

“Artificial Intelligence Standardisation: challenges and opportunities”

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1. Introduction

The rapid advancement of Artificial Intelligence (AI) technologies has brought forth transformative changes across various industries, reshaping the ways in which businesses operate and societies function. As AI continues to evolve, the need for standardised frameworks to ensure consistency, interoperability, and ethical integrity becomes increasingly crucial. This report stems from a series of dedicated workshops organised by [HSbooster.eu](https://www.hsbooster.eu) that focus on connecting AI standardisation expertise with domain-specific applications, aiming to foster a deeper understanding of how standardization can drive innovation while addressing key challenges such as ethical concerns, risk management, and regulatory compliance.

Through a diverse array of use cases presented in sectors such as energy, healthcare, manufacturing, and mobility, the report highlights both the opportunities and hurdles in implementing AI standards. By examining these real-world applications, we aim to provide insights into the pivotal role that standards play in promoting interoperability, ensuring transparency in procurement processes, and enabling ecosystem growth. Additionally, this report explores how compliance with emerging regulations, such as the EU AI Act, helps mitigate risks and contributes to the development of trustworthy and transparent AI systems.

The workshop series was organised between June and July 2024 and served as an opening dialogue, bringing together EU-funded research projects like, industry representatives, policymakers, and standardisation experts to collectively address the growing importance of AI standards in facilitating seamless integration and fostering trust across different domains. This report provides an overview of the key findings from these discussions, offering actionable recommendations for stakeholders, from SMEs to large enterprises involved in EU-funded research initiatives, as they navigate the complex landscape of AI standardisation.

2. AI Standardisation: Challenges & Opportunities - AI Use Cases in Key Sectors

This first workshop of the series aimed to connect the dots between AI standardisation expertise and domain-specific knowledge. Participants obtained insights from a series of project use cases that illustrate practical applications and the potential for standardisation in various operational contexts. Through this event, participants also gained a deeper understanding of how standardisation can drive innovation, efficiency, and harmonization across industries.

This webinar acted as the opening event in a series designed to explore the intersections of AI and standardisation. The following topics were touched upon during the event.

AI Standardisation: Ensuring interoperability, procurement, and ecosystem growth in standardisation - Renaud di Francesco

The importance of standards was discussed, focusing on their role in promoting interoperability and ensuring the smooth integration of devices and services from various manufacturers and suppliers. Renaud di Francesco, representing Sony, an electronics company with diverse content activities such as Sony Pictures, Sony Music, and Sony Interactive Entertainment (known for PlayStation), recognises the necessity of standards to facilitate interoperability. This is evident in everyday technologies like Bluetooth, USB, and mobile communication, where standards allow different devices to work together seamlessly.

Standards play a crucial role in procurement processes. They ensure that companies, whether large or small, can source solutions, components, and equipment from multiple suppliers, enabling them to negotiate better prices, features, and delivery terms. Moreover, adherence to standards guarantees transparency and auditability in procurement, mitigating risks such as corruption. This is particularly important for large companies like Sony, which must comply with numerous regulations and maintain transparency in their operations.

The development of an ecosystem is another significant advantage of standards. By creating a transparent and engaging environment, standards attract multiple developers and users, facilitating collaboration and broader market reach. This is especially relevant in the context of the EU AI Act, a regulation that impacts all organizations and citizens in the EU. Compliance with standards provides a presumption of conformity, reducing legal risks for companies and ensuring they meet regulatory requirements.

The workshop also highlighted the different approaches to AI and standards. Companies can choose between proprietary (closed) systems or open-source systems, each with distinct implications for control and transparency. AI should be considered as part of larger systems rather than merely software, necessitating comprehensive standards for risk management and trustworthiness. Effective risk management involves understanding and mitigating risks through engineering principles and standards, particularly for high-risk systems targeted by the EU AI Act. The development of a catalogue of varied examples helps guide risk management processes, including harm assessment and countermeasures.

In conclusion, this introductory presentation emphasised the multifaceted importance of standards for interoperability, procurement, ecosystem development, regulatory compliance, risk management, and the overall advancement of AI technologies.

