Meaningful information on the use of AI in the robo-investing context

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A. Background

Due the nature of financial markets as mass markets dealing mainly with intangible goods, algorithmic systems are used at almost every level, including operations, regulatory compliance as well as customer-focused applications.[1] One customer-facing activity in which algorithms have been deployed for many years, leading to questions about the "right" level of transparency (and opacity) *vis-à-vis* clients, is so-called robo-advice.[2] Contrary to what could be assumed at first glance, it is however not only about a "robot" advising on investing in financial products, but about an algorithmic system making investment decisions on behalf of the client.[3] Thus, it might be better framed as "robo-investing",[4] which is also the case in this paper.

1 Cf., e.g., *G. Spindler*, Control of Algorithms in Financial Markets – the Example of High Frequency Trading, in: M. Ebers/S. Navas (eds.), Algorithms and Law, Cambridge 2020, 207; *Financial Stability Board*, Artificial intelligence and machine learning in financial services, Market developments and financial stability implications, November 2017, 18 et seq.

2 On the history, e.g., *P. Maume*, Reducing Legal Uncertainty and Regulatory Arbitrage for Robo-Advice, ECFR 2019, 622 (633).

3 More on this in the next paragraph. "Robot advisors" are not only discussed in the investment context, but for instance also in insurance. See, e.g., *European Insurance and Occupational Pensions Authority (EIOPA)*, Artificial intelligence governance principles: towards ethical and trustworthy artificial intelligence in the European insurance sector, A report from EIOPA's Consultative Expert Group, 17 June 2021, 45. This contribution focuses, however, on investing.

4 See, e.g., *H. J. Allen*, Driverless Finance [:] Fintech's Impact on Financial Stability, Oxford 2022, p. 66.

In general, robo-investing[5] comprises three steps.[6] First, it starts with an online questionnaire where a potential customer has to answer various questions regarding his or her investment goals, previous financial knowledge, risk tolerance etc. Second, in light of the responses to this web-questionnaire and on the basis of some finance model,[7] an algorithm (sometimes called "profiling algorithm"[8]) constructs a tailored investment portfolio, which includes different financial products.[9] After the presentation of this initial proposal, a potential customer usually has the option to enter into a contract with the service provider and to transfer the necessary funds so that the proposed investment can be implemented.[10] But this is not the end. Subsequently, the actual robo-investing begins. Another algorithm (accordingly referred to as "quantitative management algorithm"[11]) continuously monitors the initial investment and as the market moves up and down, makes decisions on selling and buying financial products

5 It is not the intention of this contribution to provide a detailed explanation, see rather for a more detailed analysis, e.g, *W.-G. Ringe/C. Ruof*, Robo Advice: Legal and Regulatory Challenges, in I. Chiu/G. Deipenbrock (eds.), Routledge Handbook of Financial Technology and Law, London 2021, p. 193 et seqq.; *D. Linardatos*, Technische und rechtliche Grundlagen, in: D. Linardatos (ed.), Rechtshandbuch Robo Advice, München 2020, § 1 marginal no. 22 et seqq.; also, *P. Maume*, Robo-advisors [:] How do they fit in the existing EU regulatory framework, in particular with regard to investor protection?, June 2021, PE 662.928, 11 et seq. Recently, *F. Zunzunegui*, Robo-Advice as a Digital Finance Platform, ECFR 2022, 272 (275).

6 See, e.g., *D. Linardatos*, Robo Advice, in: M. Ebers (ed.), StichwortKommentar Legal Tech, Baden-Baden Forthcoming 2023, marginal no. 2; also, *Better Finance*, Are Robo-Advisors sufficiently intelligent to provide suitable advice to individual investors? A research report by Better Finance, December 2021, 16. Arguably, one can also distinguish between only two phases (e.g., *Maume*, Robo-advisors [n. 5], 16 et seq).

7 Often the "modern portfolio theory", on this, i.a., *M. Bianchi/M. Brière*, Robo-Advising: Less AI and More XAI? Augmenting algorithms with humans-in-the-loop, Working Paper 109–2021 I April 2021, 10.

8 See, e.g., *ESMA*, Final Report Guidelines on certain aspects of the MiFID II suitability requirements, 28 May 2018, ESMA35–43–869, para. 6, referring to some market participants.

9 The investment universe often contains investment funds, esp. Exchange Traded Funds (ETFs). See, e.g., *Maume*, Robo-advisors (n. 5), 13; *Linardatos*, Grundlagen (n. 5), marginal no. 26.

10 More detailed, e.g., *Linardatos*, Grundlagen (n. 5), marginal no. 29 et seq.

11 See reference at n. 8.

included in the portfolio.[12] In this regard, it has to be stressed that this "rebalancing" or risk management process is not fully autonomous; rather "hybrid" systems that combine algorithms with some human control predominate.[13] Altogether, the ongoing re-allocation should increase the client's long-term return.

As for the underlying technical architecture, there are indeed some service providers on the market who state to use "intelligent algorithms" and/or "artificial intelligence" (AI) on their website.[14] This concerns both the customer onboarding process as well as the ongoing rebalancing/asset allocation. In general, however, scepticism seems to be warranted when firms claim that intelligent models are already in use. This is suggested by a recent report of Brussels based *Better Finance*, looking specifically at the client profiling and initial portfolio construction. In a mystery shopping exercise, Better Finance concluded that the systems are generally a far cry from AI today.[15] This finding is also consistent with earlier statements by researchers[16] as well as supervisory authorities.[17]

So although the use of AI in the robo-investing process does not yet seem to have become mainstream, there is an increased discussion that firms will use more powerful systems in the future.[18] Also, supervisors are already discussing potential regulatory measures.[19] In particular, in

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12 Cf., e.g., *Better Finance*, Robo-Advisors (n.), 16; *R. Theis*, Der Einsatz automatischer und intelligenter Agenten im Finanzdienstleistungsbereich, Berlin 2021, p. 45 et seqq.; *Bianchi/Brière*, Robo-Advising (n. 7), 7 et seq.

13 Cf. more detailed *Linardatos*, Grundlagen (n. 5), marginal no. 17 et seqq.

14 See, e.g., *Theis*, Agenten (n. 12), p. 58 and the references contained therein.

15 Cf. *Better Finance*, Robo-advice: Automated? Yes. Intelligent? Not so much., Press Release 21 December 2021, 2; more detailed also *Better Finance*, Robo-Advisors (n. 6), 8.

