where there is a hybrid robo-advisor, the steps for the client to interact with a human advisor should be explained, (ii) a clarification to the client as to the impact the information provided will have on the suitability of the advice, (iii) an indication of the sources of information that will be accessed to formulate the advice, such as whether the only source will be the questionnaire or other platforms, and (iv) an explanation of how and when the client's data will be updated.[101]

Clients' receptivity to information is greatly influenced by its volume, as well as its presentation. When establishing what information must be disclosed to the clients, a list with the mandatory key points to be addressed should be created, in a similar format to

[100] Directive 2014/65/EU (MiFID II), art 67 ff.
[101] European Securities and Markets Authority (n 9) 6.

the key information documents ("KIDs"),[102] which consist of brief and direct documents that answer the client's main inquiries about the investment products' characteristics and features.[103]

Regarding the presentation and transmission of the information, "simplification, visualization and plain language"[104] are essential features that financial intermediaries must bear in mind.[105] Therefore, some client-friendly suggestions to be implemented tend to be, for example, the design of a section of FAQs or the implementation of interactive notifications.[106]

One way of ensuring the transparency of supervision, as well as the accuracy and quality of information is through record-keeping (Article 25(6) of the MiFID II and Article 52(12) of the MiFID II Delegated Regulation). For instance, if a client wishes to invest in a certain financial product after being duly informed by the financial intermediary that the product is not suitable for its risk profile and the reasons for this, a record of that decision and the justification that led to it should be kept for probative purposes (Article 54(10) of the MiFID II Delegated Regulation).

But is the financial intermediary obliged to ensure that the client has effective knowledge of the information disclosed? It does not appear that the European legislator intended to impose such a legal burden on the financial intermediary.[107] One could argue that financial intermediaries would still be able to ascertain to a certain extent the actual knowledge of investors (e.g.: if they completed a practical test before being bound by any

[102] Regulation (EU) No 1286/2014 of the European Parliament and of the Council of 26 November 2014 on key information documents for packaged retail and insurance-based investment products (PRIIPs) [2014] OJ L 352, Recital 22.
[103] Maume (n 34) 40; European Commission, 'Key Information Documents (KIDs) for Packaged Retail Investment and Insurance Products - Frequently Asked Questions' (2014) MEMO/14/299 2 <https://ec.europa.eu/commission/presscorner/detail/en/MEMO_14_299> accessed 8 June 2023. For an illustration of a KID form, see Regulation (EU) No 1286/2014 (PRIIPs Regulation), Annex I.
[104] In order to avoid litigation between investors and financial intermediaries, financial intermediaries should be required to disclose information in a way that encourages the effective reading and digestion of relevant information by investors. See Marika Salo and Helena Haapio, 'Robo-Advisors and Investors: Enhancing Human-Robot Interaction Through Information Design' [2017] Jusletter IT 5–7 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2937821> accessed 10 May 2023.
[105] Financial intermediaries must comply with the conditions of the Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 44(2). Therefore, financial intermediaries must guarantee, for instance, that the same font size is used throughout the documents, that no important information is disguised or obscured, and that the information is provided in the same language and in clear terms.
[106] European Securities and Markets Authority (n 9) 6.
[107] Nogueira (n 52) 92.

agreement or before the provision of those services, it would be possible to monitor the effective assimilation of the information).

Nonetheless, imposing such a burden on the financial intermediary would be a disincentive as it would have to guarantee that all its clients have read and understood all the relevant information when many of them may just want to rush the assessment to the point of fabricating the results and not wanting to take the necessary precautions for an informed decision. In fact, imagine that financial intermediary A demanded that its clients take a practice test and score above 70% to ensure that they understand the conditions and are able to proceed. If later on, investor X, who scored 80% on that test, argues that a certain aspect was not properly comprehended and, therefore, did not consider a certain implication for his portfolio, the financial intermediary would always be bound by such claims, in a vicious cycle. Such a subjective duty – the quantification of the client's actual knowledge – would be too onerous to be required from the financial intermediary.

Hence, a criticism that has been made in this context is that of the paternalistic nature of such obligation to the financial intermediary, considering that investors may simply want to rely on someone else's advice rather than try to understand and learn what is being conveyed to them.[108] Indeed, even if one maintains – as is the case here – that the financial intermediary must clearly inform the investor and make an effort so that the information is understood by the latter[109] (especially when dealing with retail investors who typically lack expertise and knowledge in the area), the investor's freedom of choice is of uttermost importance. If the investor deliberately ignores what is being presented in order to ensure that an informed and clear decision is made, the financial intermediary should not be held liable for potential misalignments that may be later acknowledged by the investor.

Regardless, there should still be the possibility – not the obligation – of a client to conduct an assessment to ensure the information provided was properly comprehended,

[108] Presenting the critique, though apparently not taking a position, see Nicole Iannarone, 'Rethinking Automated Investment Adviser Disclosure' [2019] SSRN Electronic Journal 13 <https://ssrn.com/abstract=3332722> accessed 3 July 2023.

[109] Especially considering that robo-advisors have the ability to monitor and assess the investor's use and understanding of the information disclosed in a manner a human may not be able to carry out. See ibid 12.

before making a decision. In such a case, the client would ultimately shape the timing of the procedure as this option would be somewhat time-consuming.[110]

Thus, without prejudice to the financial intermediaries fulfilling their information duties as diligently as possible, namely by ensuring the information is transmitted in such a way that it is comprehended by "the average member of the group to whom it is directed, or by whom it is likely to be received" (Article 44(2)(d) of the MiFID II Delegated Regulation), investors should themselves seek to clarify their doubts before taking any decision, safeguarding themselves from potential adverse situations that could have been detected at an earlier time.

What can clients reasonably expect from receiving the information from financial intermediaries in "good time" as mentioned in Article 24(4) of the MiFID II? The interpretation of such expression is determined by (i) the urgency of the situation, (ii) the time gap of a certain client to apprehend and understand the information and (iii) the knowledge and experience of that particular client.[111] Therefore, the greater the urgency of the situation, the more reduced the time gap and, consequently, the greater the difficulty for the client to understand all the information made available. The less the clients' expertise, the longer it will take them to absorb the information.

However, as this tends to be a somewhat subjective assessment, the financial intermediary should strive to achieve a balance between the urgency of the procedure and a reasonable level of knowledge of the client to make an informed decision. As conveyed earlier, an intuitive and clear presentation of the information is crucial as the completeness of the information may imply an information overload for the investor.

1.2.2. Suitability and appropriateness assessments

First of all, the concepts of appropriateness and suitability present in MiFID II must be distinguished. When conducting a suitability assessment, the financial intermediary must guarantee the personal recommendation is suitable to the client's profile, by

[110] The robo-advisors' speed benefits may be counterproductive when encouraging "reactive executions" and "less reflective deliberations". See Thomas Lin, 'The New Investor' [2013] University of California School of Law, Law Review 713 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2227498> accessed 7 June 2023.
[111] Directive 2014/65/EU (MiFID II), Recital 83.

considering its financial situation and investment objectives; on the other hand, in an appropriateness assessment, the financial intermediary must provide information about the characteristics of a financial product and assess whether or not it is appropriate for the client, by evaluating only its knowledge and experience.[112]

As exhibited in **Table 2**, when providing investment advice and/or portfolio management services, both assessments must be performed, given the special relationship of trust between the investor and the financial intermediary underlying these types of services.[113]

By conducting these assessments, while investors are better protected against mis-buying risks, i.e., the risk of investing in products that are not the most adequate for their choices, financial intermediaries also ensure they are not misselling their products, i.e., that they are not selling products that are misaligned with investors' needs.

In turn, when performing execution-only services (e.g.: receiving and carrying out orders on behalf of clients), an appropriateness assessment is sufficient to evaluate if the asset that is intended to be transacted is compatible with the investor's risk profile.[114]

Assessment requirements		Execution Only	Investment Advice	Discretionary Portfolio Management
Suitability	Investment objectives		✓	✓
	Financial situation		✓	✓
Appropriateness	Knowledge & Experience	✓	✓	✓

***Table 2** - Summary of requirements for appropriateness and suitability assessments*[115]

[112] Ronald Janssen, Arthur Kilian and Tom Loonen, 'MiFID II: Suitability and Appropriateness - Practical Guidelines for Investment Services' [2016] *Investment Officer* 6–7 <https://www.investmentofficer.nl/nieuws/white-paper-mifid-ii-passendheid-en-geschiktheid> accessed 18 April 2023. Additionally, it is important to stress that the Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 54(3) assumes that the client's degree of knowledge and experience as well as its financial situation are satisfied when dealing with a professional client (that has not chosen to be treated as a retail client).

[113] Paulo Câmara, *Manual Dos Valores Mobiliários* (4th edition, Almedina 2018) 446.

[114] Janssen, Kilian and Loonen (n 112) 7. In line with the need for increased protection in this type of service, under the terms of Directive 2014/65/EU (MiFID II), Recital 80, although with the exceptions laid out in Directive 2014/65/EU (MiFID II), art 25(4).

[115] ibid.

The obligation of assessing the suitability and appropriateness prevails even when investment advice or portfolio management services are totally or partially provided "by an automated or semi-automated system", as it is when financial intermediaries rely on robo-advisory services, in accordance with Recital 86 and Article 54(1) of the MiFID II Delegated Regulation.[116] Even in such cases, the burden of fulfilling such an obligation remains with the financial intermediary.

Article 25(2) and Recital 71 of the MiFID II determine that when providing investment advice or portfolio management, the financial intermediary must evaluate the suitability and the appropriateness of its recommendations to their clients by obtaining information about their knowledge and experience regarding the specific type of product or service in question, financial situation and capability to bear the risk as well as their investment objectives.[117] This is the so-called *know-your-client approach*,[118] whereby the financial intermediary must ensure that its clients are not only aware of the risks associated with the transactions and fully comprehend them but are also in a position to bear them and that the transactions are in line with their investment goals and ambitions.[119]

According to Articles 16(2) and 24(2) of the MiFID II and Article 54(9) of the MiFID II Delegated Regulation, a *know-your-product approach* should also be followed to ensure that the financial intermediary is fully aware of the financial products it is offering, their features, their drawbacks and to whom they should be recommended to.[120]

[116] See Baker and Dellaert (n 95) 716–717. The Authors maintain that raising the standards for robo-advisors in comparison to those already in place for human advisors is not justified, at least for now, since its market share is not prominent enough. Therefore, robo-advisors should be compared to humans who are far from perfect.

[117] It is important to note that every recommendation must be deemed suitable, whether it is a recommendation to buy, hold or sell an instrument. For instance, if a retail client is advised to sell instrument X and to buy instrument Y, the result of both actions should be assessed against the client's preferences and objectives before the transaction is actually carried out. See Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), Recital 87.

