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Ethics of artificial intelligence in the financial sector

Etyka sztucznej inteligencji w sektorze finansowym

Abstract

The application of artificial intelligence in finance is one of the new issues which, in addition to regulatory challenges of hard law nature, raise ethical questions. This study deals with the subject of ethical aspects of the use of artificial intelligence in the financial sector, which is becoming more and more common, and therefore sometimes "invisible" to the end user. Examples of its use can be found, among others in risk assessment models or systems for detecting fraudulent transactions and counteracting money laundering and terrorist financing. Increasingly, they are also used to assess the creditworthiness of a potential borrower or provide investment advice. In the latter cases, transparency and ethics take on a special meaning, because they directly "touch" the human sphere and can significantly affect the observance of fundamental rights. At the same time, finding the "happy medium" that will not only balance various interests, but also be realistic to implement, is not an easy task. It is often emphasized in the literature that today there is no positive (any?) Effect on the implementation of many postulates in the field of ethical AI (Dubber et al., 2020), in connection with the use of various codes of ethics or good practices, which are more based on the so-called self-regulation or self-governance, that is, self-determination practices that are then audited by the settler. At the same time, the dynamic development of algorithms, especially those that make (to some extent) autonomous decisions, means that supervision — also ethical — cannot be temporary, but should be carried out continuously (Lo Piano, 2020), which only exacerbates the already existing problems related to algorithmisation.

Keywords: ethics, artificial intelligence, robo-advice

JEL: K23, G21, G51

Streszczenie

Wykorzystanie sztucznej inteligencji (SI) w finansach należy do nowych zagadnień, które obok wyzwań regulacyjnych o charakterze twardego prawa rodzą pytania natury etycznej. Niniejsze opracowanie porusza tematykę etycznych aspektów wykorzystania sztucznej inteligencji w sektorze finansowym, która staje się coraz bardziej powszechna, a przez to niekiedy „niewidoczna" dla odbiorcy końcowego. Przykłady jej wykorzystania znajdziemy m.in. w modelach oceny ryzyka czy systemach wykrywania transakcji oszukańczych (fraudowych) oraz przeciwdziałania praniu pieniędzy i finansowaniu terroryzmu. Coraz częściej sztuczna inteligencja jest wykorzystywana także do oceny zdolności kredytowej potencjalnego kredytobiorcy czy w doradztwie inwestycyjnym. W tych ostatnich przypadkach przejrzystość i etyka nabierają szczególnego znaczenia, „dotykają" bowiem bezpośrednio sfery człowieka i mogą w istotny sposób wpływać na przestrzeganie praw podstawowych. Jednocześnie znalezienie „złotego środka", który nie tylko będzie wyważał różne interesy, ale także będzie realny do wdrożenia, jest zadaniem niełatwym. Nierzadko w literaturze podkreśla się, że już dzisiaj widoczny jest brak pozytywnego (jakiegokolwiek?) efektu, jeśli chodzi o realizację postulatów w zakresie etycznego SI (Dubber i in., 2020), w związku ze stosowaniem różnej maści kodeksów etycznych czy dobrych praktyk, które bardziej opierają się na tzw. *self-regulation* czy *self-governance*, czyli samostanowieniu praktyk, które następnie są audytowane przez ustanawiającego. Jednocześnie dynamiczny rozwój algorytmów, szczególnie tych podejmujących (w jakimś stopniu) autonomiczne decyzje, powoduje, że nadzór — również etyczny — nie może być chwilowy, ale powinien odbywać się w trybie ciągłym (Lo Piano, 2020), co tylko potęguje już istniejące problemy związane z algorytmizacją.

