Navigating Challenges and Opportunities of Standards Developing Organizations in Times of Rapid Technological Advancement

A DIN e.V. Perspective

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Abstract: *The standardization of AI ethics is an essential yet complex endeavor, necessitating a balance between technological progress, regulatory frameworks, and societal values. As AI systems increasingly shape economic, political, and social realities, ensuring their ethical use requires robust and legitimate standardization mechanisms. DIN e.V. as a national Standards Developing Organization (SDO) acknowledges the challenges of defining a universal ethical framework, given the vast differences in values, legal systems, and governance structures across the globe. In this publication we will address the involvement of for-profit companies in the standardization process, the distribution and visibility of stakeholders and their interests, and whether ethics can be formalized and how the certification of AI could proceed. The certification of ethics in AI with regard to defined specifications on principles of fairness, transparency, accountability and privacy, shows trustworthy compliance through a trusted structural process. The specifications used as a basis for certification need to have a solid understanding of their implications. This requires the participation of all stakeholders. Critics point out that traditional standardization bodies often struggle to achieve a balance between open democratic participation and efficiency, which leads to the criticism that certification mechanisms are either too bureaucratic or not inclusive enough (Werle and Iversen, 2006). Another point of criticism is the perceived increasing influence of private companies and industry-led bodies on the standardization process behind closed doors, leading to concerns about industry dominance and regulatory capture (Corporate Europe Observatory, 2025). Addressing these points, we show which mechanisms we have within the SDOs, which institutions (e.g. Consumer Council and Commission for Occupational Health and Safety and Standardization (KAN)) exist and how they*

contribute to a formalization of ethical principles in order to enable a fair and inclusive standardization process. Using case studies, we show that standardization is a means that can serve as a mechanism to align technological advancements with societal values. In conclusion, the certification of AI ethics and the governance of AI standardization at first glance appears fraught with challenges, from industry influence to geopolitical disparities. However, history demonstrates that standardization can serve as an important moderating system for harmonization, ensuring responsible innovation while safeguarding fundamental rights. SDOs work as a mediator between many different stakeholder groups, advocating for a balanced approach that fosters global cooperation while upholding ethical principles in AI development and deployment.

Keywords: *Standardization; Standards Developing Organization; DIN; Artificial Intelligence*

Introduction

Artificial intelligence (AI) influences various facets of human lives ranging from economic to social domains like chatbots or automated creditworthiness assessments (Genovesi et al., 2024). Given the range of AI through its integration into everyday processes, the demand for regulation to ensure ethical use is on the rise as shown by the European Artificial Intelligence Act. Robust ethical standards within evolving AI technology should encompass key principles such as fairness, transparency, accountability, and privacy (Hermann, 2022; Hunt and Vitell, 1986). Official international standards guide the development and deployment of AI systems and must therefore ensure they themselves are aligned with societal values and do not inadvertently compromise human rights.

Standards Developing Organizations (SDOs), such as DIN e.V. on a national level, or ISO and IEC as international institutions, play a critical role in this endeavor. These organizations are tasked with orchestrating the development of standards that harmonize technological advancements with ethical imperatives. SDOs face the challenge of establishing frameworks that are not only technologically sound, but also socially responsible, contributing actively to global efforts in setting legitimate standardization mechanisms (Hoek, 2015; Van Eck and Waltman, 2010). Through these frameworks, SDOs aim to shape the future landscape of AI development, advocating for standards that also reflect diverse ethical considerations and promote responsible innovation.

Ethics in AI and Business

When talking about ethics, common understanding is the rational and systematic examination of the norm of what is right and wrong, and moral actions whose results do not cause harm to people. Another aspect is the ability to distinguish between good and bad actions/guidelines and standards that prescribe the decision to act in different circumstances (Graham, 2013; Kazim, 2017; Weiss, 2014). It should be noted that morality in philosophical ethics compares inner states that are directed towards external constraints, the so-called virtue. Meanwhile, AI ethics can be oriented towards the legislature to cover the key issues of governance, accountability and transparency. Here, it is important that there are rules and guidelines that are covered and implemented by the executive branch of the government, a so-called coercive core (Kazim and Koshiyama, 2021).