[118] Given the possibility that the financial intermediary may not have ever interacted directly with their clients, this expression should be interpreted in the sense that the financial intermediary is only required to obtain information from the clients and to provide its services based on that information. As a result, the suitability of a given investment recommendation will be assessed not against the clients as they actually are, but rather against what the clients reported to be, see Maia (n 23) 290–292.

[119] Haentjens and Carabellese (n 45) 97.

[120] European Securities and Markets Authority (n 9) 10 and 21.

What should be understood by the "necessary information" to be collected, according to a principle of proportionality? The extent of the information will depend on:[121]

i. The features of the investment advice or portfolio management services to be provided (e.g.: the degree of knowledge and experience required by from client in portfolio management services will, in principle, be much less stringent than in investment advice, since in the former, the investment decisions will be made by the financial intermediary on behalf of the client);
ii. The type of financial instruments or transactions concerned (e.g.: liquid/illiquid, complex/simple, risky/risk-free);
iii. The characteristics of the client (e.g.: marital status, assets, income, financial commitments, financial literacy); and
iv. The desired length of the investment (e.g.: the higher the investment horizon, the more detailed information on that client must be gathered and the greater the guarantees that the client must have available).

For instance, if a more complex and riskier instrument or strategy is at stake, financial intermediaries should request more in-depth information. The same logic applies when dealing with an inexperienced or less literate client, and notwithstanding the general obligation of Article 24(3) of the MiFID II, greater attention should be given to presenting the risks and potential losses for a better understanding of its consequences by these types of clients.[122]

In terms of the financial intermediary's duty to collect information, ESMA Guidelines recommend (i) the clarity and exhaustiveness of the questionnaire presented to the clients, bearing in mind the most common causes why they may fail to answer it properly, (ii) the logic in the construction of the layout and the questions asked, (iii) the assurance of the client's understanding of the questions presented, namely by providing additional clarification or examples, and (iv) the consistency of the responses by incorporating certain features that alert clients to incongruous answers and suggests

[121] ibid 11–12.
[122] ibid 14.

reconsideration, or by implementing systems that automatically flag inconsistent information and ensure a follow-up by the financial intermediary.[123]

In addition to the responsibility of the financial intermediary to collect the information, it must ensure its "reliability, accuracy and consistency" through the internal procedures set forth in Article 54(7) of the MiFID II Delegated Regulation, without overly relying on clients' self-assessment.[124] This provision intends to prevent situations like the following: A is a 20-year-old student, with no income, but 3,000 € of expenses. A claims that it is a very experienced investor and has 4,000 € willing to invest right away – although the example may be slightly exaggerated, these are the types of inconsistencies that the software should be able to identify so that the financial intermediary can thoroughly analyse the client's actual situation.[125]

Clients could intentionally give misleading information to gain access to particular financial products, or they could accidentally do so if they misinterpret a question.[126] Therefore, despite the assumption of Article 55(3) of the MiFID II Delegated Regulation that the financial intermediaries should trust the information provided by their clients, they must impose *ex-ante* measures in order to mitigate the risk of the unreliability of the information supplied, as well as *ex-post* mechanisms to detect and address discrepant information. Intra-system consistency checks (such as risk-profiling software) and periodic system tests will assist in reducing such risk as they allow for more easily spotting inconsistencies and taking concrete action to ascertain its impact.[127]

Instead of asking clients about their experience in investing in certain financial instruments, whether they have sufficient funds to invest or whether they intend to bear more or less risk, ESMA Guidelines suggest that the financial intermediary (i) provide examples of real situations to determine how clients would behave, (ii) inquire about the familiarity with certain financial investments and the frequency with which clients invest in them, (iii) request factual information about their financial situation, such as whether

[123] ibid 7 ff.
[124] "(…) [t]he risk of overestimation by clients may result higher when they provide information through an automated (or semi-automated) system, especially in situations where very limited or no human interaction at all between clients and the firm's employees is foreseen". See ibid 14–15. The very own client's exercise of self-assessment may be in part affected by social and behavioural biases (e.g.: overconfidence) which inevitably impact the accuracy and trustworthiness of the information provided.
[125] In a similar example, it was found that 8 out of 21 robo-advisors still issued a recommendation at the end of the process, without identifying such irregularities. See Maume (n 34) 30.
[126] Colaert (n 55) 27.
[127] Nogueira (n 52) 113; Colaert (n 55) 15; European Securities and Markets Authority (n 9) 16.

they have bank loans and what sources of income they have, as well as (iv) what level of loss clients are comfortable taking on for a specific amount of time.[128]

Besides ensuring the reliability of the information provided by the clients, financial intermediaries must also ensure its up-to-datedness. But how often should client information be updated and why it is important for investor protection? The financial intermediary is required to frequently review client information to ascertain that it does not become outdated, unreliable or incomplete, thereby undermining the investor's profile.[129] If client A's risk profile is out of date in the financial intermediary's database and he now prefers a more conservative position than the one he originally adopted, the asset allocation will not meet his risk expectations. If, for some reason, client A decides that he wants to assume a riskier position in the market and communicates this change to the financial intermediary, the financial intermediary must inform him about the consequences of this change in his profile. For instance, a greater number of risky and complex financial products may be suitable for him, albeit with the possibility of suffering greater losses.[130]

If not updating client information is detrimental, the flip side of the coin may also be problematic if the profile is constantly being updated by the client in order to match a certain recommendation, i.e., the financial intermediary may encourage the client to update its profile to ensure that a certain financial product is considered suitable, without there being any change in the client's situation. This situation is of particular concern when the investment firm is issuing such financial products or receives inducements from other firms to promote them.[131] ESMA Guidelines imply that financial intermediaries should develop procedures that monitor the update movements that occur in the client's profile, before or after the transaction takes place, to identify any suspicious pattern and subsequently report it to the institution's internal control function, which fosters greater proactivity in controlling possible misconduct towards clients.[132]

[128] European Securities and Markets Authority (n 9) 14.
[129] ibid 18.
[130] ibid.
[131] European Securities and Markets Authority (n 47) 39 ff.
[132] European Securities and Markets Authority (n 9) 18.

One of the heated debates on this topic focuses on the possibility of robo-advisors providing truly personalised advice, which is directly related to information retrieval efficiency.

Firstly, it should be pointed out that the way the information about the clients is collected in both traditional financial advice and robo-advisory is through the use of questionnaires presented to their clients. The analysis of the information displayed in the questionnaires reveals the source of the problem: are robo-advisors able to weigh up all the circumstances of their client's life? Does the incapacity of discretion by the robo-advisors in the assessment of such information compromise personalised financial advice?

Even if MiFID II does not address whether the questionnaires should be standardised, they usually tend to cover the same topics, namely the clients' financial situation, family situation, investment objectives and their reactions to hypothetical risky situations.[133]

One of the criticisms regarding questionnaires is their one-size-fits-all approach, which may translate into the unsuitability of individual advice.[134] Such an approach seems to presume that individuals with similar risk profiles would give similar answers, which is not always accurate.[135] This assumption would lead to predetermined results and, consequently, to overly similar recommendations, without reflecting the client's real circumstances, which can ultimately cause market distortions on a large scale.[136]

Although to some extent questionnaires may not be considered the most complete source of information, given their limited questions and answers and the numerous circumstances that may not be addressed,[137] a subsequent close analysis with the client usually manages to cover other types of situations that may have an impact on the portfolio and that are not directly addressed in the questionnaire (e.g.: the intention of

[133] Contrarily, Bianchi and Briere (n 77) 13. The Authors contend that because there is no standardisation of questionnaires, they may be constructed in the most varied ways, fostering a substantial heterogeneity of the questions presented to clients and consequently a variety of results.
[134] Ringe and Ruof (n 35) 17.
[135] Abraham, Schmukler and Tessada (n 74) 3.
[136] Maume (n 24) 39.
[137] Given that clients tend to give up on filling in questionnaires that are too long and too time-consuming, companies typically keep them to a bare minimum. See Maia (n 23) 294.

retiring soon or planning to start a family tend to shift its profile to a more conservative one).[138]

When dealing with fully-automated robo-advisors, the ability to provide personalised advice becomes shakier, since there is no human interaction.[139] However, this argument does not seem to be decisive, since it is not because there is no contact with the client on a regular basis, as can happen with human financial advisors, especially those who resort to passive investment strategies,[140] that they are unable to provide personalised advice. Robo-advisors have the ability to send real-time notifications to clients so that they are compelled to go and update their data on the platform.

When it comes to hybrid robo-advisors, clients can easily clarify their doubts in more detail with a human advisor who, due to common sense, sensitivity and previous experience, is typically more alert to capture aspects that may be relevant to the investor and that may go unnoticed or that differ from the typical average investor situations (e.g.: unusual short investment span or frequently changing investment preferences).[141] When it comes to a fully-automated robo-advisor, eventual queries that the client needs to obtain may remain unanswered as it does not have access to a human advisor. Without neglecting the need to inform the client about such a limitation, the situation could be improved, for instance, through the availability of programmed chat-bots to clarify potential doubts.[142]

With the advancement of AI, the robo-advisor's algorithm could ultimately filter and connect all the information required to build the client's portfolio. It could even compare several datasets to determine the veracity of the answers provided in the questionnaire and any biases underlying them through the client's actual behaviour (e.g.: credit history, professional background, asset/investment records).[143] This would further

[138] This problem affects both human and robo-advisors, as either of them must take precautions to make sure they have enough information to provide reasonable and appropriate advice. See John Lightbourne, 'Algorithms & Fiduciaries: Existing and Proposed Regulatory Approaches to Artificially Intelligent Financial Planners' (2017) 67 Duke Law Journal 667 <https://scholarship.law.duke.edu/dlj/vol67/iss3/4> accessed 18 June 2023.
[139] Addressing this issue further and mentioning others, see Melanie L Fein, 'Robo-Advisors: A Closer Look' [2015] SSRN Electronic Journal 8–11 <http://www.ssrn.com/abstract=2658701> accessed 25 May 2023. The Author maintains that the use of automated systems is inconsistent with the provision of personalised advice.
[140] Lightbourne (n 138) 667–668. Contrarily, see Fein (n 139) 23.
[141] Maume (n 34) 29.
[142] Salo and Haapio (n 104) 3; Nogueira (n 52) 110.
[143] Ringe and Ruof (n 35) 24–25.

mitigate the risk of unsuitable advice. Even so, problems with data protection may arise, requiring the client's consent for the company to collect, possess and analyse the data.[144]

When robo-advisors issue a recommendation, a suitability report must be prepared and made available to the client in question, outlining the specific reasons the investment advice was deemed appropriate in light of the information that was gathered, irrespective of whether or not such advice leads to a transaction (Article 25(6) of the MiFID II and Article 54(12) of the MiFID II Delegated Regulation).[145]

The obligation to express in a report the reasons why a recommendation is considered suitable for a certain investor contributes to the explainability of the decision-making process, i.e., it allows for the deconstruction of the decision that the algorithm reached and the process by which it was achieved, in a way that is understandable to clients, even if based on a complex model.[146]

1.2.3. (In)existence of conflicts of interest

In a broad sense, conflicts of interest can be defined as the "circumstances in which a choice of action necessarily implies preferring certain interests over others".[147] Given the trust relationship with the investor that underlies the activity of financial intermediation, the financial intermediary must decide and act solely on the interests of the person it represents – the investor.[148]

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[144] ibid 26. This issue raises questions in terms of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data [2016] OJ L 119 ("GDPR"), which will not be addressed in this dissertation.