Słowa kluczowe: etyka, sztuczna inteligencja, robodoradztwo

Introduction

The progressive algorithmisation of private and economic life means that we are faced with constantly fresh challenges, and our future depends on how we resolve them. The development of what may be broadly understood as artificial intelligence (AI) offers great opportunities, including in terms of personalisation and improved management of financial resources (Al-Blooshi, Nobanee, 2020), but at the same time raises many ethical questions (Hiang Teng, 2020) seldom broached in social, business or scientific discourse. Yet, this is a most salient issue from the perspective of individuals as well as entire financial sectors and economies, also when taken from a systemic angle, as indicated by other authors too (Sastry, 2019, p. 31).

This study deals with the ethical aspects surrounding the use of artificial intelligence in the financial sector, which is becoming increasingly common yet sometimes "invisible" to the end user. Examples of its use can be found, inter alia, in risk assessment models or systems for detecting fraudulent transactions and counteracting money laundering and the financing of terrorism. They are also ever more frequently used to assess the creditworthiness of a potential borrower or for investment advice. In the latter cases, transparency and ethics take on a special meaning, as they directly "step into" the human arena and can significantly affect the observance of fundamental rights.

At the same time, finding a "happy medium" that will not only balance various interests, but also be feasible to deploy, is no easy task. The literature often highlights that today there is a noticeable lack of any positive effect on the implementation of many postulates in the field of ethical AI (Dubber et al., 2020), due to the use of various codes of ethics or good practices, which are more based on so-called self-regulation or self-governance. At the same time, the rapid development of algorithms, especially those taking autonomous decisions (to some extent), means that supervision — also ethical — cannot be temporary, but should be carried out continuously (Lo Piano, 2020), which only exacerbates the problems related to algorithmisation that already exist.

For this reason, when analysing the development of algorithms or artificial intelligence in the financial sector — or, in principle, in every regulated sector — not only should ethical aspects (defined later in this study) not be ignored, but other important issues related to ongoing digitisation should also be taken into account, and these include:

1. Modification and adaptation of the concept of ethics on the basis of applicable codes and practice, including the Code of Banking Ethics[1] or the Code of Good Practice for Brokerage Houses,[2] or at least extending existing documents with content relating to new (breakthrough) technologies.

2. The possibility for wider and more common use of solutions such as RegTech and SupTech (Armstrong, 2019, p. 42 and hereinafter) in order to ensure a high level of ethics in the financial sector.

3. Education in terms of understanding artificial intelligence and challenges of an ethical nature.

4. The development of digital skills within financial institutions and supervisory authorities.

5. Creating a friendly and "preventative" law as well as regulations that are technologically neutral and based on the principle of a risk-based approach, yet transparent and clear enough so that the scale of duties and requirements for actors using algorithms may be understandable.

Of course, there is no single solution that would allow a full implementation of the postulate of "ethical AI" — or "trustworthy artificial intelligence",[3] as it is defined by, inter alia, the European Commission — since research on the effectiveness of various options, including, for example, guidelines or codes of good practice, is still ongoing (Hagendorff, 2020) and although the first conclusions suggest that completely "soft" solutions (Dubber et al., 2020) would be ineffective, we are nevertheless now standing at the beginning of the road to development in this area.

Later in this study, we focus on demonstrating the needs and ethical challenges in the financial sector in connection with the development of new technologies. At the same time, one ought to bear in mind that this is an area in constant flux and relatively "fresh", which means that as yet there have not been many empirical studies or "high-profile" cases concerning, for example, the violation of fundamental rights by algorithms.

What does ethics in artificial intelligence mean?

Before we proceed to attempt to define what artificial intelligence is — at least in the juridical sense — let us turn to the issue of ethics, which will be the starting point for further considerations. At the same time, it should be noted that ethics is very rarely defined within EU acts and regulations. Even the most extensive documents on the ethical application of artificial intelligence do not refer to this concept, although some of its elements may be distinguished from the texts themselves. This does mean, nevertheless, that how ethical norms are understood in the area of new technologies, for example, may vary wildly depending on the context, which hinders the standardisation of such principles.