16 *Bianchi/Brière*, Robo-Advising (n. 7), 14 discussing i.a. technological and knowledge as well as regulatory constraints (esp. fiduciary duties) as reasons why not more AI is built into robo-investing. Cf. also *Maume*, Robo-advisors (n. 5), 29: "rather simple procedures"; as well, *Linardatos*, Robo Advice (n. 6), marginal no. 6.

17 E.g., *Commission de Surveillance du Secteur Financier* (CSSF), White Paper Artificial Intelligence, December 2018, 41.

18 Cf., e.g., *F. Möslein*, Leitlinien für den Einsatz künstlicher Intelligenz und ihre Bedeutung für die Erbringung von Robo Advice, in: Linardatos (ed.), Robo Advice (n. 5), § 3 marginal no. 2; also, *Better Finance*, Robo-Advisors (n. 6), 17: "highly possible in the future".

19 Cf., e.g., *Expert Group on Regulatory Obstacles to Financial Innovation (ROFIEG)*, 30 Recommendations on Regulation, Innovation and Finance – Final Report to the European Commission, December 2019, 38.

September 2021, the global standard setter for securities markets, the International Organization of Securities Commissions (IOSCO), published a report on the use of AI and machine learning (ML) by market intermediaries, including a Guidance with six (non-binding[20]) measures.[21] As regards the customer-side, Measure 5(a) stipulates that supervisors "should consider requiring firms to disclose *meaningful information* to customers and clients around their use of AI and ML that impact client outcomes".[22]

B. Questions and scope

Against this background, the aim of this paper is to explore the legal status quo around the disclosure of the use of AI[23] in the robo-investment context. In doing so, an attempt is made to analyse whether the current framework is requiring "meaningful information" to be disclosed or not. To answer these questions, I will structure the remainder of this article in three sections. In the next section, I will first briefly present potential transparency rationales (esp. in light of the use of innovative techniques), in order to build the foundations for the following discussions (B.). Subsequently, in the main section (C.), I will then assess the level of disclosure set out under the relevant EU financial law *acquis*, referring also to the national implementations in Germany and Austria, which have been the subject of some controversy. Lastly, I will end with a few brief remarks on the need for more information to stimulate further discussion (D.).

Before proceeding, however, it must be emphasised that there are other potentially applicable rules which are beyond the scope of this contribution. This concerns firstly the national private law framework, in particular

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20 Nevertheless, national competent authorities (NCAs) such as the Austrian Financial Markets Authority *FMA* and the German Federal Financial Supervisory Authority *BaFin* are explicitly encouraged to consider the measures in light of their legal and regulatory frameworks.

21 *IOSCO*, The use of artificial intelligence and machine learning by market intermediaries and asset managers, Final Report, September 2021 available at https://www.fsb.org/2021/09/the-use-of-artificial-intelligence-ai-and-machine-learning-ml-by-market-intermediaries-and-asset-managers/ (last access: 18.10.2022).

22 *Ibid.*, p. 20 (emphasis added).

23 A note on terminology: although IOSCO stresses the use of "AI and ML techniques" in the Guidance, the two terms are used slightly differently in the following. This is because in the EU the proposed AI-Act refers to the notion of AI as the umbrella term; ML is (only) one technique and approach of AI. See Art. 3 no. 1 *juncto* Annex 1 of the Commission proposal, COM(2021) 206 final.

contractual information obligations arising from the relationship between service provider and investor. While the issue of private law enforcement will be picked up later, it seems justifiable to not place too much focus on the private law rules, because many scholars – at least in Austria and to some lesser extent also in Germany – agree that the interpretation of those obligations is subject to the *leges speciales* in the finance domain.[24] Something different is certainly true for the data protection regime, the General Data Protection Regulation (GDPR). Indeed, there is a discussion among scholars whether at least some aspects of the robo-investing process constitute automated decision making (with similarly significantly affects) as per Art. 22 GDPR[25] and, subsequently, whether service providers would need to comply with the granular information duties under Art. 13, 15 GDPR.[26] This issue, however, must be discussed elsewhere. Finally, the proposed "AI Act"[27] could be relevant in the future, although probably to a limited extent. This because requirements for so-called "high risk AI sys-

24 Cf., generally, e.g., *E. Brandl/P. Klausberger* in: E. Brandl/G. Saria (eds.), WAG 2018, 2nd ed., Wien 2018, § 47 marginal no. 10 et seqq.; also *K. Rothenhöfer* in: E. Schwark/D. Zimmer (eds.), KMRK, 5th ed., München 2020, Vor § 63 marginal no. 9 et seqq.; cf. in particular on the contractual duties *Linardatos*, Robo Advice (n. 6), marginal no. 72 et seq.; differing for Art. 25 MiFID II *R. Kulms*, Digital Financial Markets and (Europe's) Private Law – A Case for Regulatory Competition?, in: E. Avgouleas/H. Marjosola (eds.), Digital Finance in Europe: Law, Regulation, and Governance, Berlin/Boston 2021, p. 213 (229). For a monographic analysis see *F. Della Negra*, MiFID II and Private Law [:] Enforcing EU Conduct of Business Rules, London: Bloomsbury 2019.

25 Cf. *Maume*, Robo-advisors (n. 5), 25: likely; also, at least partially in favour *G. Spindler*, WpHG und Datenschutz, in: L. Klöhn/S. Mock (eds.), Festschrift 25 Jahre WpHG, Berlin/Boston 2020, 327 (335), but only for negative decisions (e.g., if not admitted to the service); generally against the application of Art. 22 GDPR *C. Hirsch/N. Y. Merlino*, Do Robots Rule Wealth Management? A Brief Legal Analysis of Robo-Advisors, SZW 2022, 33 (44), according to them Art. 22 would only apply if the amount invested represents more than 80% of the client's assets; also, *M. Henneman/K. Kumkar*, Robo Advice und automatisierte Entscheidungen im Einzelfall, in: Linardatos (ed.), Robo Advice (n. 5), § 13 marginal no. 17, even if not entering into a contract.