Use Cases

AI in Energy

Synergy project - Hrvoje Keko

The Synergy project focuses on addressing the increased complexity and data management challenges in the modern, renewable-focused electricity system. As the energy value chain generates orders of magnitude more data, managing this data effectively becomes crucial. This shift has introduced new business and interoperability barriers, necessitating a framework that can extract and utilize the added value from this data, which is often underutilized or burdensome for business entities.

The project proposes a solution by establishing a platform that offers advanced services for the collection, curation, mapping, and linking of data. This platform is designed to facilitate the sharing, trading, and safeguarding of data and pre-trained models. The core challenge is to enhance coordination between stakeholders, streamline data exchange, and improve business operations based on this data, ultimately enhancing the electricity networks with better forecasts and reduced margins of error. For instance, regional blackouts, like the recent one in Southern Europe, can be mitigated or foreseen by leveraging the value derived from data.

The Synergy platform is envisioned as a comprehensive infrastructure for the electricity value chain. It includes contract management and applications that generate new data, which can then be traded on the platform. This ecosystem aims to serve as a backbone for the development of new services and innovative applications beyond the project itself. The platform is designed to manage data securely, ensuring it conforms to proper models, harmonizes data, and maintains its quality.

A significant aspect of the Synergy project is its focus on standardization. The project has produced reports and frameworks that align with evolving regulations, such as the EU Data Act and the AI Act. The Synergy reference architecture, which includes a common information model, underpins the platform and its applications. This model is not static; it includes procedures to ensure it remains relevant and up-to-date, respecting established standards and handling big data scales. Semantic interoperability is also emphasized, ensuring that data's meaning is understood and preserved.

The project's implementation has revealed uneven regulation and market maturity across different regions, posing additional challenges. The developed solutions must be adaptable to both advanced and less developed markets. The project has encountered significant obstacles with proprietary "walled garden" systems, which required substantial effort to integrate and extract data. Despite

these challenges, the project highlights the potential for regulation to facilitate standardization and ease integration efforts.

In summary, the Synergy project has developed a robust platform to manage and utilize the extensive data generated in the electricity value chain. Through standardization and innovative infrastructure, it aims to improve data exchange, stakeholder coordination, and overall system efficiency, setting a foundation for future services and applications in the energy sector. The project's ongoing work continues to influence new initiatives, product developments, and regulatory frameworks, contributing to the broader goal of a more integrated and efficient energy system.

AI in Healthcare

IDERHA project - Rada Hussein

The IDERHA project aims to establish one of the first European health data spaces. The project, currently in its early stages, seeks to create a federated data infrastructure and develop AI and machine learning algorithms to handle diverse health datasets. Initially focusing on lung cancer, IDERHA aims to expand its architecture to other health domains over its five-year duration.

The project utilizes the OMOP (Observational Medical Outcomes Partnership) standard for the secondary use of health data, aiming to empower patients by providing a personal health data environment. This initiative will allow patients to monitor their health status through various apps. Additionally, IDEera aims to develop policy recommendations that align with the principles of the European health data space, such as common standards, infrastructure, governance frameworks, and data reuse.

IDERHA integrates data from various sources, including electronic health records (EHRs), imaging in DICOM standards, and patient-generated health data from wearables. The project's infrastructure is designed to support the development of AI algorithms for lung cancer risk prognosis and prediction, as well as remote patient monitoring and engagement through wearables and apps.

Collaboration is a cornerstone of IDERHA, with partnerships and synergies with other projects like AIDEN and Optima in Cancer. The project is co-led by Johnson & Johnson from the industry side and the Fraunhofer Institute from academia. LBI leads the interoperability work package, emphasizing the importance of not reinventing the wheel but rather building on existing standards and projects.

Hussain highlighted the role of the HS Booster initiative in fostering synergies with other projects and experts, particularly in extending standards to integrate patient-generated health data with clinical data. The project also collaborates with significant infrastructures and pilots in the European health space.

IDHERA's work focuses on three categories of health data standards: health data exchange (e.g., DICOM, FHIR), standards for data discovery (e.g., Health DICAT-AB), and enabling semantic interoperability (e.g., OMOP common data models). The project has contributed to the development and extension of these standards, with primary results accepted as a full paper in the Medical Informatics Europe conference.