The most relevant ethical theories for business ethics and AI ethics are virtue, consequentialism, and deontology ethics (Kapteint and Wempe, 2002). Virtue ethics has its roots in pre-Enlightenment Aristotelianism and states that a person's character traits influence their behavior in certain situations. Character traits or virtues such as honesty, self-control, integrity, courage, generosity and fairness are desirable. The person should develop into a perfect self, the action itself or its consequences are not the focus of virtue ethics (Kapteint and Wempe, 2002; Kazim and Koshiyama, 2021).

In contrast, consequentialism theory has the consequence of an action at its center. The maximization of pleasure or minimization of displeasure is sought as a consequence through the formulation of principles. Here, the outcome literally justifies the means, and the character traits of a person can be disregarded. This ethical approach is often found in government policy and decision-making, for example the maximization of gross domestic products as an argument in economic policy (Kazim and Koshiyama, 2021; Okello, 2021). The third deontology ethics theory, which is also known as duty ethics, sees the duty and obligation to commit an action as the main essence of its theory. This distinguishes it from the consequences and outcomes of consequentialism ethics, where the weakness lies in the inflexibility and the use of strict rules (Kapteint and Wempe, 2002; Okello, 2021). When ethics is applied practically, it is often referred to as morality, as it is more concrete in its application and more helpful to society. Morals and ethics are related, but not the same, which often leads to misunderstandings and discussions in literature. Morality is based on realistic standards of behavior and norms of action and is therefore

easier for businesses to grasp (Place, 2019; Yeh et al., 2020; Vadera & Pathki, 2021;).

Business ethics emphasizes organizational responsibility to society over organizational profit (Kolb, 2008). This responsibility to society has been discussed in literature since the 1930s and 40s, with the question of what specific social responsibility companies have (Caroll, 1999). With the current environment and the increased interest in ethics, businesses have no choice regarding their moral responsibility and how they behave, as misconduct can lead to profit and image loss (Brimmer 2007; Okello, 2021; Kamila and Jasrotia, 2023). Environmental, social and governance issues (ESG factors) have received a lot of attention in recent years and can influence a business positively or negatively. Without ethical practices, the business opens itself up to a high risk of being boycotted by consumers, fines, and penalties or litigation claims, whereas the positive effects of ethical behavior in an organization include increased profitability and strengthened internal and external relationships with stakeholders (Nelson, Campfield and Weeks, 2008; Jin, Drozdenko and DeLoughy, 2013; Okello, 2021). The lack of ethical behavior and guidelines can lead to very diverse business risks such as data leaks from technology companies, the dissemination of false information on platforms or the fast fashion industry, with its poor working conditions in production countries and harmful environmental impact (Binet et al., 2019; Jing and Murugesan, 2019; Marsden, Meyer and Brown, 2020; Niinimäki et al., 2020).

There are two ethically relevant aspects in AI development, on the one hand AI itself, how it works and "acts", and on the other hand the development of AI, under what working conditions the developers work, whether the programming work has been outsourced to countries with lower wages and possibly inhumane working conditions for example. Both aspects offer approaches for standardization in order to take ethical aspects into account in both the development and application of AI, and to give industry and users guidelines and technical basis for their behavior and processes. In the discussion of AI ethics, however, the focus is primarily on the processes and development of AI, consumer safety in its application and the ethical concepts that AI developers follow and that are used in programming.

Challenges in Standardizing AI Ethics

AI ethics is concerned with the psychological, social and political implications of AI. This includes e.g. protection against undue manipulation, the right to know when you are not interacting with a human and questions of mental autonomy in the psychological sphere. The issues of justice and fairness fall under the social aspect of above mentioned ESG factors and influence on economic and democratic processes falls under the political area (Floridi, 2014; Kriebitz and Lütge, 2020; Müller, 2020).

The process of standardizing AI ethics is complex, primarily due to the diverse cultural and legal landscapes across the globe reflecting a profoundly dynamic and novel technology with diverse societal interaction. Different regions uphold varying ethical values, legal systems and regulatory approaches making it challenging to formulate a universal framework that encompasses these differences (Hoek, 2015; ÓhÉigeartaigh et al. 2020).