26 See generally for an interesting approach *H. Asghari/N. Birner/A. Burchardt/D. Dicks/J. Faßbender/N. Feldhus/F. Hewett/V. Hofmann/M. C. Kettemann/W. Schulz/J. Simon/J. Stolberg-Larsen/T. Züger*, What to explain when explaining is difficult? An interdisciplinary primer on XAI and meaningful information in automated decision-making, Alexander von Humboldt Institute for Internet and Society 2021, combining technical, social and legal aspect, available at https://graphite.page/explainable-ai-report/ (last access: 18.10.2022)

27 See reference *supra* n. 23.

tems" will only be applicable to a small number of financial service providers (not including the management of portfolios[28]); apart from that, the proposal contains rather rudimentary transparency rules.[29]

C. *Potential rationales for informing clients around AI use*

It is well known that disclosure is one of the primary regulatory techniques in the context of the provision of investment services.[30] The rationale behind this is first and foremost to enable clients to make informed decisions. More concretely, it is about the reduction of information asymmetries.[31] The relevance of this basic idea was also emphasised by IOSCO in its AI Guidance according to which the objective should be to disclose "sufficient" information to clients to enable them "to understand [1] the nature of, and key characteristics of the products and services that they are receiving, and [2] how they are impacted by the use of the technology."[32] On a more abstract level, enabling informed choices serves the overall goal of investor protection.[33]

Another aspect that is often mentioned as an additional reason for disclosure relates to the risk that a lack of transparency of AI processes could undermine the already low level of trust in the financial system and financial services.[34] For instance, in its 2020 Digital Finance Strategy the Commission stressed that customers would be fearing biases and exploitative profiling due to opaqueness and lack of understanding about how

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28 It includes solely the use for credit scoring and insurance purposes – at least according to the presidency compromise text, see 2021/0106(COD).

29 See only Art. 52 of the proposal, which at least could have some relevance for the robo-onboarding process (arg. "interact"). Additionally, with respect to high-risk systems, this conclusion could be put into perspective by the fact that the AI Act, by mandating the provision of information to users in Art. 13, enables the user to fulfil its GDPR obligations. See *G. Mazzini/S. Scalzo*, The Proposal for the Artificial Intelligence Act: Considerations around Some Key Concepts, SSRN, 2 May 2022, 22.

30 Cf., e.g., *J. Armour/D. Awrey/P. Davies/L. Enriques/J. N. Gordon/C. Mayer/J. Payne*, Principles of financial regulation, Oxford 2016, p. 76.

31 Cf., e.g., *Maume*, Robo-advisors (n. 5), 22.

32 *IOSCO*, Report (n. 21), 20. Cf. also, e.g., *Organisation for Economic Co-operation and Development*, Artificial Intelligence, Machine Learning and Big Data in Finance, 11 August 2021, 45: disclosures should also allow customers to make the right choice between competing services and products.

33 *Armour/Awrey/Davies/Enriques/Gordon/ Mayer/Payne.*, Principles (n. 30), 76.

34 *Better Finance*, Robo-Advisors (n. 6), 45.

a particular outcome is obtained.[35] The underlying rationale corresponds to another building block of financial markets regulation, i.e. ensuring confidence of investors in markets and the services provided.

Finally, a last concern, sometimes stressed in connection with the trust issue and certainly also relevant from an investor protection perspective, is the difficulty of contesting ML-based outcomes.[36] Another plausible rationale for some transparency in relation to AI use could therefore be the need to have information to substantiate a claim when wrongdoing occurs,[37] and ultimately to enable self-advocacy.[38]

D. Analysis of the MiFID II transparency regime vis-à-vis clients

Considering the above, this section will assess the applicable disclosure requirements for the use of AI in the robo-investing context. The key legislation governing the provision of investment services in the EU is the Markets in Financial Instruments Directive (MiFID II).[39] As far as transparency towards clients is concerned, two provisions of MiFID II deserve particular attention: first, Art. 24, imposing requirements regarding "information to clients", and Art. 25, which regulates the "assessment of suitability". In the following, slightly deviating from the logic of the MiFID II, first any information requirements in the suitability assessment context will be analysed (I.); subsequently, the level of disclosure set out in Art. 24 will be scrutinised (II.). This approach can be explained, among other things, by the fact that in practise the disclosure required by the law is often provided at the end of the customer journey rather than at the beginning of it.[40]

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35 *European Commission*, Digital Finance Strategy for the EU, COM(2020) 591 final, 11.

36 *Ibid*.

37 E.g., *H. Mueller/F. Ostmann*, AI transparency in financial services – why, what, who and when?, FCA Insights, 19 February 2020, mentioning an unfavourable loan decision; cf. also already *Maume*, Robo-advisors (n. 5), 40 et seq., noting the relevance for enforcement-actions, because only the disclosure of the algorithm would give a client a chance to prove his case in a potential lawsuit.

38 Cf., e.g., *Asghari/Birner/Burchardt/Dicks/Faßbender/Feldhus/Hewett/Hofmann/Kettemann/Schulz/Simon/Stolberg-Larsen/Züger*, XAI (n. 26), 13, providing an overview of transparency needs of different groups.

39 Directive 2014/65/EU, OJ L 173/349.

40 As the French financial markets authority *AMF* found in a digital mystery shopping exercise, the disclosures were made at a time when investors had already been confronted with a various different information, see *ESMA*, Final Report on

I. Disclosure in the suitability assessment and reporting to clients

As per Art. 25(2) MiFID II,[41] traditional as well as digital portfolio managers first have a duty to obtain certain information *from* the (potential) client to provide suitable services, covering knowledge and experience, financial situation (incl. loss-bearing capacity) and investment objectives (incl. risk tolerance). This information collection and assessment process is a cornerstone of the EU's investor protection regime[42] and also at the heart of robo-investing.[43] Here, the assessment is generally performed based on the information obtained from the customer via the online questionnaire, as described above.[44] In collecting the information on risk appetite etc., there is certainly an *implicit information element towards clients* because by answering these questions, a client will be already confronted with some information on the (robo-)investment process. In addition to implicit information in the customer profiling, the suitability assessment regime however also includes some *explicit information components*,[45] as will be explained below.

1. Information to clients about the purpose of the suitability assessment

Explicit information is not required by Art. 25 MiFID II, but at the so-called level 2[46] in Chapter III, Section 3 of the Commission Delegated Regu-

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the European Commission mandate on certain aspects relating to retail investor protection, 29 April 2022, ESMA35–42–1227, para. 11. Furthermore, a similar approach has been taken by *Maume*, Robo-advisors (n. 5).

41 Transposed in Sec. 56(1) of the Austrian Securities Supervision Act (abbreviated "WAG 2018") and in Sec. 64 of the German Securities Trading Act (in short: "WpHG").

42 See, e.g., *E. Avgouleas/A. Seretakis*, Governing the Digital Finance Value-Chain in the EU: MIFID II, the Digital Package, and the Large Gaps between!, in: E. Avgouleas/H. Marjosola (eds.), Digital Finance in Europe: Law, Regulation, and Governance, Berlin/Boston 2021, p. 1 (24); explicitly *Maume*, Robo-advisors (n. 5), 28.