[145] "(…) [t]he firm should explicitly set forth not only if but how the recommendation (including the recommendation not to sell, buy or hold a product) matches the client's investment objective (…). Investment firms should avoid general statements such as «the recommended product is suitable because it matches your risk tolerance» or «the product is suitable because it matches the information you provided to us» as such phrases do not provide the client with information on how the firm has determined that the recommended product is in fact suitable for the client (…)". See European Securities and Markets Authority (n 47) 37–45.

[146] Bianchi and Briere (n 77) 16–19. The Authors highlight the importance of "XAI" (explainable AI), i.e., the idea that the underlying model's predictions of the algorithm can be explained to the users, despite the fact that it is not a simple task in the context of robo-advisors.

[147] Marc Kruithof, 'Conflicts of Interest in Institutional Asset Management: Is the EU Regulatory Approach Adequate?' [2005] SSRN Electronic Journal 2 <http://www.ssrn.com/abstract=871178> accessed 19 June 2023.

[148] ibid 2–3; Directive 2014/65/EU (MiFID II), Recital 56. There is an increased possibility of a conflict of interest when the financial intermediary provides various services simultaneously and has to protect the interests of each of its clients.

The concern about conflicts of interest lies in the asymmetry of information between the provider of the advice – the financial intermediary by means of a robo-advisor, with knowledge and expertise in the area – and the receiver of the advice – the client, prone to be influenced in its choices and decisions, entrusting its interests to the former.

Both Articles 16(3) and 23(1) of the MiFID II establish an obligation for the financial intermediary to identify conflicts of interest and to adopt adequate measures to prevent the adverse consequences of such conflicts.

This obligation manifests in the financial intermediary acting in the best interests of the clients, overriding their own interests – to generate profits (Article 24(1) of the MiFID II), as well as in the limitation[149] of the commissions and fees to be received (Article 25(8) of the MiFID II) and in the elimination of undue incentives, preventing financial products from being recommended solely due to the fact that a commission is earned from their sale and not because they are indeed suitable for the client's profile (Article 24(10) of the MiFID II).

Nonetheless, being in a conflict of interest does not necessarily imply that the advice provided is bad for the client, more so because according to the letter of Article 23(2) of the MiFID II only conflicts that negatively impact the client's interests are relevant for this purpose. For example, the robo-advisor may be recommending financial products from affiliated entities, but regardless of this, these products may be considered suitable for the client's risk profile. Even if it is possible to identify a benefit to the financial intermediary from this situation, the transaction must be carried out as it constitutes a benefit to the client, provided that the client has been properly informed and agreed to this strategy.

In any case, according to MAUME – which one should agree with – if a conflict of interests may generate a risk of damage to the client's interests, then there is an obligation of disclosure. In other words, it is not necessary for such damage to materialize, the mere possibility of its occurrence being sufficient.[150]

[149] It is important to underline that as of now the receipt of inducements is not entirely forbidden by MiFID II: financial advisors may still accept them, but doing so will be deemed as providing non-independent advice. See Better Finance (n 33) 22.
[150] Maume (n 34) 36.

If conflicts of interest persist and cannot be eliminated (e.g.: there is no other financial product available that can so effectively meet the client's objectives as that conflicted financial product issued by an affiliated), it must be disclosed by the financial intermediary that the robo-advisor is investing in financial products (some of them conflicted) for the client to be able to make an informed decision before entering into the contract.[151]

During the contractual relationship itself – and especially when the investor resorts to the robo-advisor's automatic rebalancing of the portfolio – the investor's influence on decisions is diminished, as the robo-advisor does not require its consent to make investment decisions as long as they are in line with the type of risk portfolio initially chosen by the client and consequently discussing disclosure in a later stage of the agreement does not seem viable.[152] However, even if this is not the case, a subsequent disclosure of a conflict of interest is not as effective as an initial disclosure, with the client being caught by surprise and forced to decide – whether to withdraw the funds from the robo-advisor or change the risk profile, for instance.[153]

Nevertheless, this is a measure of last resort, not only because it would otherwise contradict the automated nature of robo-advisors and the assumption that they can independently detect and avoid conflicts of interest without constantly contacting their clients to seek their approval, but also because the organizational arrangements (e.g.: internal control mechanisms, organizational structure, reporting lines) required for conflict prevention in Article 16(3) of the MiFID II should be adequately and efficiently implemented (Article 34(4) of the MiFID II Delegated Regulation).[154]

On the one hand, there are Authors[155] who argue that robo-advisors have fewer biases and errors than human advisors for being based on mathematical and objective algorithms. Following this logic, the vulnerability to conflicts of interest will be lower the less human intervention there is. Hence, fully-automated robo-advisors would be less permeable to conflicts of interest when compared to hybrid robo-advisors.

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[151] Maume (n 34) 35.
[152] ibid 34.
[153] ibid.
[154] ibid 36.
[155] Fisch, Labouré and Turner (n 21) 24; Ringe and Ruof (n 35) 11; Francesco D'Acunto, Nagpurnanand Prabhala and Alberto G Rossi, 'The Promises and Pitfalls of Robo-Advising', *8th Miami Behavioral Finance Conference* (2018) 2 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3122577> accessed 11 June 2023.

Although this may be partly true, those who program the algorithm of the robo-advisors are people who are fallible and subject to conflicts of interest.[156] As Ji highlights, even if the conflict of interest in the employee-client relationship can be mitigated, conflicts between the firm-client may persist as the person designing the algorithm may favour financial instruments issued by the financial intermediary or affiliated entities.[157] The Author – with whom one agrees – additionally proposes that firms be required to reveal when conflicts are purposefully built into their algorithms, resulting in a more stringent disclosure requirement.[158]

Although both human financial advisors and robo-advisors may be integrated into their own firms or related entities, which always carries the risk of them trying to sell products issued or marketed by these firms to their clients, the information asymmetry problem seems to be more pronounced in robo-advisors, whose algorithms tend to be opaque and lack transparency.[159]

The mechanism of Article 24 of the MiFID II was designed to avoid the typical situations where human advisors receive undue commissions from third parties to sell certain products. Nonetheless, this provision may be unsuited for the reality of robo-advisors, whose structural proximity to issuers or affiliated entities, namely via marketing

[156] Megan Ji, 'Are Robots Good Fiduciaries? Regulating Robo-Advisors Under the Investment Advisers Act of 1940' (2017) 117 Columbia Law Review 1572 <https://www.ssrn.com/abstract=3036722> accessed 18 June 2023. With a slightly different point of view, D'Acunto, Prabhala and Rossi (n 155) 6. The Authors contend that while "robo-advising tools might be subject to the biases, conflicts, and limitations of the humans and institutions that develop them (…) [they are] by construction neutral to the idiosyncrasies of specific human advisers". Although the partial neutrality of its construction can be asserted - in terms of the biases of specific human advisors (e.g.: promoting certain products of their company to increase the commissions to be received) -, it does not seem that one can argue for the total neutrality of the algorithm, which will always be potentially subject to the influences of those who design it. See also Baker and Dellaert (n 95) 732. The Authors maintain that even if a "robo-advisor can be designed to ignore those incentives [incentives that historically have been affecting financial intermediaries] (…) many consumer financial product intermediaries that develop or purchase robo-advisors are subject to those incentives".

[157] Ji (n 156) 1573 and 1578. The Author emphasizes the issue of "programmed bias" and the fact that robo-advisor conflicts are more common and pose a greater threat than those of human advisors.

[158] ibid 1580; Fein (n 139) 24–25. Fein points out that robo-advisors do not properly disclose conflicts of interest as they are embedded in the terms of the contract, which due to their density and complexity are considered by clients as "small print", not being carefully read. Differently, see Lightbourne (n 138) 668. The Author stresses that the potential for conflicts of interest exists for both human and robo-advisors. They both can fulfill their obligations towards the clients through adequate disclosure, namely by updating their terms and by presenting the information in a user-friendly manner. It also emphasizes that the interface of robo-advisors tends to allow for a more transparent disclosure than that of human advisors.

[159] Bianchi and Briere (n 77) 12.

and distribution agreements, as well as their complex composition makes it more challenging for clients to identify such conflicts of interest.[160]

Therefore, the focus should be on the *ex-ante* and *ex-post* information duties regarding the disclosure of conflicts of interest by the financial intermediary, following a logic of inverse proportionality: the lower the knowledge and inexperience of the investor, the higher the degree of detail and clarity of the information provided by the financial intermediary.[161]

IV. Liability of robo-advisors

1. (In)existence of legal personality

Given the complexity of the robo-advisors' algorithm, there may be instances where a particular investment recommendation results in losses for the investors as it either failed to consider their needs and goals or did so in a defective manner. One could also consider the scenario where (i) a robo-advisor was improperly programmed to achieve certain results or recommend specific financial products, (ii) software updates were not carried out, which ultimately led to the undue interference of malicious third parties, or (iii) a client provided false information and then tried to obtain compensation for losses incurred as a result of using the robo-advisory service.

Automation raises questions about how robo-advisors can fit into current legal notions, namely whether existing liability rules should be extended to robo-advisors, an *ex-novo* regime should be established, or the responsibility should instead be attributed to those who design, program, commercialize, or use them. Who should be liable? Who should bear the burden of proof?

[160] Maume (n 34) 32; Fisch, Labouré and Turner (n 21) 26. The inadequacy of the provision does not imply that there are no conflicts of interest at the level of the fee structure in robo-advisors. Following Fisch, Labouré and Turner's example, when different services with varying fees are offered, robo-advisors face a conflict of interest if they recommend the service that generates the highest revenue for the firm.
[161] Nogueira (n 52) 86; Câmara (n 113) 415.

Legal personality refers to one's susceptibility of being the holder of legal positions, such as rights and obligations.[162] It is said that legal personality is inherent to the quality of being a human.[163] Nonetheless, legal personality may also be conferred beyond the quality of humanity – albeit to a limited extent – therefore, raising questions about whether it can be recognised to robo-advisors. Legal persons, such as companies, are granted legal personality by means of legal fiction. This way, companies – which are ultimately represented by humans – acquire a limited set of rights and obligations that enable them to carry out their activities.[164] Can this extension of legal personality be attributed to robo-advisors, and, if so, should it be?