Secondarily, conflicting objectives and the unclear state of technology regarding metrics for AI monitoring present further barriers to standardization. Also, the diversity in use cases necessitates tailored ethical considerations, making a one-size-fits-all approach impractical at this stage (Genovesi et al., 2024; Radanliev et al., 2024).

The literature highlights the need for dynamic and adaptive standards that can navigate these intricacies, allowing for the global dissemination of ethical AI practices without sacrificing cultural specificity (Ho, Wang and Vitell, 2012; Vitolla, Raimo and Rubino, 2021).

Furthermore, some SDOs, such as DIN e. V. have internal guidelines and documents that prohibit the standardization of ethics as such. Since ethics is a term that can be interpreted in different ways, ethical aspects and guidelines should be defined and anchored in national and international standards. Here the task of the SDOs is not to define ethical principles but to process the legislative framework and support regulation through technical definitions, requirements or guidance documents. This puts the SDOs and thus the respective topical stakeholders in a position to help shape AI regulation within the legislator's intended boundaries. These standards act as principles in the development of AI products and can integrate ethical considerations. To ensure trust of other market actors in one's own adherence to standards and specifications, actors can certify their AI products. This means having a third party audit the implementation of standards and specifications and document this audit to allow for higher confidence in these AI products. (Radanliev et al., 2024).

Another significant challenge lies in incorporating adequate stakeholder participation. A large amount and high variety of participants boosts inclusiveness, while it reduces speed and flexibility creating a conflict of interest. The main objective of the international standardization system and its involved national SDOs is to dissolve this conflict of interest and to create a diverse and high participation.

An example of the demand for mechanisms of participation and moderation is evident in the numerous definitions of artificial intelligence systems. As AI is subject to potential regulation or oversight, having a clear and distinct definition is crucial to understanding its scope. However, various definitions of AI exist. For instance, the EU AI Act and the broadly accepted OECD definition differ, and the foundational document ISO/IEC 22989:2022 offers yet another interpretation of 'AI system' (Holistic AI, 2024). This diversity in definitions likely stems from the involvement of many stakeholders, resulting in consensus based on the minimal common denominator for each individual working group.

While democratic inclusiveness is vital in capturing a wide array of perspectives, there is often criticism that standardization mechanisms either become too bureaucratic or not sufficiently inclusive (Corporate Europe Observatory, 2025; Raj, Jasrotia, Rai and Ansari, 2022). Additionally, the influence of private companies and industry-led bodies can lead to concerns regarding regulatory capture and industry dominance in setting ethical guidelines. This dominance can skew ethical standards towards commercial interests, potentially perceived as undermining broader societal values (Schuklenk, 2020).

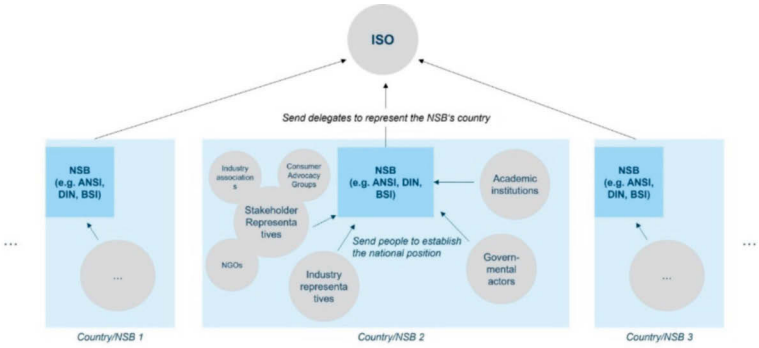
While standardization historically focused only on specific technologies, standardization today is becoming increasingly interconnected and complex. Almost all surrounding aspects of a given technology, e.g. logistics, process management, safety and environmental impact, are now also standardized. Additionally, international standards are becoming more politicized because of their wide influence. While governments have historically stayed out of the standardization process, a change is noticeable here. As such, the influence of the Western actors is often pitted against the growing influence of China within the world of international standardization. A metric frequently used to monitor country involvement in international standardization is the number of proposals for new working items or the chair of working groups by country or their representative national standardization body (NSB) providing the administrative work of a given committee. The various incentives for govern-

ments to participate in standardization, whether through tax breaks or by paying experts for their contributions, illustrate the harsher tone (Barrett, 2024).