43 E.g., *Theis*, Agenten (n. 12), p. 185.

44 See Sec. A.

45 Cf. also *F. Mezzanotte*, An examination into the investor protection properties of robo-advisory services in Switzerland, Capital Markets Law Journal 2020, 489 (504).

46 See in general on this, e.g., *A. Schopper*, WAG 2018: Ausgewählte Neuerungen im Anlegerschutz, Zeitschrift für Verbraucherrecht 2018, 4.

lation (EU) 2017/565 (in the following: CDR).[47] According to Art. 54(1) subpara. 1 s. 2 CDR, it is specified that investment firms shall inform (potential) clients – clearly and simply – that the reason for assessing suitability is to enable the firm to act in the best interest of the client, thus optimise the recommendations.[48] While at first sight no robo-specific disclosure duties are mandated by Art. 54(1) CDR,[49] a different picture might follow in light of the next level of EU capital markets regulation.

Already back in 2018, the European Securities and Markets Authority (ESMA) issued a revised version of its "Guidelines on certain aspects of the MiFID II suitability requirements"[50] in the form of so-called "own-initiative guidelines"[51] under Art. 16 of the ESMA Regulation.[52] These quasi-regulatory rules[53] clarify different aspects of the suitability assessment process and have been specifically amended to take into account the phenomenon of robo-investing.[54] Although the Guidelines – as their title suggests – are primarily focused on the suitability assessment as per Art. 25 MiFID II,[55] they also contain certain disclosure considerations *vis-à-vis* customers in Guideline 1. Strikingly, these transparency aspects are under the hea-

47 OJ L 87/1.

48 Cf., e.g., *I. Koller* in: H.-D. Assmann/U. H. Schneider/P. O. Mülbert (eds.), Wertpapierhandelsrecht Kommentar, 7th ed., Köln 2019, WpHG, § 64 marginal no. 38.

49 It is however expressly recognised by Art. 54(1) subpara. 2 CDR that the ultimate responsibility for an appropriate suitability assessment lies with the investment firm if (semi-)automated systems are used for the suitability assessment, see, e.g., *Maume*, Robo-advisors (n. 5), 28; *Kulms*, Digital Financial Markets (n. 24), p. 229.

50 *ESMA*, Guidelines on certain aspects of the MiFID II suitability requirements, 6 November 2018, ESMA35–43–1163.

51 See *ESMA*, Guidelines (n. 50), para. 11; on the Art. 16 Guidelines in general see *N. Moloney*, The Age of ESMA: Governing EU Financial Markets, Oxford 2018, p. 145 et seqq. There are different views in the literature on the lawfulness of the guidelines. Against *Koller* (n. 48), § 64 marginal no. 38: without sufficient legal basis. Differently *C. Krönke*, Öffentliches Digitalwirtschaftsrecht [:] Grundlagen – Herausforderungen und Konzepte – Perspektiven, Tübingen 2020, p. 579: legitimate. The latter is further supported by the Case C-911/19, ECLI:EU:C:2021:599 and the legal nature of the guidelines. See on latter the text accompanying n. 66.

52 Regulation (EU) No 1095/2010, OJ L 331/84.

53 *Moloney*, ESMA (n. 51), p. 151.

54 Stressing this also *ESMA*, Final Report Retail Investor Protection (n. 40), para. 153. See for an overview of the guidelines *F. Möslein*, Regulating Robotic Conduct: On ESMA's New Guidelines and Beyond, in: N. Aggarwal/H. Eidenmüller/L. Enriques/J. Payne/K. Zwieten (eds.), Autonomous Systems and the Law, München/Baden-Baden 2019, p. 45 (47).

55 See also on the purpose *ESMA*, Guidelines (n. 50), para. 9.

ding "information to clients about the purpose of the suitability assessment", clearly referring to the duty under Art. 54(1) subpara. 1 CDR.[56]

A closer look at Guideline 1 shows that a distinction is made between a "general guideline" and "supporting guidelines". While "General guideline 1" only adds fairly generic information requirements with respect to Art. 54(1) subpara. 1 CDR,[57] specific aspects for robo-investing are put forward in the supporting guidelines to general guideline 1.[58] Especially, it is stated that firms "should" provide "a very clear explanation of the exact degree and extent of human involvement and if and how the client can ask for human interaction".[59] Moreover, "an explanation that the answers clients provide will have a direct impact in determining the suitability of the investment decisions recommended or undertaken on their behalf" should be given.[60] Finally, it also is set forth that a firm should offer "a description of the sources of information used to generate an investment advice or to provide the portfolio management service".[61]

The relevance of these supporting guidelines for algorithm/AI-related information has been discussed differently in the literature. On the one hand, it was noted by one scholar that the Guidelines would define the scope of the information to be provided to clients when using (semi-)automated procedures; by implication, a customer would not have a right to disclosure of the functioning or parameters of the algorithm used.[62] In stark contrast, according to other researchers, the Guidelines would actually mandate some information on the functioning (and purpose) of the systems.[63]

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56 In addition, explicit reference is made to Art. 24(1), 24(4) and 24(5) of MiFID II as "relevant legislation". See *ESMA*, Guidelines (n. 50), before para. 15.

57 *ESMA*, Guidelines (n. 50), para. 15.

58 On this and the following also, e.g., *Krönke*, Digitalwirtschaftsrecht (n. 51), p. 579.

59 *ESMA*, Guidelines (n. 50), first point of para. 20.

60 *ESMA*, Guidelines (n. 50), second point of para. 20.

61 *ESMA*, Guidelines (n. 50), third point of para. 20.

62 Cf. *C. Herresthal*, Vertriebsbezogene Interessenkonflikte beim Robo Advisor – Der Vertrieb (konzern-)eigener Anlageprodukte sowie von Anlageprodukten verbundener Unternehmen, in: Linardatos (ed.), Robo Advice (n. 5), § 9 marginal no. 60, with explicit reference to the ESMA Guidelines, para. 20 and 21.