1.1. Morality and consciousness

One of the first issues one must consider is the robo-advisors' absence of morality and consciousness, which are commonly associated with humans.

The concept of a "legal person" presupposes a being endowed with consciousness, emotions, and feelings, which allow one not only to make decisions but also to consider the implications of those choices.[165]

That is exactly what the notion of responsibility is about. Responsibility is associated with the freedom to act, which means that in order to establish a connection between a person and the outcome of their actions, their intentionality and their ability to foresee the consequences must be assessed.[166]

Directly related to such a notion is the concept of autonomy, which can be defined as the ability to make decisions and carry them out independently.[167] The degree of

[162] Claudio Novelli, Giorgio Bongiovanni and Giovanni Sartor, 'A Conceptual Framework for Legal Personality and Its Application to AI' (2022) 13 Jurisprudence 202 <https://www.tandfonline.com/doi/full/10.1080/20403313.2021.2010936> accessed 3 May 2023.
[163] Filipe Albuquerque Matos, 'Responsabilidade Por Danos Causados a Terceiros Por Robôs', *Direito e Robótica* (Centro de Direito do Consumo, Faculdade de Direito da Universidade de Coimbra 2020) 161 <https://www.fd.uc.pt/cdc/pdfs/rev_16_completo.pdf> accessed 11 April 2023.
[164] ibid 167–168. For instance, corporations cannot marry, have a family or adopt as these abilities are not compatible with the instrumental nature of such entities.
[165] Diana Correia, 'O R de Robótica No R Da Responsabilidade Civil: O Paradigma Da Inteligência Artificial' (Master's Degree, University of Lisbon 2021) 91 <https://repositorio.ul.pt/handle/10451/49814> accessed 7 June 2023.
[166] Merel Noorman, 'Computing and Moral Responsibility', *Standford Encyclopedia of Philosophy* (2023) 2 <https://plato.stanford.edu/entries/computing-responsibility/> accessed 10 February 2023.
[167] ibid 6–7.

autonomy will differ according to the sophistication of the robot and its interaction with the surroundings: the greater the degree of autonomy, the greater the degree of responsibility (e.g.: the impact of a robot vacuum simply scanning its user's home to clean it does not compare with the impact of a drone flying over a war zone having to identify when there is an imminent danger situation without striking civilians). As previously stated, there are semi and fully-automated robo-advisors, with the latter requiring less human input during the decision-making process.[168]

Nonetheless, against what has been said regarding the need for humanity in legal personality, one could contend that the idea of legal personality should be separated from the idea of humanity, in order to include other non-human entities.[169] In fact, the notions of "legal person" and "legal relationships" are no longer exclusively reducible to natural persons, namely with the inclusion of legal persons created by legal fiction.[170] The same reasoning could be extended to AI systems, as they are created in the interest of humans and subjugated to their purposes, thus being on a similar level as legal persons.[171]

It has also been highlighted that AI entities can feel empathy and may have intentional behaviour.[172] AI systems have a high level of intelligence that legal persons do not possess, even surpassing some humans, such as children, due to their characteristics of autonomy, self-learning and adaptation to the environment.[173] When AI is given a problem to solve, software developers do not provide a specific algorithm that describes the step-by-step process to reach the solution – they simply provide a description of the issue, allowing the AI to build the path to reach a solution through its

[168] Note that, as mentioned before, there is still some degree of human intervention even in fully-automated robo-advisors.
[169] Denis Franco Silva, 'From Human to Person: Detaching Personhood from Human Nature' in Visa Kurki and Tomas Pietrzykowski (eds), *Legal Personhood: Animals, Artificial Intelligence and the Unborn*, vol 119 (Springer Cham 2017) 113 ff; Amanda Wurah, 'We Hold These Truths to Be Self-Evident, That All Robots Are Created Equal' (2017) 22 Journal of Futures Studies 70–71 <https://jfsdigital.org/wp-content/uploads/2017/12/05WeHoldTheseTruths.pdf> accessed 3 February 2023.
[170] Correia (n 165) 92.
[171] Luís Manuel Pica and Mário Filipe Borralho, 'A Personificação Dos Autómatos? A Eclosão de Uma Nova Arquitetura Jurídica Derivada Da Inteligência Artificial' [2022] E.Tec Yearbook Industry 4.0: Legal Challenges, JusGov - Research Centre for Justice and Governance, University of Minho 22 <https://repositorium.sdum.uminho.pt/bitstream/1822/81488/1/E-TEC_2022_Yearbook.pdf> accessed 8 June 2023.
[172] Daniel Dennett, 'When Hal Kills, Who's to Blame? Computer Ethics' in David Stork (ed), *Hal's Legacy: 2001's Computer as Dream and Reality* (Cambridge 1997) 354 <http://hdl.handle.net/10427/57613> accessed 6 May 2023; Giovanni Sartor, 'Cognitive Automata and the Law' [2006] EUI Working Papers Law 9 <https://www.researchgate.net/publication/228235329_Cognitive_Automata_and_the_Law> accessed 10 July 2023.
[173] Resolution with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL) [2017] C 252/239, Recital R; Correia (n 165) 93.

own learning and experience.[174] It should be noted, however, that this statement is by no means universally accepted as an absolute truth.

Even so, one of the examples presented to justify the ability of robots to make independent decisions is that of a project conducted in 2002, in which two robots were assigned the roles of prey and predator, with the instruction to hunt and to flee, respectively, in order to assess their innovative capacity for self-defence techniques. In the course of the experiment, the prey robot escaped the premises and ended up being hit by a car – such behaviour was unexpected as it had not been programmed to perform specific actions.[175] Following this logic, the more independence robots have, the less sense it makes to claim that they are merely tools at the disposal of humans, considering they would have the autonomy to decide for themselves.[176]

Another argument in favour of the attribution of legal personality to AI systems is that it would benefit both the economy and the companies' interests. If companies do not have to worry about being held liable for any damage caused by the AI systems they resort to when developing their activities, they will rely on these technologies even more.[177]

However, even damages caused by fully autonomous systems are typically limited to risks attributable to nature or legal persons and where this is not the case, new laws aimed at individuals are preferable than creating a new category of legal person.[178] Even if a specific legal status were to be established, it does not seem plausible that an AI system could be objectively liable as it does not exhibit consciousness of its own.[179] Regarding the example presented, one could still argue against the robot's ability to

[174] Thatiane Cristina Fontão Pires and Rafael Peteffi Da Silva, 'A Responsabilidade Civil pelos Atos Autónomos da Inteligência Artificial: Notas Inicial sobre a Resolução do Parlamento Europeu' (2018) 7 Revista Brasileira de Políticas Públicas 242 <https://www.publicacoes.uniceub.br/RBPP/Article/view/4951> accessed 5 July 2023.
[175] ibid 243.
[176] Waleed Al-Majid, 'Electronic Agents and Legal Personality: Time to Treat Them as Human Beings', *British & Irish Law, Education and Technology Association* (Bileta - British & Irish Law, Education and Technology Association 2007) 1 <https://www.bileta.org.uk/wp-content/uploads/Electronic-Agents-and-Legal-Personality-Time-to-Treat-Them-as-Human-Beings.pdf> accessed 2 August 2023.
[177] ibid.
[178] Expert Group on Liability and New Technologies - New Technologies Formation, 'Liability for Artificial Intelligence and Other Emerging Digital Technologies' 38 <https://op.europa.eu/en/publication-detail/-/publication/1c5e30be-1197-11ea-8c1f-01aa75ed71a1/language-en> accessed 7 June 2023.
[179] Correia (n 165) 37.

decide independently, as its behaviour of running away derives from a previously given instruction inserted into its code.

Also, one can mention an increasing responsibility gap: in principle, the greater the robot's autonomy, the less direct human influence and involvement in its behaviour, and, consequently, the more challenging it is to legally hold human agents responsible for the robots' decisions.[180] The impact that the temporal and physical distance that computing creates between a person and the consequences of their actions should also be considered. For instance, when creating an automated decision-making system, programmers must first determine the contours in which certain decisions must be made. From the moment of its creation to its use, there is a considerable time gap. The materialisation of the impact of the algorithm on individuals' lives is distant in time and space, i.e., the original actions in the programming of the system can affect people from anywhere in the world and only years later.[181]

Such a time gap can interfere with the ability of those who build and develop these types of technologies to fully realise the magnitude of their actions and, hence, decrease their sense of responsibility.[182] Yet, considering the involvement of several individuals in the development, production and deployment of robo-advisors, humans will always have a sieve of responsibility for the robots' outputs.

Other Authors[183] – which one should agree with – highlight how robo-advisors lack human characteristics such as common sense, emotion, or empathy, and how their actions are already predetermined, even when interacting with their surroundings. Attributing personality to a robot would mean accepting that an entity without consciousness, nor emotional and affective capacities can be attributed rights and obligations, which would go against the very foundations of human dignity that underlie the ideals of the European Union. A robo-advisor's autonomy is solely technological, based on the potential of the algorithmic combination of software – there is no ethical autonomy, i.e., there is no ethical reasoning behind the decision-making process.[184]

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[180] Noorman (n 166) 2.
[181] ibid 2–3.
[182] ibid 3.
[183] Nuno Devesa Neto, 'Responsabilidade Civil Pela Utilização de Robo-Advisors' [2020] Revista de Direito da Responsabilidade 932–933 <https://revistadireitoresponsabilidade.pt/2020/responsabilidade-civil-pela-utilizacao-de-robo-advisors-nuno-devesa-neto/> accessed 1 August 2023; Matos (n 163) 177–178.
[184] Barbosa (n 36) 53–54.

Moreover, the argument that legal persons also have legal personality in order to justify a departure from the idea of humanity does not succeed. The justification for attributing legal personality to legal persons is founded on (i) the protection of the human beings who form their *substratum* and their interests and (ii) the fact that legal persons always act and are represented by people.[185] In contrast, the objective of granting legal personality to AI entities appears to be primarily focused on avoiding litigation problems.[186] Although it is true that one of, if not the main purpose of assigning non-human entities legal personality is the attribution of liability that is not feasible if the robot lacks the free will and autonomy to act.

Additionally, conferring legal personality to robo-advisors would also imply that they would have the financial means to withstand an effective legal claim, thus dissociating from their creator. Nonetheless, in practice, robots lack compensation mechanisms, which would be inconsistent with the intended outcome.[187]

Considering the above, as robo-advisors should be seen as mere tools at the disposal of humans, the patrimony that would be liable in the event of damage would be that of the humans behind them – the identification of the specific person (or group of people) responsible for the damage (e.g.: the manufacturer, the programmer, the user) would depend on the specific circumstances of the case.[188] For instance, if the damage was caused by the robo-advisor's misuse, it would seem unreasonable to hold the programmer liable. Otherwise, programmers would be held liable *ad eternum*, which would discourage the development of new technologies.