Despite the increased political interest, SDOs, such as ISO and IEC, have mechanisms in place to avoid over-politicization and to ensure their functionality and legitimacy. These mechanisms are based on the two core principles of consensus and voluntarism (Barrett, 2024). These two principles state that only a maximum of a quarter of negative votes and a positive two-thirds majority are required for votes. These guidelines presuppose the willingness of the various parties to discuss and compromise in order to reach an agreement and virtually prevent a single party from doing it alone. The agreed standards are not binding but are to be applied voluntarily. As a result, application through market actors ultimately decides whether the standard is fit for purpose, unless governments intervene and make the standard binding by law. A special category are Harmonized European Standards, whose development is commissioned by the European Commission and complying with them demonstrates compliance with requirements of the relevant EU legislation. However, the industry is still free to choose a different solution to meet the requirements (Barret, 2024, Your Europe). The ethical challenges in the field of AI require proactive strategies from governing bodies, including mechanisms that promote equal stakeholder representation, mitigate the risk of industry dominance, while fostering constructive dialog between all parties involved (Rothschild, 1999; Quazi & O'Brien, 2000; Brenkert, 2002). To accomplish this task, SDOs rely on incorporating stakeholder with different backgrounds' perspectives for a holistic approach and inclusive standardization processes (Agudelo, Jóhannsdóttir and Davídsdóttir, 2019). As the means of different parties vary greatly, one of the simplest first steps is to facilitate access to meetings, e.g. by setting up web meetings or hybrid solutions.

Another problem is the influence of interest groups from industry. Silicon Valley giants have historically used their considerable resources to shape academic research and ethical guidelines to align with their commercial goals (Ochigame, 2019; Schuklenk, 2020) This practice risks unduly influencing regulatory institutions that are supposed to oversee AI development, thereby distorting AI standards in favor of commercial interests and potentially at the expense of the common good.

Figure 1: Structure of opinion formation in ISO as an exemplary Standards Development Organization (SDO). The National Standardization Bodies (NSB) represented by NSB 1, NSB 2 and NSB 3 get input from different sources, such as stakeholder representatives, industry representatives, academic institutions and governmental actors, forming a national opinion. This opinion is then represented by a delegate sent by the NSB to the SDO, here ISO.



To prevent this, transparency in the standardization process is essential. Ensuring that dialogues and negotiations between stakeholders are open and documented will help to maintain accountability and prevent undue influence by any single party. The distribution and visibility of the stakeholders involved, such as in the foreword of DIN SPECs developed by DIN e. V., can make a contribution here. Conventional standardization mechanisms are often criticized for being either too bureaucratic or not inclusive enough, which limits the participation of critical voices such as smaller technical innovators or consumer groups. Current strategies to improve stakeholder engagement include public consultations, open forums and the use of digital platforms to broaden participation. By increasing stakeholder visibility and accountability, SDOs are better able to develop standards that align technological advances with societal values.

Formalizing Ethics and Certification Mechanisms in AI

In the previous sections, various ethical principles and theories were discussed. Nowadays, ethics no longer only refers to interpersonal interactions, but also includes a technical component, on the one hand the exchange be-

tween humans and technology and, on the other hand, what influence new technologies have on life. As AI-driven processes become more widespread and integrated into our everyday lives, the formalization of ethics in AI systems is a crucial process that underpins the integrity and social acceptance of artificial intelligence. AI technologies permeate different sectors. Establishing robust certification mechanisms enables compliance with ethical principles such as fairness, transparency, accountability and privacy. These principles are crucial to protect (individual) liberties and enable regulatory mechanisms.

In order to maintain an ethical AI system, the expectations of the system's outcome as well as the expectations of how the system has arrived at these outcomes must be considered with ethical principles (DIN and DKE, 2022). It is also important that the algorithms in question are accountable throughout the application's lifecycle, i.e. they operate transparently, fairly and in line with societal expectations (Radanliev et al., 2024).