According to the definition offered by the Encyclopaedia Britannica, ethics, also known as the philosophy of morality, is a discipline that deals with evaluating what is morally right or wrong,[4] as well as acceptable and unacceptable. This term is also used in reference to systems or theories of values and moral principles. The manner in which we discover them and incorporate them into our lives is highly diverse, although — as B. Resnik rightly observes — most people learn [whether we do actually learn them is a separate issue] them at home, school, church or during various social interactions (Resnik, 2020). It is also worth paying attention to the definition proposed by K. L. Rich, who defines ethics — in addition to understanding it as a field of science — as a systematic [human] approach to understanding, analysing and

distinguishing between what is right and wrong, what is delightful and disgusting, as well as relationships with thinking beings (Karen, 2013).

However, ethics in the context that interests us does not necessarily have to adopt the understanding stated above due to the rather relevant issue of the "dehumanisation" of algorithms that are equated with artificial intelligence. By dehumanisation, we assume — and this is the state-of-play at the time of writing — that no software has autonomy nor is "thinking" or "feeling" in our — human — understanding (Shabbir, Anwer, 2015). This thesis remains valid regardless of the adoption of the Turing Test as the starting point, which, however — according to the authors — does not reflect the essential humanistic aspects that characterise human beings[5]. Consequently, in the foreseeable future, algorithms are unlikely to be "ethical" and the ethical dimension of AI will be quite different here.

An interesting approach in this regard is presented by V. C. Muller, who points out the issue of so-called machine ethics, distinguished from ethics in the classical sense by the fact that machines [it is not always clear whether the idea of machines should be extended to software and this is also debated] here are subject to ethics (Muller, 2020) and this precludes them from being granted the possibility to decide and distinguish between right and wrong. M. Anderson and S. L. Anderson indicate that the overriding goal of machine ethics is that they be created in such a way as to operate in accordance with certain ethical principles, which in practice means that such principles influence their "decisions" (Anderson, Anderson, 2007, p. 15). At the same time, it must not be forgotten that because AI neither thinks nor feels, ethical principles — also expressed in numerous guidelines and recommendations — are addressed to humans (developers or operators) (Ryan, Stahl, 2021). V. Dignum speaks in a similar vein, who, when asked whether artificial intelligence systems can be ethical, suggested that this would be unlikely, while leaving a certain margin relating to another important issue — the autonomy of such systems or agents (Dignum, 2019, p. 91). The adoption of a "dehumanised" approach means calling into question the "ethics of AI" in general. Therefore, should we not be talking about ethical design, supervision and use of AI systems — something along the lines of "ethics in artificial intelligence"? Such a solution could be beneficial as it would raise little controversy or doubts regarding the attempt to weave ethical standards into non-autonomous and non-thinking (or feeling) digital solutions, and would impose a certain pattern of behaviour (or expectations) on individual actors creating solutions based on AI.

At the same time, such an approach would not mean that certain ethical norms could not be embedded in the algorithm itself, which is a postulate of many organisations or institutions — for example, in the context of the aforementioned trustworthy AI. M. Ryan rightly observes that perhaps the term *trustworthy* should be replaced with a more appropriate one — *reliable* — or maybe the "humanisation" of artificial intelligence should be abandoned altogether (Ryan, 2020, p. 2765).

So, let us assume that although we are dealing with the ethics of artificial intelligence, we are certainly not talking about classical ethics, as indicated by J. Zigon, who emphasises that ethics is not able to "program" certain patterns, that ethics is not a program but the ability to act in a certain way in a certain situation (Zigon, 2019). This also somewhat undermines the concept of a list of components that AI systems should feature in order to be called "trustworthy".[6]

In other words, principles or ethical standards in the context of artificial intelligence will be applied primarily to the wide spectrum of people involved in the functioning of such a system. This also means that we can easily — although the issue itself is not particularly simple — identify the entity responsible for possible violations. However, this is an issue that requires a separate study.

What is artificial intelligence?