In conclusion, the project underscores the importance of collaboration, interoperability, and the practical application of health data standards. It aims to shape the future of the European Health Data Space for the secondary use of data, emphasizing the need for tools that facilitate the adoption and implementation of these standards across new and existing projects. With a significant budget and a broad scope, IDHERA aspires to be a pioneering force in the digital health landscape.

AI in Mobility

MobiSpaces project - Rita Giuffrida

The Mobispaces project aims to develop a data governance platform utilising AI-based mobility analytics. This platform is designed to optimise the data path by making it mobility-aware and mobility-optimised, drawing data from mobile sensors and IoT devices to ensure efficiency, trustworthiness, and privacy. The project, which began in September 2022 and is scheduled to last 36 months, comprises a consortium of 25 partners.

The project focuses on five use cases within the mobility sector, two of which pertain to urban transportation systems and three to maritime transportation. These use cases serve as practical applications to test and refine the data governance platform.

Standardisation is a crucial aspect of the Mobispaces project. The team aims to contribute to standards in the mobility and AI sectors, identify and apply relevant standardisation rules, ontologies, and data models, and learn from best practices in related projects. A significant part of their work involves conducting mapping analyses to identify pertinent working groups, technical committees, standard development organizations (SDOs), and national standardisation bodies at the European level. This process helps in understanding how to integrate and implement these standards within the project's use cases.

The project has received support from HSBooster, facilitating the Mobispaces team access to a standards orientation tool and to benefit from consultancy services. This collaboration resulted in a comprehensive report that provided recommendations on EU data policies, standards, data models, and best practices. This report has been instrumental in guiding the project's standardisation activities and enhancing their landscape analysis.

The team plans to continue the landscape analysis and reach out to working groups and technical committees related to AI to further their understanding and application of relevant standards. They also seek to exchange best practices with similar projects and experts in the AI community to refine their approach. The second half of the project will focus on the technical implementation of the identified standards and data models, aiming to achieve the project's overarching goals of optimizing mobility through advanced data governance and AI analytics.

AI in Manufacturing

STAR project – Christos Emmanouilidis

The STAR project focused on developing human-centric AI solutions for manufacturing. Coordinated by Intrasoft and supported by a consortium of diverse stakeholders, the project explored three primary use cases: human-robot collaboration at Philips in the Netherlands, shared human-robot coworking spaces in a Smart Factory in Kaiserslautern, Germany, and an automotive component manufacturing company, Iberolef, in Portugal.

One example from the project involved the Smart Factory in Kaiserslautern, where visual analytics were used to detect human activities to aid robotic navigation. This approach raised privacy concerns, leading to the development of a solution using heatmaps to forecast human movement and presence without compromising privacy. Another example from Philips demonstrated how AI is transforming quality control, with humans preparing data for machine learning and interacting with AI modules to correct and guide training. This scenario also brought up concerns about tracking and privacy, addressed through a risk assessment aligned with the AI Act.

The project highlighted the evolving dynamics of human-AI collaboration, where both humans and AI enhance each other's capabilities, requiring new approaches to risk assessment. The STAR team employed a trustworthiness auditing framework and iterative design approaches that considered operational, technical, and ethical, legal, and social aspects (ELSA). This multifaceted approach ensured that the solutions were not only effective but also ethically sound.

Standardisation played a crucial role in the project, necessitating adherence to domain-specific standards in manufacturing operations, asset management, human factors, ergonomics, and emerging AI standards. It was emphasised the importance of these standards in ensuring quality and trust in AI applications.

3. Advancing Equity and Ethics in AI

AI ethics involves addressing the moral and societal implications of artificial intelligence technologies. Standardisation plays a crucial role in this domain by establishing guidelines and frameworks to ensure that AI systems are developed, deployed, and used in a responsible and ethical manner. Standardisation efforts focus on promoting transparency, fairness, accountability, and privacy in AI applications, ultimately aiming to mitigate potential risks and maximise the benefits of AI for society.