Moreover, automated investment advice agreements are celebrated between the clients and the financial intermediaries – and not the robo-advisors, considering that they are not subjects of a legal relationship, do not have the ability to express will, nor do they

[185] Ana Elisabete Ferreira, 'Responsabilidade Civil Extracontratual Por Danos Causados Por Robôs Autónomos: Breves Reflexões' [2016] Revista Portuguesa do Dano Corporal 45 <https://digitalis.uc.pt/handle/10316.2/43559> accessed 1 August 2023; Horst Eidenmueller, 'The Rise of Robots and the Law of Human' [2017] Oxford Legal Studies Research Paper 13 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2941001> accessed 5 May 2023.
[186] Neto (n 183) 937.
[187] Correia (n 165) 92.
[188] Neto (n 183) 937.

have needs, which contributes to the idea that robo-advisors are a mean to an end – the provision of the services underlying such contracts.[189]

In 2017, the European Parliament[190] recommended the creation of a specific legal status for robots – the status of an electronic person, i.e., a limited "e-personality" comparable to the legal personality granted to companies, at least where compensation is concerned, which would give the possibility of robots to own assets and provide compensation to injured parties. Such a proposal was later abandoned in 2020, with the argument that damages caused by AI systems "are nearly always the result of someone building, deploying or interfering with the systems".[191]

As it has been explained and in line with the recent position of the European Parliament, there appears to be no benefit in considering such a legal status when the intention is not to make them autonomous holders of rights but rather to make them liable for the damages caused, which could be achieved by other more efficient means of compensation.[192]

The idea of attributing legal personality to AI entities is linked to the idea of accountability and, consequently, to the concepts of justice and punishment. But what would be the practical effect of punishing an AI entity devoid of emotional and moral capacity when it will not benefit from its inherent pedagogical purpose?[193]

Therefore, the question should not be whether the responsibility lies with the robo-advisor, but rather: from that range of agents participating in the construction and employment of robo-advisors, who contributed to the outcome of events and, as a result, should bear responsibility for the damages caused?[194]

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[189] Maume (n 34) 10; Neto (n 183) 937; this also seems to be the EU legislator position as MiFID II holds financial intermediaries accountable when resorting to semi and fully-automated systems in Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 54(1).

[190] Resolution with recommendations to the Commission on a civil liability regime for artificial intelligence (2020/2014(INL) [2021] OJ C 404, Recital 59(f).

[191] ibid para 7.

[192] Ferreira (n 185) 48; Neto (n 183) 938; Nathalie Nevejans, 'European Civil Law Rules in Robotics' (Directorate-General for Internal Policies, European Parliament 2016) PE 571.379 15 <https://www.europarl.europa.eu/RegData/etudes/STUD/2016/571379/IPOL_STU(2016)571379_EN.pdf > accessed 18 April 2023. Nevejans advocates for the creation of a compulsory insurance scheme complemented by a compensation fund.

[193] Lawrence B Solum, 'Legal Personhood for Artificial Intelligences' (1992) 70 North Carolina Law Review 1247 <https://scholarship.law.unc.edu/nclr/vol70/iss4/4> accessed 31 July 2023.

[194] Noorman (n 166) 3.

1.2. Unpredictability and self-learning capacities

Subsequent deviations from the original source of code may occur as a result of the robot's ability for self-learning, i.e., its capability to improve and refine its outputs through ongoing learning.[195] As POLSON and SCOTT said, "[i]n AI, the programmer's role is not to tell the algorithm what to do. It is to tell the algorithm how to train itself for what it should do, using data and the probability laws".[196]

It could be argued that with machine learning ("ML") and deep learning ("DL"),[197] algorithms can learn from themselves in such a way that there is no longer any human control over the robot's performance. Thus, unforeseeable behaviour leading to possible damages caused by a robot would not be, in principle, linkable to the action of a human being. Although in several cases the robot's performance can be attributed to the intentional or negligent conduct of a human (e.g.: failure to carry out software updates, breach of duties of care that allow third parties to interfere inappropriately with the system or inaccurate information about the robot's use), there may be cases where that may not be possible.[198]

Although typically robo-advisors rely on relatively simple algorithms,[199] they can be programmed to develop self-learning abilities (e.g.: learning from clients' previous

[195] Ehrentraud and others (n 19) 54.
[196] Nick Polson and James Scott, *Inteligência Artificial: Como Funciona e Como Podemos Usá-La Para Criar Um Mundo Melhor* (Vogais Editora 2020) 11 (freely translated quote).
[197] In a nutshell, whilst machine learning systems are designed to recognise patterns, learn to perform specific tasks and evolve from prior experiences (functional learning); deep learning systems tend to mimic the functioning of a human brain, the algorithm can be fed categorised or uncategorised information and automatically learns which resources are useful to it and uses them in its development. The more and higher quality data the algorithm is fed, the more precise the results will be. The main difference between the two systems is that the first algorithm requires meticulous planning and is limited to the function for which it was designed, whereas the second does not require labeled and catalogued data; instead, it will process it and autonomously classify the information received. See Ana Beatriz Simões, 'Inteligência Artificial e Responsabilidade Civil: À Luz Do Quadro Normativo Vigente' (Master's Degree, Universidade Católica Portuguesa 2021) 9 ff <http://hdl.handle.net/10400.14/31993> accessed 3 August 2023). For the time being, robo-advisors appear to be based on machine learning models as they are designed to carry out a specific task – recommending an investment strategy to investors considering the information provided by them. See Sónia Moreira, 'IA & Robotics: Towards Legal Personality?' [2022] E.Tec Yearbook Industry 4.0: Legal Challenges, JusGov - Research Centre for Justice and Governance, University of Minho 3–4 <https://repositorium.sdum.uminho.pt/bitstream/1822/81488/1/E-TEC_2022_Yearbook.pdf> accessed 8 June 2023.
[198] Mafalda Miranda Barbosa, 'O Futuro Da Responsabilidade Civil Desafiada Pela Inteligência Artificial: As Dificuldades Dos Modelos Tradicionais e Caminhos de Solução' (2020) 2 *Revista de Direito da Responsabilidade* 283–284 <https://revistadireitoresponsabilidade.pt/2020/o-futuro-da-responsabilidade-civil-desafiada-pela-inteligencia-artificial-as-dificuldades-dos-modelos-tradicionais-e-caminhos-de-solucao-mafalda-miranda-barbosa/> accessed 2 August 2023.
[199] European Securities and Markets Authority (n 30) 9–10.

investment transactions in order to optimize the outcomes of future ones through real-time market analysis). Having self-learning abilities does not imply that robo-advisors should be solely responsible for their outputs, let alone granting them legal personality for that purpose. It does not contradict the idea that robo-advisors' actions are always pre-determined, as they are humans' creations, even when modified by self-learning, i.e., even if robo-advisors decide differently from what was initially foreseen in their programming, it may be more difficult to hold humans accountable for the robot's performance.[200]

The software developers include several examples of correct answers to solve a specific problem in the robot's code, i.e., by mapping a set of inputs to a set of outputs, which will assist in its decision-making process.[201] For instance, robo-advisor A is programmed to match risk-averse clients with low-risk products. What if, considering the market conditions and the intended results by the investor, instead of recommending low-risk products, robo-advisor A recommends highly volatile products? As robo-advisors lack genuine free will, their self-determination would always be the result of previous programming.[202] Thus, it is not considered that the robot can truly and indiscriminately go against the indications of the creator, i.e., the indications of the creator (software developer or in a broader sense, the company that uses it on the market) are incorporated in the algorithm itself. Therefore, the possibility of robots acting in a certain manner is inevitably built into the algorithm to a greater or lesser extent. Even when the robo-advisor makes a mistake, it is only doing so based on what the algorithm allows it to do.

Hence, a more conservative view is favoured, as it is understood that the actions of robots, namely robo-advisors, are ultimately attributable to the humans behind them, even when based on ML models. Even if the robot's performance was not anticipated, responsibility would have to be assessed according to the human agents' knowledge of the software's limitations – in fact, the greater the autonomy and sophistication of the machine, the greater the need for monitoring, verifying and reviewing the software.[203]

One could critically argue that a continuous need for monitoring the software would conflict with the idea that AI systems are designed to autonomously act, without the need

[200] Neto (n 183) 933; "only humans, as individuals, can be responsible, as they are the only ones who are in control of their actions" (freely translated quote). See Barbosa (n 198) 299.
[201] Ana Rita Maia, 'A Responsabilidade Civil Na Era Da Inteligência Artificial – Qual o Caminho?' [2021] *Julgar* 5–6 <https://julgar.pt/a-responsabilidade-civil-na-era-da-inteligencia-artificial-qual-o-caminho/> accessed 1 August 2023.
[202] ibid 8.
[203] Correia (n 165) 78.

for human intervention.[204] Nevertheless, the AI system will only be able to autonomously perform its tasks if properly functional (e.g.: if the algorithm has a bug that causes investors' funds to be misallocated to the financial products for their risk profile, there should be intervention to correct what has failed and try to improve).

In view of the above, it is also worth mentioning the concept of unpredictability, which refers to the level of unforeseeability of robots' outputs.[205] If the robots' algorithms act on a large set of constantly changing inputs, their outputs become unpredictable.[206] Nonetheless, even those outputs are based on information that is fed by humans – the probabilities are incommensurable, but they are still probabilities and not conscious choices the robot makes. In this case, robo-advisors' inputs – clients' personal information and risk preferences – are fairly stable (e.g.: the investor's risk appetite does not tend to change every day), which results in generally predictable outputs.

1.3. Legal (un)certainty

The underlying logic of granting robo-advisors legal personality is for them – as subjects of rights and duties – to be held responsible for the damages their actions caused to investors.

By granting such status to robo-advisors, fewer contradictory legal decisions would arise, which would contribute to greater legal certainty, as there would be less room for debate regarding the robot's liability and who should be held accountable for its wrongful outputs. On the contrary, holding robo-advisors fully responsible for their outputs can result in situations of carelessness by those who design, program and manage them, since once they have done their part, they would not be responsible for potential wrongdoing of the robot.

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[204] ibid 80.

[205] Philipp Hacker, 'The European AI Liability Directives – Critique of a Half-Hearted Approach and Lessons for the Future' [2022] SSRN Electronic Journal 57 <https://www.ssrn.com/abstract=4279796> accessed 2 August 2023.