63 This was argued with reference to the ESMA Consultation Paper by *T. B. Madel*, Robo Advice [:] Aufsichtsrechtliche Qualifikation und Analyse der Verhaltens- und Organisationspflichten bei der digitalen Anlageberatung und Vermögensverwaltung, Baden-Baden 2019, p. 174. The Consultation Paper, however, was more detailed than the Final Guidelines, see n. 65. Presumably also assuming binding duties *Krönke*, Digitalwirtschaftsrecht (n. 51), p. 580, noting that these "informati-

As regards the latter view, it is highly questionable whether the supporting guidelines indeed demand such information on an AI system. ESMA itself was mindful to not create excessive information requirements vis-à-vis clients.[64] This is further supported by the fact that the Consultation Paper, leading to the adoption of the Guidelines, originally provided for more granular information to be provided to clients.[65] The above, however, should not lead to the opposite conclusion that the non-inclusion of algorithm/AI-related information is legally relevant in any way. This is because, as per para. 8 of the Guidelines, ESMA stressed that the revised suitability guidelines do not always reflect absolute obligations; rather, it was highlighted that if the word "should" is used, it would not constitute a MiFID II requirement.[66]

As a result, the specific disclosure aspects set forth by the supporting guidelines are merely recommendations by ESMA for "good" behaviour. For a firm intending to follow these suggestions, some conclusions can nevertheless be drawn for the use of AI/ML. While the guidelines were certainly drafted for "simple" rule-based systems at the time of their publication, looking at the wording of the first recommendation highlighted above, a service provider should communicate the use of AI. Secondly, if a firm emphasises the "direct impact" of client responses, it should not be possible that a potential customer can enter almost anything but change little. Finally, to be in line with the third recommendation mentioned, one should describe any additional input sources if a firm deploys a ML model not only using the responses from the customer, but learning on previous experiences etc.

In summary, due the nature of the supporting guidelines set out in the revised ESMA guidelines on suitability, no binding robo-specific information requirements arise as per Art. 25(2) MiFID II or Art. 54(1) CDR. Nonetheless, a "good" robot that uses AI should communicate about AI's pre-

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on obligations" would require some basic information on the functioning of the systems, but no individual explanations.

64 *ESMA*, Final Report Guidelines (n. 8), 13.

65 See in detail *ESMA*, Consultation Paper Guidelines on certain aspects of the MiFID II suitability requirements, 13 July 2017, ESMA35–43–748, Annex III para. 21. Additional, more comprehensive "examples" for these draft guidelines were given in the background of the document, see para. 39. In the end, however, these draft disclosure requirements were not included in the final version of the (supporting) guidelines.

66 On the other side, the words "shall", "must" or "required to" would reflect a MiFID II obligation. See *ESMA*, Guidelines (n. 50), para. 8; highlighting this also, e.g., *Della Negra*, MiFID II (n. 24), p. 67.

sence and the type of sources a ML model or alike techniques are based in the profiling process.

2. *Ex-post and suitability reporting obligations*

Pursuant to Art. 25(6) MiFID II,[67] service providers are subject to two different reporting obligations, including (i) ex post reports as well as (ii) so-called suitability reports.[68] Art. 25(6) subpara. 1 specifies that a firm must give "adequate reports on the service provided […] taking into account the type and the complexity of financial instruments involved and the nature of the service provided to the client", which is further fleshed out at level 2 (esp. Art. 60[2] CDR). Concerning the suitability of the service and specifically with respect to portfolio management, Art. 25(6) subpara. 4 adds that a firm has to periodically provide a report together with updated information on how an investment meets the client's preferences, objectives etc.[69] Additional details are set out in Art. 54(12) CDR.

At a first glance, one might assume that "adequate reports" would require some sort of AI/ML disclosure (esp. with reference to "the nature of the service provided") or that technology-related disclosures might be necessary in the suitability reports if AI is used in the onboarding. However, looking at the context as well as current understanding, the reporting framework does not seem to mandate such aspects.[70] Under the ex-post reporting requirement, the focus is more on providing an abstract review of the actions taken by the portfolio manager,[71] although some arguments put forward in the discussion around disclosure as per Art. 24(4) MiFID II,[72] could imply a different understanding.[73] Unlike Art. 24(4) *juncto* (5), which explicitly requires information about the service (and focuses on enabling informed choices), Art. 25(6) however only

67 Transposed with Sec. 60(1) and (4) WAG 2018 as well as Sec. 63(12) and 64(8) WpHG.

68 Cf., e.g., *Brandl/Klausberger*, WAG 2018 (n. 24), § 60 marginal no. 1.

69 On this in general, e.g., *Schopper*, WAG 2018 (n. 46), 8 et seq.

70 Presumably assuming this as well *Mezzanotte*, Investor protection properties (n. 45), 505 et seq.; *C. Müssig*, Aufsichts- und zivilrechtliche Anforderungen der digitalen Vermögensverwaltung bei einer Online-Abschlussmöglichkeit, in: Linardatos (ed.), Robo Advice (n. 5), § 5 marginal no. 71 et seqq. as well as 89 et seqq.; *Theis*, Agenten (n. 12), p. 199 et seq.

71 See in general, e.g., *Rothenhöfer*, KMRK (n. 24), § 63 marginal no. 378.

72 See *infra* Sec. II.1.

73 See the discussion at the text accompanying n. 82 et seqq. as well as n. 91 et seqq.

states that the nature of the service must be "taken into account". The suitability reporting requirement seems even less relevant; in order to comply with this obligation, one will indeed have to refer to the client's answers in the online questionnaire,[74] but not to the use of algorithms or ML.

As a result, Art. 25(6) appears not to require any information on AI use.

II. Overarching disclosure requirements to clients

After concluding that the suitability assessment regime merely provides for voluntary disclosure requirements, let us now turn to the actual information regulation pursuant to Art. 24 MiFID II, which has been the subject of controversy in the German literature.

1. Standardised information requirements

At the heart of the debate among scholars is Art. 24(4),[75] which obliges service providers to present a large amount of information to (potential) clients[76] and sets out the so-called "minimum content".[77] More precisely, it is stipulated that firms must provide "appropriate" information on several topics, including the firm itself and its services as well as the proposed investment strategies. What kind of information should be generally disclosed, is specified at level 2 in Chapter III, Section 1 of the CDR (relating i.a. to the firm and its services[78]). Para. 4 is further complemented by Art. 24(5), ac-

74 Stressing the latter *D. Linardatos*, Qualifizierung der Dienste von Robo Advisor im Kapitalanlagegeschäft und Wohlverhaltenspflichten, in: Linardatos (ed.), Robo Advice (n. 5), § 4 marginal no. 75; see, in general, e.g., *Brandl/Klausberger*, WAG 2018 (n. 24), § 60 marginal no. 85: the periodic reports will entail certain service-, investment- or client-related changes compared to the original suitability report.

75 This is transposed in Sec. 48(1) WAG 2018 and Sec. 63(7) WpHG.

76 Stressing this, in general *Ringe/Ruof*, Robo Advice (n. 5), p. 206 et seq.

77 For this distinction between "minimum content" and "minimum standard" see, e.g., *K. Rothenhöfer* in: P. O. Mülbert/A. Früh/T. Seyfried (eds.), Bankrecht und Kapitalmarktrecht, 6th ed., Köln 2022, marginal no. 13.24; calling it "general standardised information requirements" *P. Knobl*, Die Wohlverhaltensregeln unter dem WAG 2018, Österreichisches BankArchiv 2018, 460 (469); also *M. Brenncke* in: M. Lehmann/C. Kumpan (eds.), European Financial Services Law, Baden-Baden 2019, Art. 24 MiFID II marginal no. 19: overarching disclosure requirement.