This second workshop in the series provided an overview of the standards already developed or being developed in AI Ethics and examples of project results, showcasing their frameworks.

AI ethics and standardisation in CEN-CENELEC - Alessio Tartaro, CEN-CENELEC JTC21 and University of Sassari

The intervention focused on the critical role of ethics in the AI standards being developed at the European level, specifically in response to the European Commission's AI Act. Alessio highlighted the importance of ethical considerations being deeply embedded across various AI standards, even in those not explicitly labelled as ethical standards, such as the AI Risk Management Standards and the Trustworthiness Framework. These standards address ethical concerns by incorporating measures to protect European values, fundamental rights, and by fostering trust in AI systems.

Tartaro also discussed more targeted AI ethics projects. A key initiative is the competence requirements for AI ethics professionals, which aims to define the necessary skills, knowledge, and attitudes for those working in the field of AI ethics. This project seeks to standardise the role of AI ethicists, addressing the societal and market need for clear definitions of their competencies to reduce risks and foster trust in AI systems.

He emphasised that while this project will outline the competencies and provide practical examples, it will not determine what is ethically good or bad, nor will it create new ethical frameworks, as existing guidelines like the Ethics Guidelines for Trustworthy AI already serve this purpose.

Tartaro also outlined the five main knowledge areas identified for AI ethicists, which include foundational aspects of AI, understanding ethical implications, the social impact of AI in different sectors, application of AI principles, and AI governance in relation to legal requirements such as the AI Act and GDPR.

In summary, Tartaro emphasised the necessity of defining clear competence requirements for AI ethicists, underlining the importance of developing standards that ensure AI professionals are well-equipped to handle ethical considerations in AI systems. His discussion focused on ethical tools, organizational upskilling, and the creation of a trustworthiness framework, all aimed at addressing the complexities of AI risk management and bias mitigation.

AI ethics and standardisation in IEEE - Ali Hessami, IEEE

Ali Hessami's intervention focused on the ethical challenges and responsibilities associated with AI systems, particularly from his experience leading the IEEE's ethics programmes in standardisation and certification. He emphasised the importance of addressing social responsibility in AI, noting that AI systems, or as IEEE calls them, autonomous intelligence systems, can make decisions without human validation and adapt their behaviour based on environmental feedback. This autonomy necessitates a deeper focus on ethics, especially as AI continues to be a strategic technology with significant social impacts.

Hessami outlined the key ethical concerns in AI, which include bias in decision-making, transparency and explainability, accountability, privacy, governance, fairness, and the traditional trio of safety, security, and dependability. He connected these concerns to various ethical theories, including consequentialism, deontology, and virtue ethics, to highlight the diverse philosophical foundations that inform IEEE's approach to AI ethics.

He described IEEE's proactive role in developing ethical standards for AI, notably through the 7000 series, which provides a framework for integrating ethical considerations into system design. He also discussed a certification programme initiated by IEEE in 2018, which evaluates the ethical impact of AI products and services. This programme doesn't just indicate processes but assesses products based on their accountability, bias, privacy, and other ethical dimensions, using a risk-based approach.

Hessami also introduced the concept of "ethical profiling," a process developed by IEEE to quickly assess the ethical pulse of an AI product or service at any stage of its lifecycle. This process, along with other tools like ethics characterization and certification, forms an ecosystem designed to ensure that AI technologies are developed and deployed with a strong ethical foundation.

He concluded by acknowledging the challenges in regulating AI, noting that the rapid evolution of the technology makes static regulations quickly outdated. He highlighted the necessity for a precautionary approach in AI deployment, emphasizing that independent, competent scrutiny is essential for maintaining public trust and ensuring that AI products and services genuinely adhere to ethical standards. This scrutiny is critical for validating the claims made by AI developers and for protecting societal values and rights.

In a nutshell, Hessami's presentation provided an in-depth look at the IEEE's global initiatives, including the P70xx series of AI technology standards and the Ethics Certification Programme (CertifAIEd). Hessami outlined how these standards and certification processes strive to promote transparency, accountability, and reduce algorithmic bias in autonomous and intelligent systems. He also delved into principal ethics theories, such as consequentialism, deontological ethics, and virtue ethics, and their relevance to AI. The convergence of these insights underscores the critical need for a robust standardization framework that can navigate the ethical and social implications of AI, fostering a more equitable and ethically sound technological future.