[206] Cindy Van Rossum, 'Liability of Robots: Legal Responsibility in Cases of Errors or Malfunctioning' (Ghent University 2018) 21 <https://libstore.ugent.be/fulltxt/RUG01/002/479/449/RUG01-002479449_2018_0001_AC.pdf> accessed 26 June 2023. The Author gives the example of Watson-like robots, where algorithms rely on online data that is constantly changing as a result of the behaviour of millions of individuals.

But to what extent would it be possible to distinguish where the responsibility of those behind the robo-advisors ends and the responsibility of the robo-advisors commences? Would it be when the robo-advisor's performance went beyond what it had been programmed to do? Or could such unpredictable outputs of the robot still be attributed to the person who should have ensured the maintenance of the algorithm and failed to do so? Or even to the one who programmed the algorithm defectively and, therefore, allowed such situations? The robo-advisors' inherent intricacy would seem to lead to regulatory challenges, as it would require complex legal frameworks that, in practice, would be somewhat counterproductive.

In light of the current European framework, there is a propensity to tackle the legal issues raised by AI systems by adapting existing liability models[207] – which one should agree with –, as opposed to extending them legal personality.[208]

If, on the one hand, the lack of harmonisation of the legal framework applicable to robo-advisors may foster legal uncertainty, on the other hand, excessive regulation may be counterproductive, not only because these realities are constantly evolving, but also because it is difficult for regulators to keep up with such changes in such a short period of time. This may be the reason why the European Union tends to complement legal regimes with specific guidelines to ensure an effective and material equivalence, without imposing additional requirements.[209]

Although it is not necessary to create a "Law of the Horse"[210] for robo-advisors, considering that the doubts in the attribution of responsibility are common to the opacity and complexity of other types of robots' algorithms, it seems appropriate to legally address such problems for the purposes of legal certainty and uniformity in the treatment of situations by the EU Member-States. Even if it is true that trying to keep up with the

[207] For instance, the logic of responsibility under Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 54(1) may be extended to robo-advisors.
[208] Novelli, Bongiovanni and Sartor (n 162) 198–199.
[209] Maia (n 23) 297.
[210] Frank H Easterbrook, 'Cyberspace and the Law of the Horse' (1996) 1 University of Chicago Legal Forum 207–210 <https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?Article=1204&context=uclf> accessed 8 July 2023. The Author refers to the example of owning a horse and its legal implications, notably the process of its transaction or its liability if the horse injures someone, to demonstrate that it is not necessary to create a specific law regulating horses to address such issues. The same should be thought of in relation to cyberspace advancements at the time – where property laws were not effective, contractual and liability general principles would be sufficient to overcome the problem, without the need to develop a new legal framework. See also Valerie Albus, 'Of Horses and Cyberspace' (2022) 2–3 <https://digi-con.org/of-horses-and-cyberspace/> accessed 8 August 2023.

constant development of technologies by creating more and more rules, without due consideration, ends up being counterproductive, creating confusing and ineffective laws,[211] it is also true that robo-advisors emerged almost fifteen years ago and are still a poorly regulated reality.

2. Liability regimes and investor protection

It is of utmost importance to address the legal mechanisms and regimes that investors may resort to protect themselves when robo-advisors' performance causes damages, even if it is maintained that robots have no legal personality.

As mentioned above, the use of automated systems is irrelevant for excluding or limiting liability for compensation of damages resulting from incongruous advice.[212] MiFID II fails to regulate the enforcement of the rules it establishes, despite its significance for investor protection.[213] Therefore, the reaction to a breach of a duty of conduct imposed by MiFID II – such as not properly conducting a suitability assessment – depends on the EU Member-States' ability to supervise and effectively enforce the rules.[214]

Nonetheless, proper and effective enforcement of market rules must be ensured to guarantee the proper functioning of the market,[215] especially considering the wide chain of agents involved from the robo-advisor's manufacturing to its use by clients, as well as the opacity and complexity of AI systems. To this end, one could argue that it would be more appropriate to implement legally binding standards regarding the criteria for assessing the liability in such cases, rather than just guidelines and joint reports.[216]

Regardless of the robo-advisor being semi or fully-automated, injured parties should be able to demand the firm that resorted to a robo-advisor to provide investment advice in order to effectively be compensated, guaranteeing their right to an effective

[211] Easterbrook (n 210) 215.
[212] Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 54(1)(2) and Recital 86.
[213] Rinaldo (n 96) 329.
[214] ibid.
[215] ibid 330.
[216] ibid 333.

remedy and a fair trial.[217] The firm should be held liable even in the events of malfunctioning and programming defects – except when clients, for example, negligently convey incorrect information – and should not be exempted from responsibility by adducing technological errors or operating defects.[218] As when human advisors provide investment advice, they are liable for any errors or failures that may even have been caused by those who help them carry out the assessment and issue of the recommendation, the same logic should apply when using a robo-advisor, whose performance would be attributable to the firm using it, despite its flaws on the decision-making process.[219]

Then, the firm may directly address those who ultimately may have caused the damage, such as the software developers in the event of a defect in the algorithm.[220] For example, in the light of the specific case, it could be questioned whether the defect was recognisable at the time; if not, whether it could have been known and whether such damage could have been avoided if a certain update had been properly made.

Another important point to emphasise is the need to alleviate the onerous burden of proof of the injured party when faced with complex cases, such as the ones where the nature of the technology used may require extensive and deep AI knowledge that an average person is not expected to have. It can be challenging even for experts to determine the correctness of the procedure followed and the results obtained without proper and exhaustive technical details.[221] Such difficulty may ultimately lead to a reduced level of compensation for the damages caused by AI systems when compared to cases where the damages have been caused by technologies other than AI, fuelling legal uncertainty and distrust in the use of AI.[222]

In this regard, the need arose for a more incisive action by the EU in order to consistently achieve the desired effect of harmonisation in terms of civil liability, in particular through the recent Proposals: the PLD Proposal and the AILD Proposal.

[217] Charter of Fundamental Rights of the European Union [2012] C 326/02, art 47.
[218] Rinaldo (n 96) 332.
[219] ibid.
[220] ibid 332–333; Van Rossum (n 206) 29. To mitigate the difficulty in pinpointing when the defect first appeared, Van Rossum suggests checking the robot's black box to help with the identification of the cause of damage and whether or not the product was defective at the time of the incident.
[221] Rinaldo (n 96) 330.
[222] ibid.

Both the PLD Proposal and the AILD Proposal encompass two main key provisions with respect to damages caused by AI: (i) the disclose of relevant evidence[223] by national courts within the limits of what is necessary and proportionate for the injured party to support a claim, at its request and provided it presented facts and evidence sufficient to support the plausibility of the claim and (ii) the establishment of rebuttable presumptions regarding the injured party's burden of proof.[224]

Whereas the scope of application of the PLD Proposal is limited to physical products and software, including AI systems, that can cause harm due to their defects, the AILD Proposal covers situations where AI providers, developers or users acted wrongfully leading to damages caused by AI products and services.[225]

Nevertheless, whilst the PLD Proposal is a maximum harmonisation Directive,[226] the AILD Proposal is a minimum harmonisation Directive, which allows EU Member-States to choose to apply their national laws where they are more favourable to injured parties[227] (e.g.: they may choose national laws that provide for a complete reversal of the burden of proof).[228] It does not aim to harmonise general aspects of civil liability – which tend to differ from one national legal system to another – but to ensure a minimum level of protection for injured parties, notably by developing procedural aspects such as the

[223] Proposal on liability for defective products (PLD Proposal), art 8; Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), art 3.
[224] Proposal on liability for defective products (PLD Proposal), art 9; Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), art 4.
[225] The PLD Proposal establishes a strict liability model, where the manufacturer (and, under certain conditions, other economic operators) is liable for the damages caused by defective products, regardless of whether such defects were caused by fault. Such a regime is more beneficial than a fault-based liability regime since claimants do not have to prove that a fault was committed by the service provider or AI user. Therefore, the AILD Proposal follows a "balanced approach", where it implements a fault-based liability regime – where an agent who acted with the fault (intent or negligence) is liable for the damages caused by the AI system – and introduces a presumption of causality, making it easier for the injured party to pr. See Alexandre Lodie, Stephanie Celis and Theodoros Karathanasis, 'Towards a New Regime of Civil Liability for AI Systems: Comment on the European Commission's Proposals' (2022) 5 ff. <https://ai-regulation.com/eu-commission-proposals-on-ai-civil-liability/> accessed 12 August 2023. Nevertheless, it may be argued that the scope of both Proposals may overlap as an AI system can cause damages due to a defect originating from an intentional action of its programmer. See Hacker (n 205) 9.
[226] Proposal on liability for defective products (PLD Proposal), art 3.
[227] Maria Lillà Montagnani, Marie-Claire Najjar and Antonio Davola, 'The EU Regulatory Approach(Es) to AI Liability, and Its Application to the Financial Services Market' [2023] SSRN Electronic Journal 22 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4439219> accessed 6 August 2023. On this topic, see also Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), art, art 1(4) and Recital 14.
[228] Nonetheless, a minimum harmonisation Directive may lead to different treatments according to different Member-States' national legislation, which may also incentive companies to do forum shopping, i.e., to develop their activities in jurisdictions with less stringent liability laws. See Marta Ziosi and others, 'The EU AI Liability Directive: Shifting the Burden from Proof to Evidence' [2023] SSRN Electronic Journal 13 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4470725> accessed 6 August 2023).

establishment of burden of proof measures to address AI-specific problems.[229] Therefore, in order to avoid overstepping national laws, the AILD Proposal only requires EU Member-States to adopt the two presumptions it establishes under Articles 3 and 4.[230]

At this stage, it is not clear whether the AILD Proposal covers robo-advisors.[231] The AILD's definition of "AI system" refers to the definition laid down in Article 3(1) of the AI Act: "software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with" (emphasis added). The AI Act's Annex I refers to machine learning approaches – which are the basis of robo-advisors' algorithms, allowing them to interpret the data, recognise previous patterns and assist with the decision-making process.

It is not clear under which category of risk robo-advisors would fit under the AI Act. The AI Act follows a risk-based horizontal approach, where risks are divided into: (i) unacceptable risk, (ii) high-risk, (iii) limited risk, and (iv) low-risk or minimal risk,[232]

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[229] Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), arts 1(1) and (3) and Recital 10.

[230] Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), art 3 introduces a mechanism for disclosing evidence and a rebuttable presumption of breach of the duty of care; Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), art 4 establishes a rebuttable presumption of causality, implying a causal link between the injurer's fault (e.g.: breach of duty) and the AI system's output (or failure to do so) that caused the damages – the extension of the presumption varies depending on the nature of the AI used: (i) if a high-risk system is involved, the presumption is not applicable if the defendant can demonstrate that the proof of the causal link is reasonably accessible to the claimant; if a non-high-risk system is at stake, national courts only apply such presumption when it is considered to be excessively difficult for the claimant to prove the causal link. See Montagnani, Najjar and Davola (n 227) 22 ff.