78 See Art. 47 CDR, which will be discussed in more detail later in this contribution.

cording to which the objective of this information provision is that customers understand the nature and risks of the service and ultimately can make an informed investment decision. Lastly, Art. 24(4) and (5) also add some "procedural" clarifications: (i) the information needs to be provided "in good time", i.e. pre-contractually; (ii) firms have to do this a in a comprehensible form; and (iii), if a member state allows it (which is the case in Austria[79] and Germany[80]), it is also possible to deliver the information to clients in a standardised way (esp. in the terms and conditions).

The issue now is whether "appropriate" information on the firm, its services or investment strategies must contain disclosures on use of AI. While it is certainly true that there is no obligation to disclose the algorithm/model or to give a detailed explanation,[81] it has been discussed whether some algo/AI-related information is required per Art. 24(4) *juncto* (5) MiFID II. Especially in Germany, the majority seems to be in favour of some (limited) algo/AI transparency. Generally speaking, it is argued that service providers have to disclose at least the use of an algorithmic/AI system[82] and/or describe the basic functioning of the system to meet the duties under Art. 24.[83] According to one scholar, a duty to disclose the basic parameters of the automated investment decision would also follow from the accompanying level 2 provisions in Art. 47(2) and (3) CDR.[84] Finally, one author also argued that firms would have to disclose the risks of error,[85] confirming this strong sentiment towards certain Algo/AI disclosure measures. On the other hand, there are only a few disagreeing voices

79 Sec. 48(3) s. 1 WAG 2018.

80 Sec. 63(7) s. 2 WpHG.

81 Cf. already *Maume*, Robo-advisors (n. 5), 40 et seq.; also in the suitability assessment context *ESMA*, Final Report Guidelines (n. 8), 13, noting "that it does not intend to require firms to disclose their algorithms in detail to clients".

82 Both for algorithms and AI *Theis*, Agenten (n. 12), p. 181; specifically for the use of AI and the respective, comparable Swiss rules *Hirsch/Merlino*, Robots (n. 25), 38 et seq., noting that one has to communicate the use of ML as well as "basic information on the functioning of these algorithms."

83 *Theis*, Agenten (n. 12), p. 181; *Linardatos*, Robo Advice (n. 6), marginal no. 53; cf. also with respect to AI and investment brokering ("Anlagevermittlung") *M. Denga*, KI bei Finanzdienstleistungen – Robo-Advice, in: M. Ebers/C. A. Heinze/T. Krügel/B. Steinrötter (eds.), Künstliche Intelligenz und Robotik, München 2020, § 15 marginal no. 44, emphasising the need to disclose the decision-making mechanism in a comprehensible manner.

84 Cf. *Krönke*, Digitalwirtschaftsrecht (n. 51), p. 578.

85 Cf. *Denga*, KI (n. 83), § 15 marginal no. 44, noting practical problems and calling for the necessity of weighing up the constitutionally guaranteed concerns (marginal no. 45).

in the literature. Contrary to the above-cited view, but also with reference to the specifications fleshed out in Art. 47 CDR, it was stressed by one researcher that there would be no duty for a traditional portfolio manager to inform a client in detail about the content of the investment strategy, the decision-making criteria, as well as the analytical instruments, which must also apply in the digital context.[86] In addition, there would be no basis for a higher standard for robo-investing[87] and no duty to disclose an algo or its core parameters.[88] Such an understanding was presumably shared by another voice in the literature.[89]

Interestingly, from an empirical perspective, the above-mentioned critical statements seem to be in line with a 2019 study of web-disclosed information of Swiss service providers finding that only a few them expressly mentioned the word "algorithm", and even less provided an explanation on their websites.[90] Especially the latter would also correspond to this author's impression, which of course raises the question whether some market participants are currently non-compliant or whether the alleged disclosure obligations (mentioned in the previous paragraph) are not as clear-cut as some voices suggest. Indeed, there seem to be still some open questions, which have only been partially addressed in the literature so far.[91] It concerns (i) the application of the level 2 rules, (ii) the technology neutrality of Art. 24(4) MiFID II as well as (iii) the overall purpose in light of Art. 24(5) MiFID II.

As far as the relevance of the level 2 provisions is concerned, there are two different aspects. First, as mentioned above, there seems to be some

86 Cf. *Herresthal*, Interessenkonflikte (n. 62), § 9 marginal no. 66, referring explicitly to Art. 47(2), (3) (c) as well as recital 94 and Art. 47(3) (d) and implicitly also to Art. 47(3) (a) and (e) CDR *juncto* the German transposition in Sec. 63(7) sentence 1 WpHG.

87 See *Herresthal*, Interessenkonflikte (n. 62), § 9 marginal no. 66: also, *de lege ferenda*.

88 Cf. *Herresthal*, Interessenkonflikte (n. 62), § 9 marginal no. 66 ("Kernparameter"). See also already marginal no. 65: no duty to explain the functioning of the algorithm, its limits or the underlying finance model.

89 See *Müssig*, Online-Abschlussmöglichkeit (n. 70), § 5 marginal no. 104, who raised the question whether algorithms should be disclosed, but concluded that it would (only) be sensible to describe them in abstract terms in a white paper and to make them available to clients on request, if necessary.

90 See in detail *Mezzanotte*, Investor protection properties (n. 45), 496 et seq.

91 Some aspects were already addressed in discussions around the ESMA suitability guidelines, to which references are made below. The replies are available at https://www.esma.europa.eu/press-news/consultations/consultation-guidelines-certain-aspects-mifid-ii-suitability-requirements (last access: 27.10.2022).

confusion whether the information duties pursuant to Art. 47 CDR, mandating i.a. to inform on "the management objectives, the level of risk to be reflected in the manager's exercise of discretion, and any specific constraints on that discretion",[92] would require some limited algorithmic transparency or not. In this regard, I believe it is more reasonable that a firm just has to inform very generally on the management objectives, but does not need to elaborate on the actual algorithmic implementation.[93] The second aspect that has not been conclusively clarified yet is the exact interplay between level 1 and 2. The researchers who have argued in favour of some disclosure appear to assume that level 2 information requirements are not exhaustive.[94] Looking at the legal basis (i.e. Art. 24[13] [b] MiFID II), it is stipulated that the Commission is empowered to specify the details about content of information to clients i.a. in relation to investment firms and their services. The purpose of this is "to ensure that investment firms comply with the principles set out in this Article when providing investment […] services". Although this could indicate an exhaustive nature of relevant level 2 rules, a purposive interpretation of Art. 24(4) and (5) that additional information may need to be provided in certain cases in order to enable the customer to make an informed decision seems more convincing.[95] It therefore seems advisable to disclose at least whether or not the service is based on algorithms/AI in order to appropriately inform about the services.[96]