The implementation of these principles should be considered from the outset. Here developers in particular are called upon, to implement the various demands and requirements in consultation with different interest groups (ethicists, civilians, tech companies, lawyers). If you take into consideration the whole life cycle, this includes not only testing AI, but also continuous monitoring in the form of security protocols, error monitoring and reliability. There are various tests for this, such as permutation importance, drop-column importance, model-specific methods, and post-hoc interpretation methods each with their own strength and pitfalls (Radanliev et al., 2024). Another aspect is certification and regular audits, which can strengthen the trust of the civilian population in the applications. In the area of cybersecurity, there is the so-called Red-teaming, in which the system is attacked and thus the resistance is tested; this process would also be conceivable in the AI area (Radanliev et al., 2024).

Another aspect is data protection, which is a fundamental aspect of the development of AI systems, if sensitive data are part of the training or deployment of a system. and could include issues such as prejudice based on socioeconomic class, gender, skin color and other factors. Companies should and often are obliged to provide resources to address these. The inclusion of various stakeholders in development, as mentioned above, can help with issues such as prejudice by representing broader societal values and offering a range of perspectives. Feedback options from users and other stakeholders after the implementation of the system help to identify problems and adapt to changing circumstances (Radanliev et al., 2024). Transparency reports containing infor-

mation on new AI implementations, problems and solutions are another way to increase trust in AI applications.

While the implementation and realization of ethical principles is done by developers and companies, the formalization process stems from a different level of philosophical and societal discourse. From the perspective of technical implementation in democratic contexts these are foremost perspectives moderated by election, law making, laws and law enforcement as well as further discussed stakeholder requirements. Here, criteria that AI systems must meet in order to be considered ethical are established, comparable to the development of marketing ethics, where the need for reliable data is emphasized to improve ethical standards and practices (Hunt and Vitell, 1986). Similarly, AI ethics should be based on empirical rigor and supported by comprehensive methodologies detailing ethical requirements and compliance. This empirical input is needed to lower the challenge to translate ethical principles into quantifiable standards that can be universally applied. The concept of "ethics by design" discussed in the AI ethics literature advocates incorporating ethical considerations at the earliest stages of AI development (Schuklenk, 2020). This proactive approach emphasizes the importance of embedding ethical considerations into the technological design process to ensure that AI systems inherently uphold societal values. Care and consideration should be exercised to maximize the benefits to society while limiting potential harm. Establishing standards and certification procedures based on these standards, to ensure that AI is developed and applied in an ethical manner, is a crucial element in putting Ethics by Design into practice. Industry-relevant guidelines covering various aspects of AI, e.g. data management, transparency of algorithms, explainability and fairness, can be created through collaboration with international SDOs such as ISO. The development of structures, guidelines and principles should be based on a collaborative approach involving multiple stakeholders, such as governments, industry, academia and civil society. The inclusion of different perspectives is essential to develop ethical standards that are both relevant and representative, as noted in previous discussions on marketing responsibility (Kamila and Jasrotia, 2023). Another point is the promotion of global cooperation, which due to the global nature of AI technologies, standards and legal frameworks should transcend national borders (Radanliev et al., 2024).

The standards developed can be verified through innovative certification models, which helps to streamline the process, reduce bureaucratic hurdles and improve inclusivity at the same time. For example, privacy-friendly tech-

nologies such as federated learning are proposed as models that embed ethical standards directly into the development process and guarantee the confidentiality of data. Through certification, independent third parties can objectively verify whether an organization's AI system installations are ethical and in line with best practices. By formalizing ethical values represented in state law and establishing the basis for effective certification mechanisms, SDOs can promote AI systems that are ethically compliant and socially accepted. Achieving this goal not only strengthens the credibility of AI systems but also advances the mission of aligning technological progress with ethical demands on a global scale.