[231] It is important to note that the Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), Recital 15 states that "[t]here is no need to cover liability claims when the damage is caused by a human assessment followed by a human act or omission, while the AI system only provided information or advice which was taken into account by the relevant human actor. In the latter case, it is possible to trace back the damage to a human act or omission, as the AI system output is not interposed between the human act or omission and the damage, and thereby establishing causality is not more difficult than in situations where an AI system is not involved". Nonetheless – and not disregarding the fact that the performance of robo-advisors can ultimately be traced back to human programming, even in the case of fully automated robo-advisors – it seems that such cases concern the situations where human advisors do their assessment in order to issue a recommendation, resorting to software used internally, without any contact with the client, to help them in the decision-making process. In the case of robo-advisors, there is direct contact with the client, from the moment the algorithm filters the information until it issues a recommendation.

[232] AI systems are considered to pose an unacceptable risk when they threaten fundamental rights on a large scale and, therefore, they are prohibited from being introduced in the market; AI systems are deemed to pose a high risk when they have a significantly adverse impact in fundamental rights to some extent (e.g.: remote biometric identification, transports, verification of travel documents authenticity) and are subject to strict requirements; AI systems with a limited risk refer to the applications intended to interact with natural persons (e.g.: chatbots) and are subject to transparency obligations; if the AI system does not fall into any of the above types, it may be a minimal-risk AI system – configuring the vast majority of AI systems currently used in the EU – which are permitted (e.g.: spam filters) and not subject to regulatory

according to the dangerousness of the AI tools in the protection of fundamental human rights, establishing requirements and obligations for their development, commercialization and use of AI systems.[233]

Nonetheless, in order to obviate the injured party's onerous burden of proof, a presumption of causality may be considered by national courts under the AILD Proposal, regardless of the type of risk of the AI system involved. Therefore, injured parties would be relieved from having to explain in detail how the AI system was driven (i.e., if the result that caused the damage or the inability to reach the result, giving rise to the damage, originated in human action or omission), considering the technical and scientific knowledge it requires.[234] For instance, it could be quite difficult for an average person to prove that the absence of an update necessary for the proper functioning of the robo-advisor (resulting from an omission of the company using it) caused the inability for the robo-advisor to issue an adequate recommendation, which ultimately led to a poor investment strategy. Nonetheless, the company could always try to rebut the presumption by demonstrating that such omission could not have caused the damage.

Considering the increasing reliance on algorithms in the provision of various financial services and activities and its impact on the market and economies, as well as the fact that the AI Act already envisages to address some high-risk AI systems that may be relevant to the financial sector, such as software used for the credit assessment of individuals, robo-advisory could be considered under the AI Act.[235] As suggested by the European Commission, the financial sector is one of the European market segments where firms most frequently use AI to provide their services[236] and where AI regulation is most necessary.[237]

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requirements. See European Commission, 'Regulatory Framework Proposal on Artificial Intelligence' (*Policies*) <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 6 August 2023).

[233] Antonella Sciarrone Alibrandi, Maddalena Rabitti and Giulia Schneider, 'The European AI Act's Impact on Financial Markets: From Governance to Co-Regulation' [2023] European Banking Institute 7 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4414559> accessed 6 August 2023.

[234] Proposal on adapting non-contractual civil liability rules to artificial intelligence (AILD Proposal), Recital 28.

[235] Nathalie Smuha and others, 'How the EU Can Achieve Legally Trustworthy AI: A Response to the European Commission's Proposal for an Artificial Intelligence Act' [2021] Leads Lab, University of Birmingham 44 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3899991> accessed 18 July 2023.

[236] European Commission, 'Study on the Relevance and Impact of Artificial Intelligence for Company Law and Corporate Governance - Final Report' (2021) 14 <https://op.europa.eu/en/publication-detail/-/publication/13e6a212-6181-11ec-9c6c-01aa75ed71a1/language-en> accessed 17 July 2023.

[237] Alibrandi, Rabitti and Schneider (n 233) 9.

Therefore, considering the specificities of financial markets and in an attempt to avoid the risk of duplication of requirements, the EU legislator seems to have intended to limit the provisions directly related to financial regulation from the AI Act.[238]

While not directly affecting clients' fundamental rights, as robo-advisors process and classify personal information, they may impact data protection and non-discrimination rights.[239] For instance, it could be argued that robo-advisors fall under the category of high-risk AI systems, given the need to ensure investors' consent and privacy when gathering their personal data.[240]

Additionally, robo-advisors may also involve pure economic losses, i.e., losses that "are not directly linked to physical injury or property damage",[241] as poor investment recommendations may lead to investors losing money.[242] Following ALIBRANDI ET AL. understanding, "[t]he general nature of the AI Act's requirements rends these suitable for the management of purely economic-related interests traditionally targeted by financial regulation".[243] The same could be said about the PLD Proposal where pure economic losses are not expressly covered by it.[244]

According to MARANO and LI, determining the level of risk robo-advisors would depend on their function, in a specific scenario.[245] As regards the category of unacceptable risk, even if robo-advisors were to use subliminal techniques – which are prohibited under the AI Act as they cause or are likely to cause physical or mental harm – to, for example, manipulate investors into following an unsuitable investment strategy, they would not be

[238] ibid 16.
[239] ibid 18.
[240] Surabhi Mathur, 'Point of View – Artificial Intelligence Act: EU Attempts to Tame the Tech Dragon' (2023) 11 <https://www.ltimindtree.com/wp-content/uploads/2023/06/AI-Act-EU-Attempts-to-Tame-the-Tech-Dragon-POV.pdf?pdf=download> accessed 17 July 2023.
[241] Tatjana Evas, 'Civil Liability Regime for Artificial Intelligence - European Added Value Assessment' (European Parliamentary Research Service 2020) PE654.178 12 <https://www.europarl.europa.eu/RegData/etudes/STUD/2020/654178/EPRS_STU(2020)654178_EN.pdf> accessed 17 July 2023.
[242] There is controversy around the extent of purely economic losses and the (im)possibility of their compensation. For a discussion on this phenomenon. See Barbosa (n 36) 25 ff.
[243] Alibrandi, Rabitti and Schneider (n 233) 59–60.
[244] Proposal on liability for defective products (PLD Proposal), art 4(1) clearly qualifies software, such as AI systems, as a product. Nonetheless, the definition of damages in the Proposal on liability for defective products (PLD Proposal), art 4(6) ends up being quite narrow, referring only to death or personal injury, property damage and loss or corruption of data.
[245] Pierpaolo Marano and Shu Li, 'Regulating Robo-Advisors in Insurance Distribution: Lessons from the Insurance Distribution Directive and the AI Act' (2023) 11 Risks 8 <https://www.mdpi.com/2227-9091/11/1/12> accessed 21 August 2023.

banned as the damage caused would amount to a pure economic loss.[246] In turn, it seems appropriate to consider robo-advisors with a risk-assessment function under the high-risk AI systems category, avoiding discrimination against specific vulnerable groups of people from accessing services, as it happens in creditworthiness evaluation.[247] When robo-advisors are employed to assess an investor's risk profile and ultimately recommend a suitable investment strategy, they are also doing risk management and similar situations would deserve equal treatment. Nevertheless, following such logic, in this last case, the harm caused would translate into pure economic loss and since those types of losses are not explicitly addressed by the AI Act, such an equivalence would not seem possible.[248] Moreover, considering the function of interacting with clients, robo-advisors may be categorised as AI systems with limited risk, where their providers and users would be required to comply with specific transparency obligations.[249] However, it should be noted that robo-advisors, especially those with learning abilities, pose a different level of risk and, therefore, should not be equated with traditional chatbots, whose level of complexity is much lower – but rather, they should be subject to a different set of regulatory requirements.[250]

If robo-advisors are considered to be included in the scope of the Proposals, they would benefit from a clearer regime, regardless of being included as a high-risk or limited-risk AI system.[251] Although the AI Act's requirements are only applicable to specific uses of AI in the financial services industry, the Proposal encourages firms to voluntarily adopt a code of conduct – in which the requirements for high-risk AI systems are incorporated – on the use of AI in other financial services that are not explicitly addressed,[252] as it would be the case of robo-advisors. Yet, considering the voluntary

[246] ibid 8–9.
[247] ibid 9–10.
[248] "(…) the combination of truly strict liability with the recovery of pure economic loss should be limited to prohibited AI systems and those high-risk AI systems which typically primarily because financial harm (…) [o]therwise, the AI liability system effectively and unjustifiably shields these high-risk systems from liability". See Hacker (n 205) 52. Against coverage and emphasizing the risk of an "uncontrollably broad liability", see Gerhard Wagner, 'Liability Rules for the Digital Age - Aiming for the Brussels Effect' [2023] SSRN Electronic Journal 56 <https://www.ssrn.com/abstract=4320285> accessed 2 August 2023.
[249] Marano and Li (n 245) 10; Proposal laying down harmonised rules on artificial intelligence (AI Act), art 52.
[250] Marano and Li (n 245) 10.
[251] "Robo-advisors, either functioning as rule-based or advanced machine learning algorithms, will thereby be indifferently recognised as AI systems, and they will be subject to the same regulatory requirements when adopting the same practice". See ibid 8.
[252] Luke Scanlon, 'What EU Plans for an AI Act Mean for Financial Services' (24 May 2021) <https://www.pinsentmasons.com/out-law/analysis/what-eu-ai-act-means-financial-services> accessed 10 August 2023.

nature of the adoption of the codes of conduct, the level of investor protection would not be as well ensured – since it is at the discretion of the firms to implement them or not – when compared to the mandatory *ex-ante* and *ex-post* obligations as a high-risk AI system. In any case, in order to promote a more uniform application of the rules, ESMA could develop guidelines addressing the application of such Proposals to robo-advisors.

If robo-advisors are considered to be not included at all in the scope of the Proposals, they still may shed some light on future ESMA guidance requirements on standards to be developed regarding data record-keeping, transparency, risk management and supervision. Notwithstanding, it will always be possible through the European Commission's prerogative to amend the AI Act's list of high-risk systems and include robo-advisors.[253]

Regardless, if pure economic losses are acknowledged under the Proposals, a greater level of investor protection would be achieved. Nonetheless, if they are not addressed – which seems to be the case – injured parties would still have to rely on national laws to recover from pure economic losses as no other particular EU liability rules would seem to be applicable at the moment.[254]

The efforts to establish a harmonised framework at the European level that assesses the adequacy of liability rules in digital technologies such as AI systems compensation for injured parties who have suffered damages from AI systems – to the same extent as if the damages were suffered by other means – should be praised. Nonetheless, considering that the Proposals are under discussion, several changes may still arise.