The event included a panel discussion with several project representatives:

Rita Giuffrida, MobiSpaces project, AI in mobility

The MobiSpaces project focuses on enhancing mobility through a data governance platform that optimises data paths using AI-driven mobility analytics. The project aims to create a decentralised, secure, and privacy-preserving system for handling data from sensors and IoT devices in transportation.

Key aspects of the project include:

- **Equity and Ethics:** The project emphasises data protection by design, ensuring minimal use of personal data and adherence to legal standards. The framework aims to protect data confidentiality, integrity, availability, and ensure that personal data is not unnecessarily shared or retained.
- **Data Management:** The project strives for data interoperability and minimal use of personal data. It involves five use cases in urban and maritime transportation, handling varying levels of sensitive data. The framework will ensure data accuracy, up-to-date records, and protection against unauthorized access.
- **Standards and Ethics:** The team is exploring standards for data handling and ethics, seeking to integrate insights on ethical considerations to improve their system. A landscape analyses aims to identify relevant standards and technical committees and are open to further guidance on ethical practices.

In summary, MobiSpaces is developing a robust, privacy-focused platform for managing mobility data while ensuring ethical use and protection of personal information.

Giacomo Delinavelli, STAR project, AI in manufacturing

The STAR project aimed to develop trusted, human-centric AI systems for manufacturing. Aligned with Industry 4.0 and 5.0, the project focused on improving process efficiency, human-digital twin interactions, and human-robot collaboration. Integrating ethical considerations into the project, it emphasised three main pillars: human centricity, environmental sustainability, and resilience.

- **Human Centricity:** Prioritised worker empowerment through continuous learning and adapting to digital transformation while addressing specific needs such as those of disabled individuals.
- **Environmental Sustainability:** Examined the impact of technologies on energy, water usage, and material reuse to ensure environmentally responsible practices.
- **Resilience:** Enhanced the ability of manufacturing systems to adapt to changes in demand and production needs.

Key ethical issues included balancing monitoring versus surveillance, managing sensitive data from human digital twins, ensuring transparency and stakeholder engagement, and avoiding the reduction of human roles in favour of machines. The project's approach involved raising awareness, effective communication, and maintaining accountability to uphold its ethical and operational principles.

Hrvoje Keko, SYNERGY project, AI in energy

The presentation emphasised that AI in the energy sector must address governance, ethical principles, and social impact due to the sector's critical role in everyday life. It advocated for the development of explainable and robust AI systems that respect data origins and decision-making consequences. The challenge of standardisation was also noted, highlighting the need for continued efforts to create and adhere to effective standards.

Two aspects were highlighted:

- **Energy Democratisation:** The shift from centralised to decentralised energy production—marked by the proliferation of distributed generation like solar panels and wind turbines—has introduced a wealth of new data and stakeholders into the energy landscape. This transformation is captured in projects such as Synergy, which focuses on leveraging AI to optimise data across the entire electricity value chain. Another related Horizon Europe project, [WeForming](#), extends this concept by integrating buildings into the energy system, turning them into active participants in energy management.
- **System Complexity and Interconnectedness:** The increased complexity of the power system, driven by more renewables and diverse participants, heightens the risk of significant failures, as illustrated by recent cascading blackouts in Albania and Greece. These events underscore the complex decision-making processes across different time scales in the energy sector.

During the debate, two key questions were raised:

1. Will standards developed for the AI Act harm EU competitiveness and innovation?

The speakers argued that regulation, including the development of standards, is not necessarily detrimental to innovation or competitiveness. Historically, Europe's lack of competitiveness in AI is not solely due to regulation, as the AI Act has only recently been introduced. Well-crafted standards can actually support innovation by making compliance easier and less costly. While it is true that SMEs might face challenges with conformity costs and lack of expertise, standards can benefit them by providing clarity and reducing compliance costs. Additionally, ethical analysis can enhance market positioning and product value. It was also noted that standards, when well-designed, do not inherently stifle innovation but rather guide responsible and effective use of technology.