We made a conscious decision to embark on our deeper analysis by presenting ethical issues rather than defining artificial intelligence, which is, after all, of key importance for further solutions. The reason for adopting such an approach is the necessity to indicate the "human" nature of AI, which is relevant in the context of responsibility for AI systems.

The very concept of artificial intelligence is understood inconsistently within doctrine, science, as well as legal provisions and regulations. AI is also variously defined by international institutions and organisations. As a result, it is not always clear if we are actually using artificial intelligence systems, and this leads to uncertainty about possible legal or regulatory requirements in this area. At the same time, some authors indicate that creating a "good" definition of AI is a difficult or even impossible task, at least given its current state of development (Wang, 2019, p. 29). However, this is not for want of a need to define it, at least for the purposes of legal and regulatory solutions.

Considerations on the definition of artificial intelligence should begin by referring to a proposal featured in a draft regulation on AI (European Commission, 2021), according to which an artificial intelligence system means software developed using at least one of the techniques and approaches listed in Annex I, which may — for a given set of human-determined purposes — generate outcomes such as content, predictions, recommendations, or decisions that affect the environments it interacts with. Among techniques and approaches, the aforementioned Annex I lists, inter alia, machine learning and logical methods as well as statistical approaches or search and optimisation methods.[7] Such a broad approach means that a significant number of models — for instance, those used to assess credit risk — may be classified as artificial intelligence under its wide definition. One might debate the benefits of this solution, but — as the authors understand — it results from the need to subject high-risk artificial intelligence systems to specific legal

requirements, which in the proposed regulation constitute a separate category (the proposal includes artificial intelligence systems intended for to be used for the purpose of evaluating the creditworthiness of natural persons or determining their credit score, with the exception of artificial intelligence systems put into operation by small suppliers for their own personal use).

This is, of course, just one of the proposals for defining AI, and many others are to be found in both doctrine and regulatory practice. For example, T. Zalewski defines AI as "a system that enables tasks to be performed that require a learning process and new circumstances to be taken into account while solving a given problem, and which may — to a varying degree, depending on the configuration — operate autonomously and interact with the environment" (Zalewski, 2020, p. 3). S. G. Dalvinder proposes something similar and perceives artificial intelligence as a system of mechanical simulation that collects knowledge and information, and also compiles and interprets the environment, and then "spits out" the result of this action in a form assimilable to "classical" — i.e., human — intelligence (Dalvinder, 2014, p. 13).

However, in practice, definitions have arisen that, to some extent, give AI humanistic features. For example, one European Parliament resolution (European Parliament, 2020) contains a proposal according to which an artificial intelligence system is software, or software uploaded to computer hardware, that manifests behaviour simulating intelligence by, inter alia, collecting and processing data, analysing and interpreting the environment and by taking action, with a certain level of autonomy, to achieve specific goals. This definition is controversial as it assumes that:

1. Artificial intelligence can manifest "behaviours" that simulate intelligence.

2. AI can be autonomous to some extent — which is also a questionable thesis, although a lot depends on the definition of autonomy that is adopted.

3. It does not refer to the supervisory role of humans in its design.

Since this investigation mainly focuses on the use of artificial intelligence in the financial sector, it is also worth mentioning a proposal offered by the German supervisory authority (BaFin), which in a study on the principles of using artificial intelligence (BaFin, 2021, p. 3) indicated that at the current level of development it is not possible to clearly separate the use of AI and traditional processes [applied in the financial sector], and this may cause significant controversy in the future, especially when it comes to high--risk AI systems. At the same time, it is worth noting that the EU Commission is currently also working on a definition of software, which will undoubtedly include algorithms (Wendehorst, Duller, 2020).