Up until this point, it seems that such Proposals do not provide any direct major innovative solutions regarding the attribution of liability of robo-advisors in financial markets. Nonetheless, the possibility of their application to robo-advisors should be considered, in order to obtain clarity on their regime that has been overlooked so far.

[253] Proposal laying down harmonised rules on artificial intelligence (AI Act), art 7.
[254] Béatrice Schütte, Lotta Majewski and Katri Havu, 'Damages Liability for Harm Caused by Artificial Intelligence – EU Law in Flux' [2021] University of Helsinki 8 <https://www.ssrn.com/abstract=3897839> accessed 9 July 2023.

Conclusion

The Global Financial Crisis 2008 has revealed the fragilities of the financial system and the need to adopt more demanding prudential and regulatory requirements, guaranteeing greater investor protection.[255] On the other hand, the rampant advance of technology has caused another type of problem for investors: dealing with the provision of investment services by firms through semi and fully-automated systems, which tend to be somewhat complex and opaque in their decision-making process.[256]

In 2014, the MiFID II was implemented, densified years later by the MiFID II Delegated Regulation to ensure greater transparency, compliance and legal certainty. The use of semi or fully-automated systems, such as robo-advisors, in the provision of services by financial intermediaries, such as investment advice and portfolio management, seem to have been addressed in these two legal frameworks, albeit only briefly.

Given MiFID II's technological neutrality approach, the nature and functioning of robo-advisors, as well as their characteristics, have not been specifically addressed. ESMA's Guidelines tend to elaborate on these issues, however, since MiFID II reserves the enforcement of its rules to the Member States' jurisdictions[257] and does not deal with the practical issue of liability in the case of a poor recommendation, investors do not benefit from a harmonised regime at EU level to which they can resort in order to obtain effective compensation, fostering fragmentation and legal uncertainty.

The more automated the robo-advisor, the less human intervention in providing the service, the greater the complexity and opacity of the system and, consequently, the greater the need to guarantee that the investor is aware of and understands the algorithm's decisions – especially when it comes to retail investors, whose inexperience and lack of knowledge is more pronounced. Thus, whereas a hybrid robo-advisor collects and processes the information provided by the algorithm with some degree of human interaction and investors can resort to a human advisor to clarify any queries they may have, in fully-automated robo-advisors, there is no such interaction.[258]

[255] Spindler (n 1) 315.
[256] Bianchi and Briere (n 77) 12.
[257] Directive 2014/65/EU (MiFID II), art 67 ff.
[258] Maume (n 30) 29.

Regardless of the type of robo-advisor the investor resorts to, the robo-advisory process comprises several steps: (i) collecting information about the investor (e.g.: income, risk preferences, education, financial knowledge, investment experience) by answering a questionnaire, (ii) determining the client's profile on the basis of the information provided, (iii) analysing and selecting an investment strategy tailored to the client's profile, notably by choosing the financial instruments that best fit their risk profile and assembling a well-diversified and stable portfolio, and (iv) issuing a recommendation.[259] Although such a process tends to be formally equivalent to that used by human financial advisors when providing investment advice, the level of automation and complexity of the robo-advisor, as well as the absence of human intervention in this process tends to impact – in some aspects positively, in others negatively, giving rise to the need to impose stricter requirements to guarantee investor protection – the collection and completeness of the information gathered, the personalisation of the financial advice to the investor's situation, the provision of the service ensuring the best interests of its clients and, in general, the accuracy of the recommendation.

With regards to the accessibility and collection of the information by robo-advisors, all relevant information must be properly disclosed to the clients in a simple, intuitive and graphically clear way, considering the complexity of the algorithm's decision-making process.[260] The level of detail and clarity of the information that should be provided to clients should be greater the less experienced and financially literate they are.[261] Nevertheless, investors should also provide the most comprehensive and truthful information about themselves, as well as endeavouring to clarify their doubts whenever possible, before making any decision.

Similarly, the existence of any conflicts of interest must be disclosed by the financial intermediary. Despite the fact that a conflict of interest does not necessarily imply poor advice to the client, there is an obligation to disclose if there is a mere risk of causing damage to the client's interests.[262] While, in principle, robo-advisors would have fewer biases and make fewer mistakes than human advisors since their algorithms are

[259] Comissão do Mercado de Valores Mobiliários (n 53) 9–10.
[260] Salo and Haapio (n 104) 5–7; Directive 2014/65/EU (MiFID II), art 24(3) and (4); Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 44(2)(d).
[261] Nogueira (n 52) 86; Câmara (n 113) 415.
[262] Maume (n 30) 36.

based on probabilities,[263] those who program them are people, who naturally are fallible and are prone to conflicts of interest.[264] Therefore, stricter disclosure rules should be implemented as robo-advisors' algorithms may contain conflicts of interest purposefully built into them.

When providing investment advice and/or portfolio management services is being provided through robo-advisors, the financial intermediaries' obligation to perform suitability and appropriateness assessments prevails, i.e., it must be ensured that the recommendation is suitable to the client's profile according to its financial situation and investment objectives and that the financial products recommended are appropriate for the knowledge and experience of the client.[265] Since the robo-advisory process tends not to involve human intervention, it can become more challenging to guarantee the reliability of the information.[266] However, this can be circumvented by performing intra-system consistency checks and periodic system tests so as to detect inconsistencies and take concrete action to mitigate their impact more easily.[267]

On what concerns the personalisation of the advice given, it is debated whether robo-advisors can truly consider the various circumstances of the investors' lives, given their lack of empathy and judgement, or rather, their approach is more of a one-size-fits-all, leading them to make unwarranted assumptions about their client's responses.[268] Although questionnaires may not be considered the most exhaustive source of information due to their limited questions, a subsequent in-depth analysis with the client should be done to cover additional situations that may have an impact on the portfolio and that may not directly be addressed in the questionnaire.[269] Such an approach seems to be easier to accomplish when hybrid robo-advisors are used. Yet, when it comes to fully-automated robo-advisors, the lack of human interaction ends up enduring the personalisation of the advice.

MiFID II's similar treatment of human advisors and robo-advisors when providing services to their clients does not appear to sufficiently protect the investor's position and

[263] Fisch, Labouré and Turner (n 21) 24; Ringe and Ruof (n 35) 11; D'Acunto, Prabhala and Rossi (n 155) 2.
[264] Ji (n 156) 1572; Baker and Dellaert (n 95) 732.
[265] Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 54(1).
[266] Colaert (n 55) 27.
[267] Nogueira (n 52) 113; Colaert (n 55) 15; European Securities and Markets Authority (n 9) 16.
[268] Ringe and Ruof (n 35) 17.
[269] Maia (n 23) 294; Lightbourne (n 138) 67.

the market in general. A fallibility level is undoubtedly present in both robo-advisors and human financial advisors, but the impact of their errors significantly differs (e.g.: robo-advisors' performance can have an impact on multiple investments at the same time and more readily lead to market imbalances). A higher demand for effectiveness and speed in the service rendered by robo-advisors entails a higher level of risk and responsibility, which would seem to justify the implementation of stricter control, compliance, and monitoring requirements in relation to them. Regardless of the fact that there have been no significant effects on the market thus far, it is prudent to adopt a preventive approach, instead of a reactive one.[270]

Thus, in line with the aforementioned, investor protection must be ensured from both an *ex-ante* and *ex-post* perspective.[271] If, on the one hand, it must be ensured that the client makes an informed and conscious decision, namely through the explainability of the algorithm's decision-making process to clients (e.g.: by providing a suitability report[272] that justifies why such a recommendation is tailored to the client's profile and ensuring that clients recognise the risks of the transaction and their impact); on the other hand, in the event of a loss, there must be effective liability mechanisms in place that allow investors to seek compensation.

Considering that robo-advisors are mere instruments in the hands of humans and, therefore, should not be granted legal personality – namely because (i) legal personality is inherent to the quality of being a human and even when it comes to legal persons, such as companies, these are ultimately represented by humans and pursue their interests,[273] (ii) responsibility is associated with free will and intentionality, which is only possible for a being with consciousness and emotions,[274] (iii) the idea of the independence of robo-advisors is misleading since their performance is always a reflection of the instructions they have received from their creator,[275] (iv) the idea of assigning personality for the mere purpose of making the AI system accountable could end up leading to situations of carelessness on the part of those who program them and/or those who employ them on

[270] Rinaldo (n 96) 333.
[271] Lee (n 3) 127.
[272] Directive 2014/65/EU (MiFID II), art 25(6); Commission Delegated Regulation (EU) 2017/565 (MiFID II Delegated Regulation), art 54(12).
[273] Ferreira (n 185) 45; Eidenmueller (n 185) 13.
[274] Correia (n 165) 91.
[275] Neto (n 183) 933; Barbosa (n 198) 299.

the market[276] – the responsibility for a poor recommendation should be ascribed to the human individuals behind them.

Although the UE lacks a set of rules aimed specifically at robo-advisors, particularly with regard to who in particular of the various individuals should be held responsible, there appears to be no need to create a new legal framework but rather to clarify the current legal rules in order to provide an adequate framework for the effectiveness of robo-advisors.[277] In general, injured parties should be able to seek compensation from the firm that resorted to a robo-advisor to provide investment services in order to be fairly compensated, even if the firm can later directly address those who ultimately may have caused the damage.[278]

The PLD Proposal, the AILD Proposal and the AI Act are intended to shed some light on these matters, although they are not specifically aimed at the financial sector and, more specifically, at robo-advisors and are still being discussed. Investors would benefit from a more transparent and protective regime if robo-advisors were to be included in the scope of such Proposals. The extent of the requirements to be followed would also vary depending on whether robo-advisors were classified as high-risk or limited-risk AI systems. Regardless, ESMA could develop guidelines that address how such rules apply to robo-advisors, as it has done under MiFID II, to ensure a more uniform application of the Proposals' rules. Even if robo-advisors are not considered to be within the scope of the Proposals, they could still provide some insight into future guidance requirements to be explored by ESMA (e.g.: transparency, supervision, risk management standards). So far, it appears that these Proposals do not offer any direct, significant or innovative solutions regarding the attribution of liability of robo-advisors.

Considering the current EU framework (or lack thereof) regarding the use of robo-advisors, investors are not adequately protected, not only when investment services are provided, but also in the event of a loss. More stringent requirements should therefore be

[276] Noorman (n 166) 3.
[277] Pablo Sanz Bayón, 'A Legal Framework for Robo-Advisors' in Erich Schweighofer and others, *Datenschutz/LegalTech: Tagungband des 21 Internationalen Rechtsinformatik Symposions IRIS* (Weblaw 2018) 6 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3226644> accessed 9 May 2023. To this end, the PLD Proposal, the AILD Proposal and the AI Act, which are currently under discussion, are being considered for this purpose.
[278] Rinaldo (n 96) 332–333.

implemented, and existing rules should be further clarified and developed in order to manage investor expectations.

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