In parallel with industry advancements, the European Union has adopted a widely discussed regulation for AI: the EU AI Act. Based inter alia on different publications by the High-Level Expert Group on AI set up by the European Commission, it features a human- and risk-centered approach. The most critical AI applications will be categorized in the high-risk class, depending on the areas of use, leading to a vast number of obligations (Regulation (EU) 2024/1689, Busch et al., 2024). Harmonized European standards, a tool well known in the EU product safety legislation, are currently developed to implement and further formalize the EU AI legislation.

Compliance with these standards enables providers of AI systems to issue a written EU declaration of conformity stating that the system meets all relevant requirements thus reducing the involvement of third parties in most cases. Organizations will still be able to comply with the EU's obligations without using harmonized standards using a formal third-party assessment by a notified body.

Successful Co-Creation of AI Standards: Insights from Practice

To ground our discussion in current efforts, exploring examples and case studies where standardization processes have succeeded can provide insights into the practicalities of aligning AI technological advancements with societal values.

The following two examples originate from the healthcare and the financial sector. As both are highly regulated areas already due to their substantial impact on our life, they were early in developing and adopting AI governance instruments such as standards.

One significant example comes from the healthcare sector, where AI-driven diagnostic tools have revolutionized patient care. By adhering to strict ethical guidelines and certification processes, these tools have managed to enhance diagnostic accuracy while respecting patient privacy and ensuring data security (Hermann, 2022). The implementation of AI ethics standards has involved multi-stakeholder collaboration, including medical professionals, patient advocacy groups, and technology developers. This diverse engagement has helped balance innovation with ethical principles, promoting trust in AI applications.

Another area of interest is the financial industry, where AI algorithms are used for credit scoring and fraud detection. Ethical standardization has been proven as crucial in preventing discriminatory practices and ensuring accountability in decision-making processes (Ho, Wang, and Vitell, 2012; Vitolla, Raimo and Rubino., 2021). The standardization of AI within the financial sector brings several benefits. By establishing publicly available frameworks, it enhances transparency and allows customers and supervisors to better understand the mechanisms in use. For financial institutions, standardized guidelines reduce the burden of developing solutions from scratch, enabling them to rely on shared resources and established best practices. Furthermore, standards created through structured processes often integrate ethical principles, promoting fairness and alignment with societal values. However, given instances of unethical behavior in the finance industry, continuous oversight is necessary to ensure these standards are effectively implemented and adhered to. Anticipating the need for adequate AI standardization, the German Standardization Roadmap on Artificial Intelligence (DIN and DKE, 2022) was launched as an open stakeholder-involvement effort to identify needs for standardization with active participation of over 500 experts. The area of the financial industry was a main topic of the second edition of the document, leading to the development of three specifications projects. The DIN SPEC 91512 "Fairness of AI-based applications in the financial sector", DIN SPEC 91527 "Goals, Methods and Metrics for Automated/Semi-Automated Runtime Monitoring of AI Systems for Non-Adversarial Performance" and DIN SPEC 92001–3 "Artificial Intelligence – Life Cycle Processes and Quality Requirements – Part 3: Explainability" can serve as the basis and starting point for consensus-based international standardization. Industry, researchers, regulatory and governmental bodies and users have collaborated in these projects, laying important groundwork. Especially the standardization initiative DIN SPEC 92001–3 serves as a practical example of how formalization of ethical

aspects can be supported by standardization processes (DIN, 2023; DIN, 2024; DIN 2025).

A key topic, horizontally affecting all AI applications, is transparency. Being at the intersection of technical and ethics and technology it plays a key role in most frameworks or regulations trying to manage trust and accountability in autonomous systems. Transparency in AI refers to the extent to which the operations, decision-making processes, and impacts of AI systems can be understood and traced. Various organizations, both public and private, have attempted to define transparency, leading to a highly fragmented research landscape (Haresamudram, Larsson, and Heintz, 2023). A technical specification effort involving a diverse range of contributors (DIN SPEC 91528, currently being developed) seeks to lay the groundwork for standardizing the terms and definitions and overview of relations and dependencies of technical transparency dimensions that are widely recognized. In addition, the involvement of various stakeholders can help to align the currently divergent concepts of regulatory frameworks, research, legal norms and societal expectations, thereby strengthening trust in AI systems and mitigating risks while promoting regulatory compliance and societal acceptance. Thus, the creation of technical standards aims to ease discussion of these issues through staying at the descriptive level. The prescriptive level of normative social rules has to be dealt with on each individual application's level

Mechanisms for Ensuring Inclusive and Fair Standards

The pursuit of ethical AI standardization demands mechanisms that ensure inclusivity and fairness in stakeholder participation. Without such measures, the process risks sidelining important voices and values, leading to standards that may not fully address the needs of diverse communities.