Therefore, the adoption of a specific definition may be conditioned by the autonomy and the intelligence of artificial intelligence systems itself, but this issue will not be the subject of further considerations that would require a separate study. The authors of this publication are inclined to accept the definition contained in the proposal of the European Commission, but at the same time — and this was included, inter alia, in the Strategy for the EU in the field of digital finance (European Commission, 2020) — it seems necessary for competent supervisory authorities to develop sectoral guidelines that will help classify specific solutions as broadly understood artificial intelligence, or as classic models or software. In this case, the consequence of improper labelling may be the failure to apply certain requirements or rules, although these — at least at the national level — are yet to be developed.

The ethics of artificial intelligence in finance

Having developed a basic conceptual grid, some solutions can be proposed to ensure that innovations based on artificial intelligence in the financial sector meet ethical requirements. However, because at the moment we do not have any standards "imposed" by a regulatory body (including the Polish Financial Supervision Authority or the European Banking Authority) and there are no legal provisions specific to AI, further analysis and proposals only represent a starting point for discussion on the future shape of possible requirements.

It is also relevant that, in terms of ethical challenges, digital solutions used in the financial sector do not differ fundamentally from others that work "for" and "with" individuals (Jamnik, 2011). So, issues of discrimination or algorithmic bias will be typical examples of ethical standards (and sometimes legal ones too) being violated (European Equality Law Network, 2020), although issues of manipulation, involving data or violation of individual rights other than indicated above, should also be kept in mind. Issues related to transparency and keeping customers in the loop, including about how their data are processed, are also extremely relevant here. However, the directory is quite broad and may also cover issues of compliance with the law, unfair market practices and fair competition.

At the same time, it should be noted that also today an intense debate rages regarding what shape or form ethical standards for new technologies should take, as previously pointed out in this study. This debate is based on an attempt to find a "happy medium" (Stahl, 2021, p. 35 and hereinafter) that would take into account both hard (technological) and soft (human) aspects of AI, and to determine "who" should establish such norms — i.e., the institutions themselves, supervisory bodies or professional organisations.

In the authors' opinion, if the financial sector is subject to various "frictions" and sensitive to violations (including for reasons of reputation), the most effective solution would be to combine the various solutions available on the market. In particular, a future ethical framework for AI in the financial sector could combine:

- standards (codes, good practices) established by industry organisations such as the Polish Bank Association or the Chamber of Brokerage Houses,

• standards set by professional organisations, e.g. with regard to investment advisers as well as software engineers or compliance inspectors,

• standards determined by internal bodies of financial institutions, e.g. Risk Committees with the participation of ICT,

• guidelines or recommendations issued by competent supervisory authorities — although these may be less voluntary in nature.

The solutions offered above stand somewhat alongside the legal and regulatory requirements that may appear in the coming years in the context of AI and should be applied in tandem. At the same time, in terms of "content", some general requirements can be identified that, however, should be initially formed while taking into account the specificity of the financial sector, and secondly, by using two key principles — a risk-based approach and technological neutrality. The content of these standards should therefore reflect both the specificity of the technology used, as well as certain ethical "risks" characteristic of the financial sector, as well as the limited human participation in the operation of the algorithm and the actual impact of algorithmisation on end users.

The ethics of artificial intelligence exemplified by robo-advice

Robo-advice was a response to the post-crisis (2007–2009) erosion of trust in traditional, human financial consulting. Conflicts of interest and ethical issues arise with traditional financial advice. Robo-advice lowers the costs of providing services, thereby making it accessible for less wealthy investors.

Despite the codification of ethical standards that financial and investment advisers should observe while cooperating with clients on the initiative of their self-regulatory organisations, their practical implementation, as demonstrated by mis-selling practices carried out by advisers, turns out to be irksome. Members of such associations are obliged to observe commonly agreed rules of professional ethics. Professional associations are particularly active in the financial industry, where professional development and the highest ethical standards are a key element of the business (Duda, 2016). The formation of codes of professional ethics is significantly influenced by the moral tradition of a given profession and changes in the socially accepted system of values, which leave some freedom in terms of shaping and evaluating the application of ethical standards in accordance with the specifications of individual market sectors (Mitek, 2016). Compliance with ethical standards is an essential element in building trust in professions that deal with financial markets. Apart from a code of ethics, a system must exist to verify its application (a so-called ethical audit) together with an apparatus for imposing sanctions for non-compliance (e.g. exclusion from an association).