A second issue stressed in a few replies to ESMA's Consultation Paper on the draft suitability guidelines relates to the fact that not only "robots", but also some "traditional" service providers are using automated systems

92 Art. 47(3) (e) CDR.

93 Cf. in general on this *Rothenhöfer*, KMRK (n. 24), § 63 marginal no. 238; by the same token, I also do not believe that the details of the rebalancing/risk management process should be disclosed pursuant to Art. 47(3) (a), which requires "information on the method and frequency of valuation of the financial instruments in the client portfolio". From a contextual point of view, another argument against any AI disclosure pursuant to level 2 could be the fact that Art. 54(1) explicitly clarifies that the responsibility remains with the firm when a (semi-)automated system is used, whereas Art. 47 has not been modified.

94 See references at n. 82 et seqq.

95 Cf., in general, for a nuanced approach with regard to the German transposition *Rothenhöfer*, KMRK (n. 24), § 63 marginal no. 211, 228; see for the Austrian transposition and with references to German literature *Brandl/Klausberger*, WAG 2018 (n. 24), § 48 marginal no. 36.

96 Cf. the reply by the European Fund and Asset Management Association (EFAMA) available at n. 91.

for portfolio management or, put differently, quantitative processes.[97] This begs the question whether another standard for robo-investing is justified[98] or whether conventional portfolio managers using algorithms/AI also have to disclose the basic functioning etc.[99] On a more theoretical level, this question is linked to the principle of technology neutrality, according to which "[t]he same regulation must be applied to the same activity and the same risks", but "different rules should apply to different activities with different risks."[100] Precisely because of the wide reach of the algorithms (and in the future, presumably, AI) and the specific risks in the robo-context,[101] a technology-neutral interpretation of the information duties under Art. 24(4) will allow for some deviation from their previous understanding in relation to more traditional face-to-face services.

Finally, the last concern relates to the kind of information, which some authors seem to demand (especially the disclosure of some basic system capabilities and/or the risks). This could conflict with the overall goal of enabling an informed decision as per Art. 24(5). Already in the ESMA consultation it was stressed that it would be doubtful whether additional information will provide any value to customers.[102] Considering that firms have to disclose a vast amount of information to clients, further disclosures concerning the robo-investing process could actually have an adverse effect, leading to an "information overload",[103] an aspect that will be picked up in the conclusion. Nevertheless, also in my view, there are better arguments for some AI disclosure. This, however, will be limited — at least pursuant to Art. 24(4). Firms will have to inform that they are providing a digital service and/or using AI/ML. Further details, as well as how they are

97 Cf. the reply by the Association of Italian Financial Advisory Companies ASCOSIM. This was also highlighted by *ESMA*, Final Report Guidelines (n. 8), 13, however, without elaborating.

98 Critical *Herresthal*, see n. 87 in this contribution.

99 As far as can be seen no such requirement has been discussed previously.

100 On this and the following, cf. also *Zunzunegui*, Digital Finance Platform (n. 5), 295.

101 Highlighting this specific risk, e.g., *Madel*, Robo Advice (n. 63), p. 63; cf., in general, also *Maume*, Robo-Advice (n. 2), 646 et seq.; as well as *ROFIEG*, 30 Recommendations (n. 19), 39.

102 Cf., e.g., the reply by the European Association of Co-operative Banks available at n. 91.

103 As already mentioned, because of this, in the suitability context, some draft disclosure requirements did not find their way into the final version of the guidelines. See *ESMA*, Final Report Guidelines (n. 8), 13, in response to comments made in the consultation and specifically the reply by EFAMA at n. 91.

communicated (e.g., on the website)[104] will be in the discretion of the firm due to principle-based nature of the level 1 rules.

2. *Requirements for the way in which information is provided*

Having established that Art. 24(4) MiFID II does mandate some, albeit limited information on AI, it remains to examine Art. 24(3) MiFID II.[105] In addition to the above, para. 3 clarifies the "minimum standard" for providing information.[106] To be precise, it is set out that all information provided to (potential) clients shall be fair, clear and not misleading. This standard is not only applicable to the required information pursuant to Art. 24(4) MiFID II, but also to any other voluntary information provided to customers.[107]

Also here, the concrete scope has already been the subject of some discussions, although not as extensive as under para. 4. On the one hand, according to some scholars, there would be a duty to disclose some (limited) information on the system in place.[108] From one point of view, it would not require a "comprehensive disclosure" of the functioning or of the parameters of the algorithm, but would necessitate a simple explanation of the functioning, the limitations of the algorithm as well as the underlying finance model.[109] On the other hand, according to another researcher, no such an obligation would exist. Rather, it was argued that Art. 24(3) MiFID II would only outline the general standard that a firm

104 Cf. in other context, the discussion whether information not specified by the CDR, must be provided on a durable medium or not *Rothenhöfer*, KMRK (n. 24), § 63 marginal no. 225.

105 This corresponds to Sec. 49 WAG 2018 and Sec. 63(6) WpHG.

106 See for the distinction "minimum content" vs. "minimum standard" already n. 77. In other literature, the provision is also discussed as "General transparency requirement" (cf. *Knobl*, Wohlverhaltensregeln [n. 77], 469) or as "Fair Treatment Clause" (see *Della Negra*, MiFID II [n. 24], p. 66).

107 Cf. for Germany *Koller*, Wertpapierhandelsrecht Kommentar (n. 48), § 63 marginal no. 55.

108 For the German transposition of Art. 24(3) *Linardatos*, Qualifizierung (n. 74), § 4 marginal no. 87, with special emphasis on a circular of BaFin on minimum Requirements for the Compliance Function and Additional Requirements Governing Rules of Conduct, Organisation and Transparency, better known as "MaComp". Also, referring to the German equivalent of para. 3 (as well as para. 4) *Krönke*, Digitalwirtschaftsrecht (n. 51), p. 578.