One critical mechanism to realize the above goals is the implementation of public consultation processes, allowing a wide spectrum of stakeholders, including consumer groups, academia, and industry representatives, to contribute to standard development. Such consultations can help democratize the standardization process, ensuring that various perspectives are considered and valued (Schuklenk, 2020; Raj, Jasrotia, Rai, and Ansari, 2022). Within the EN/ISO set of rules for creating standards documents, organizations are invited to participate, and participating organizations are able to comment and vote.

In addition to consultations, the formation of dedicated councils and commissions can support inclusive participation. Institutions, such as, for example, the Consumer Council and Commission for Occupational Health and Safety and Standardization (KAN) at DIN e.V., play vital roles in advocating for professional end users and private individuals' interests, and ensuring that ethical standards reflect societal values (Kamila and Jasrotia, 2023). These bodies can facilitate ongoing dialogue and monitor the standardization process to safeguard against dominance by any one group.

Furthermore, cross-sector and cross-stakeholder collaborations can enhance the inclusivity of standardization efforts. By fostering partnerships between various sectors – e.g. IT, manufacturing, quality assurance – and various stakeholders – public, private, and non-profit – SDOs can encourage a holistic approach that integrates contributions from all relevant parties. These collaborations are instrumental in creating standards that not only address technological advancements, but also ensure with ethical principles on a global scale, as shown for example in the above-mentioned (DIN, 2024 *DIN SPEC 91512*), where industry and researchers collaborated with the banking supervision.

Through these mechanisms, SDOs can champion fair and inclusive standardization processes, promoting ethical AI development that upholds societal values and protects fundamental rights.

Conclusion

In this article, we have looked at various ethical theories and discussed the different requirements and challenges of ethics in AI.The standardization of AI ethics is complex due to the many areas of society that are now influenced by AI, as well as the global nature of AI and the different interpretations of ethics and their application. In addition, SDOs are confronted with accusations of industry influence and opaque processes, the lack of balance between efficiency and inclusivity and are simultaneously exposed to a changing political dimension of standardization. However, both history and recent developments have shown, standardization capacities for all stakeholders are of fundamental importance. They act as essential mechanisms for synchronization, ensuring coordinated development of standards alongside technological innovation and are a tool for protecting basic human rights, by observing conventions and rights.

To enable the standardization of ethical AI, a multi-layered approach that involves all relevant stakeholders, employs different methodologies and promotes global collaboration is necessary. SDOs play a crucial role in this process as they provide the framework for the necessary processes. By promoting transparent stakeholder engagement, lowering organizational barriers and advocating for inclusive frameworks, SDOs can drive ethical AI practices. In the example of DIN e.V., as a national SDO, examples on the development of standards that can help formalize ethical aspects and particularize legislation were shown. With internal, independent institutions such as the Consumer Council and the Commission for Occupational Health and Safety and Standardization (KAN), DIN e.V. shows a way to involve and protect stakeholders, such as end users, who are primarily affected by AI applications.

In summary, there are many challenges in the standardization of ethical AI and some changes can be expected in the future. Common technical rules will be set, if this will happen by a coordinated approach through the processes of official international standardization (e.g. ISO or IEC), by de facto means of big actors within the AI ecosystem, or otherwise has to be seen. However, standardization and the SDOs have proven in the past their ability to unite different perspectives, build consensus and ensure responsible progress. It can therefore be assumed that, in the case of AI ethics, standardization is also a valuable instrument that continues these principles and leads to a result that forms the basis for common technical implementation and certification and thus provides industry and users with a tool to facilitate understanding of the processes and trust in AI applications.

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