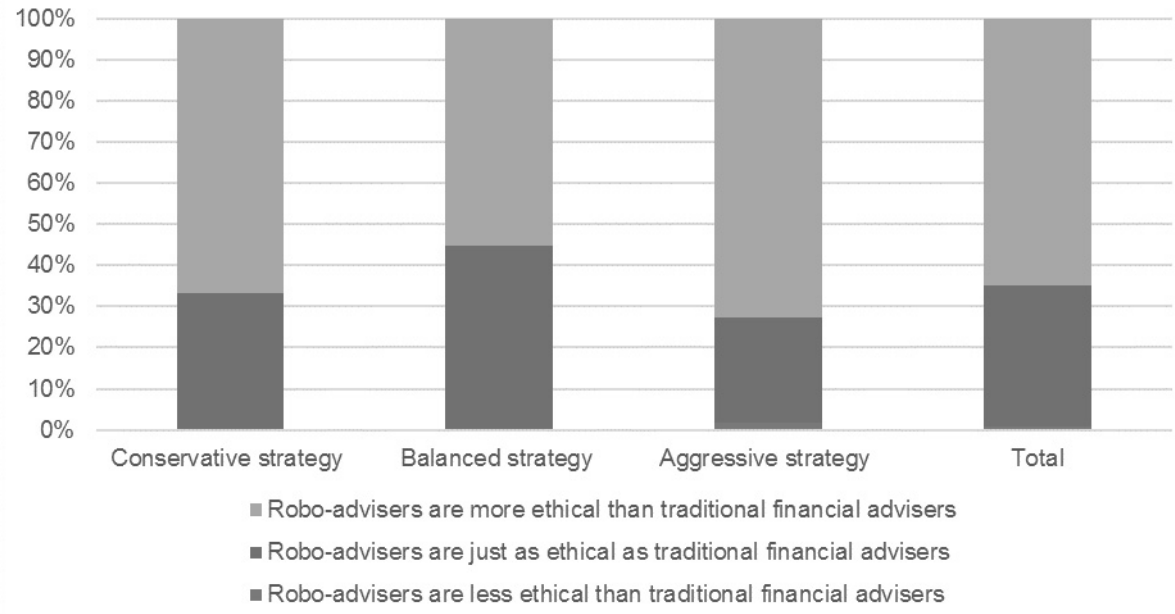
One body that promotes high standards in financial consulting is the Certified Financial Planner Board of Standards (CFP). The CFP's operations are based on the implementation and development of specific advisory standards. This organisation introduced the principle of The Four E'S (Education, Examination, Experience and Ethics), which consists in acquiring education and professional qualifications, developing theoretical and practical knowledge in financial planning, continuous improvement of qualifications and passing exams confirming financial knowledge and the ability to transfer this to the client's reality, issuing certificates to advisers who have at least three years of experience in financial planning, and obliging members to remain faithful to the ethical principles described in the code of ethics and professional responsibility. Professionals are held to the highest of standards, as outlined in the CFP Board's Standards of Professional Conduct. They are obliged to uphold the principles of integrity, objectivity, competence, fairness, confidentiality, professionalism and diligence as outlined in the CFP Board's Code of Ethics. The Rules of Conduct require that CFP® professionals put their clients' interests ahead of their own at all times and provide their financial planning services as a "fiduciary" — acting in the best interest of their financial planning clients. CFP® professionals are subject to CFP Board sanctions if they violate these standards.