109 See *Linardatos*, Qualifizierung (n. 74), § 4 marginal no. 87.

must meet when providing any information and not a duty to explain how an algorithm works, its limitations and the model used.[110]

Even if Art. 24(3), also in my view, does not stipulate any obligation to provide information,[111] this does not necessarily preclude the conclusion that some algo-transparency is required *de iure*. In fact, taking a closer look at this issue, it seems quite possible to align these (only at first sight) opposing views. This is because in any communication related to robo-investing, a firm most certainly will need to present some information about the capabilities of the system (and specifically about the use of AI, if this is the case) in order to be fair, clear, and not misleading. More precisely, with respect to the use of AI, caution needs to be taken if a firm claims to use such innovative technologies without explaining what kind of technique is used; otherwise, there seems to be a high chance that the information is too superficial, leading to problems with respect to its clarity.[112] Information is generally clear, if essential information is not left unmentioned.[113] Additional requirements follow from Art. 44(2) CDR[114] providing i.a. that information must always give "a fair and prominent indication of any relevant risks when referencing any potential benefits of an investment service"[115] and that it "does not disguise, diminish or obscure important items, statements or warnings".[116] Thus, particular attention has to be paid to cases where a firm highlights the benefits of ML use, without disclosing all the relevant risks.[117] In this context, it may be difficult to reconcile the

110 Cf. again with respect to the German transposition *Herresthal*, Interessenkonflikte (n. 62), § 9 marginal no. 65, calling it a "structurally unsuitable" legal basis.

111 Also, e.g., *Koller*, Wertpapierhandelsrecht Kommentar (n. 48), § 63 marginal no. 55.

112 Cf. generally *Maume*, Robo-advisors (n. 5), 39, noting that many clients do not even have a sound idea of what the term "robo-advisor" means, which is why there is a particular need for explanation and clarification.

113 Cf. *D. Poelzig* in: C. H. Seibt/P. Buck-Heeb/R. Harnos (eds.), BeckOK Wertpapierhandelsrecht, 4th. Ed., München 2022, § 63 marginal no. 134.

114 Similar to the discussion above at the text accompanying n. 94 et seq., one might question whether the level 2 rules provide an exhaustive list or not. See in favour for Art. 44 CDR *Brenncke*, European Financial Services Law (n. 77), Art. 24 marginal no. 16; against *Rothenhöfer*, KMRK (n. 24), § 63 marginal no. 181. Again, I assume a non-exhaustive character, although it seems less relevant because of the openness of the level 2 rules (e.g., "fair").

115 Art. 44(2) (b) as well as recital 67 CDR.

116 Art. 44(2) (e) CDR.

117 Cf. generally *Maume*, Robo-advisors (n. 5), 39, stressing that firms seem to overstate the potential benefits while giving far less priority to the risks involved; cf. in general also *Brenncke*, European Financial Services Law (n. 77), Art. 24 margi-

assumed information standard with the duty that any information should be provided in an understandable way for the average investor, which is also required by the same provision.[118] While I do recognize the challenges in balancing the necessary information on the system-use on the one hand and the comprehensibility of the information on the other hand, I do think that certain information on AI use incl. risks will be necessary. This is also supported by the general literature, according to which one can assume that the average investor has the time to read some documents.[119]

All in all, it seems reasonable that a firm stating to use AI etc. will need to disclose some information on the applied technique to comply with the requirement under Art. 24(5). Otherwise, the information provided to (potential) customers is likely unclear. Similar concerns arise with respect to highlighting benefits of ML and alike approaches while failing to disclose related risks.

E. Concluding comments

This contribution attempted to evaluate whether existing EU financial law requires "meaningful information" around AI use in the robo-investing context. Except for the recommendations included in the supporting guidelines concerning the suitability assessment, no specific provisions mandate the disclosure of information relating to the use of algorithms etc. This, however, does not mean that there is no legal basis for some transparency. Firms providing algorithm-based financial services are subject to the very general information obligations under MiFID II which apply also to the use of ML and other techniques. Taken together, there is some but limited transparency pursuant to Art. 24(3) to (5), which could prompt the question whether we need new requirements for more detailed information.

To answer this, let us briefly come back to the rationales for customer transparency outlined in Sec. C. First, as regards facilitating informed decision making, it has already been stressed that too much information

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nal no. 17, stressing that "risks" is to be understood broadly; cf. in detail also *Rothenhöfer*, KMRK (n. 24), § 63 marginal no. 183.

118 Art. 44(2) (d) CDR.

119 This is because the law is based on the normative figure of a reasonable and average-educated customer, see, e.g., *Brandl/Klausberger*, WAG 2018 (n. 24), § 48 marginal no. 55 et seq.

could actually lead to an information overload.[120] With respect to ensuring confidence/trust in services and markets, too much disclosure about AI and specifically related risks might also have a detrimental effect, increasing the reluctance of retail investors to engage with capital markets[121] and undermining the meta-goal of a true capital markets union. Last but not least, as regards the private enforcement of investor rights, there might be other preferred options. As already highlighted in the literature, consideration could be given to fine-tuning the civil procedure rules.[122] A similar approach was recently taken in the proposed AI Liability Directive,[123] which, however, would not apply to contractual relationships.[124] In the short term, therefore, it may be more practical to place greater emphasis on the responsibility of NCAs to monitor the soundness of robo-models[125] and to link supervisory findings to subsequent private enforcement in the case of investor losses.

120 See on this the text accompanying n. 102.

121 Cf. on the issue of "algorithm aversion", by mere reference, *Bianchi/Brière*, Robo-Advising (n. 7), 18 et seq.

122 See especially *Maume*, Robo-advisors (n. 5), 30 et seq. and 41, discussing a reversal of burden of proof, expressly due to the opacity; in general on the challenges in this regard *A. Schopper*, Haftung für Veranlagungsentscheidungen bei Portfolioverwaltung auf Einzelkundenbasis, Österreichisches BankArchiv 2013, 17 (25).

123 See COM(2022) 496 final, which provides i.a. for the "disclosure of evidence and rebuttable presumption of non-compliance" (Art. 3) and a rebuttable presumption of causality in the case of fault (Art. 4).

124 Pursuant to Art. 1(2) of the proposal, the directive would only cover "non-contractual fault-based civil law claims for damages".

125 The need for supervisory involvement was also emphasised to varying degrees in the responses to the ESMA Consultation (available at n. 91), i.a. by EFAMA, AMUNDI and the French Financial Companies Association ASF. See further on this issue, *P. Raschner*, Supervisory Oversight of the Use of AI and ML by Financial Market Participants, in: L. Böffel/J. Schürger (eds.), Digitalisation, Sustainability and the Banking and Capital Markets Union. EBI Studies in Banking and Capital Markets Law, forthcoming 2023.