Therefore, a legitimate question arises as to whether algorithms and machine learning used in robo-advice with the participation of humans who program these solutions can be more ethical than traditional consulting? The literature presents potential ethics problems posed by robo-advice: information disclosure, algorithm, suitability and privacy (Chong, 2017). In the case of robo-advice, the question is how to mitigate these ethical problems and who should develop specific ethical standards that should be followed when designing robo--advisory solutions?

Within the scope of the first Polish survey involving users of robo-advice conducted on clients of the Slovak brokerage house Finax, which offers an automatic financial advisory service in Poland and is developing rapidly, clients were asked about their opinion on the ethicality of robo-advisors compared to human advisors (Waliszewski, Warchlewska, 2020). As many as 65% indicated that robo-advisors are more ethical than traditional financial advisers, while 34% thought the opposite, and 1% indicated that they are equally ethical. Then, the assessment of the ethicality of robo-advisors was compared with the investment strategy used by the users of these services (aggressive, balanced, conservative).

It turned out that the evaluation of the ethicality of robo-advisory services was related to the investment strategy employed by the investors (Firure 1). The ethicality of robo-advisors was assessed most positively by investors following an aggressive strategy (approx. 73%), then a conservative strategy (approx. 67%), and finally a balanced strategy (approx. 55%).

Figure 1
Assessment of the ethicality of robo-advisory services and the investment strategy followed



Source: own study.

Closing remarks

The development of modern technologies creates new risks and ethical dilemmas. In the case of the financial sector, artificial intelligence is increasingly widespread, which inevitably evokes the need to discuss solutions for the creation and codification of ethical standards and compliance with them as well as sanctions for non-compliance. In our opinion, AI ethical codes should:

- refer to fundamental rights, with the proviso that such a reference cannot take the form of (practically) unworkable assumptions, which may include, for example, the attempt to ensure the so-called well-being of all mankind;
- highlight the importance of the principle of data protection, privacy and ethics at every stage of creating and using algorithms — data protection, privacy and ethics by default and design;
- take into account the need to raise standards and somehow educate those involved in the operation or use of algorithms;
- include a process of continual learning;
- deal with how to apply high-quality data and implement cybersecurity;
- clearly identify undesirable practices and behaviour;
- outline principles for communicating and exchanging information as well as signalling abuse or faults;
- state principles of independent audit and control;
- underline the principle of responsibility.

This directory is minimal and open. It can be freely supplemented with other ethical and legal requirements — the above proposal is in fact a mixed bag — so as to particularly take into account the specificity of a given industry or entity. Much, however, depends on the actual will to implement these requirements. Codes or standards will not serve their function unless they are properly applied, verified, supervised and modified in accordance with requirements. For this reason, it is reasonable to establish rules for their enforcement both organisationally and in terms of possible supervisory auditing or inspections. However, as it stands today, this is a touchy subject — e.g. in the context of Supervisory Review and Assessment for Banks — due to the unclear status of this type of soft solution.

Undoubtedly, ethical standards should not merely be a postulate, but represent a high standard to which individual entities should commit. Their enforcement may not only result in loss of market reputation, but also exclusion from industry organisations in the event of violations. Undoubtedly, the challenge in this case is to "force" such organisations to take more decisive actions.

Przypisy/Notes

[1] https://www.zbp.pl/getmedia/c54fc557-0e78-48e2-a92b-1a601685dbc7/KEB_final_WZ (13.07.2021).
[2] https://www.idm.com.pl/images/regulacje/Kodeks_dobrej_praktyki_domow_maklerskich.pdf (13.07.2021).
[3] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=60436 (14.07.2021).
[4] https://www.britannica.com/topic/ethics-philosophy (14.07.2021).

[5] The achievements of research on artificial intelligence in the context of the famous Turing Test are described by R. French in his column on the effectiveness of the test until 2000 (French, 2000).

[6] The assessment list for trustworthy artificial intelligence (ALTAI) for self-assessment, https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=68342 (17.07.2021).

[7] https://unesdoc.unesco.org/ark:/48223/pf0000377897 (18.07.2021).

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