2. What is the strategy for achieving cross-domain AI applications, and will the domains be compatible?

The strategy for cross-domain AI applications involves ensuring that AI systems can operate effectively across different domains by addressing compatibility and integration issues. The debate highlighted that, while there may be short-term costs and limitations due to regulatory compliance, such as adhering to GDPR and copyrights, long-term benefits include enhanced trustworthiness and broader adoption of AI technologies. Regulations and ethical principles aim to create a more reliable and transparent digital environment, which can, in the long run, support cross-domain applications and foster innovation. The focus should be on balancing short-term regulatory challenges with long-term gains in trust and market growth.

4. AI Standardisation: Challenges & Opportunities on AI & Emerging Technologies - SME perspectives

The emergence of Artificial Intelligence (AI) and Blockchain technologies presents new standardisation challenges for SMEs in Europe, requiring a proactive approach in adapting to evolving needs and requirements such as the AI Act. These challenges include addressing issues related to transparency, accountability, and data privacy, and ensuring that AI systems align with societal values. In parallel, a rapid evolution of blockchain technologies brings the need to ensure interoperability and maintain the security of their transactions. SMEs face the task of navigating the evolving landscape of blockchain standards to ensure the integrity and efficiency of their operations.

This last workshop of the series focused SME needs and concerns in alignment with the application of the AI Act in the near future and the development of new standards.

Olivier Blais - ISO/IEC JTC1/SC42

Co-founder and CTO of [Moov AI](#), a Montreal-based AI consulting startup, Olivier Blais shared his journey and insights on AI standardisation, particularly for small and medium-sized enterprises (SMEs). As the Chair of the Canadian Mirror Committee for ISO/IEC SC42 on Artificial Intelligence, he emphasised the importance of standardisation in ensuring high-quality, reliable, and safe AI systems. His experience highlighted the ad hoc nature of early AI development and the lack of best practices, which led him to explore and advocate for comprehensive standardisation tools provided by ISO/IEC.

Oliver detailed his involvement with ISO/IEC, explaining its role in international standardisation and its collaboration with the International Electrotechnical Commission (IEC) to create standards applicable globally. He stressed that while

certifications can be costly and time-consuming, standardisation offers a valuable set of best practices that are especially beneficial for SMEs. He pointed out the direct relationship between international standards and emerging regulations, such as Canada's Artificial Intelligence and Data Act and the EU AI Act, which underscore the relevance of these standards in meeting regulatory requirements.

Focusing on [ISO/IEC 42001](#), Oliver explained that this standard provides a framework for establishing, implementing, maintaining, and improving AI management systems within organizations. It integrates best practices from other standards, such as ISO/IEC 27001 on security, making it easier for organizations to adopt multiple standards. He highlighted the risk-based approach of ISO/IEC 42001, which emphasizes understanding and mitigating risks associated with AI systems.

To assist SMEs in implementing these standards, Oliver introduced an ongoing project to develop a practical guide tailored to their needs. This guide aims to offer clear, actionable guidance on adopting ISO/IEC 42001 best practices, addressing common questions about AI systems, certification, and necessary skills. Oliver concluded by inviting questions and further engagement from the audience, indicating that more information on the practical guide would be available in the future.

Rania Wazir, Austria NSB and Co-founder of Lewand.AI

[Lewand AI](#) specializes in consulting, product development, and research to ensure the trustworthiness of AI products. Rania's involvement in standards stemmed from a desire to ensure AI systems work correctly and benefit users.

Rania discussed the AI Act, a groundbreaking regulation that presents specific challenges for SMEs. The high-level nature of the regulation creates uncertainty for smaller enterprises about whether their products fall under the regulation and how to comply. SMEs often act as integrators in the AI value chain, complicating compliance as they rely on others' work without clear guidelines on what they can require from these partners.

To address these challenges, Rania emphasised the need for clear, simple, and effective requirements and tools for SMEs to ensure compliance and develop trustworthy AI systems. She suggested leveraging existing quality control processes and adding new layers to address AI-specific requirements, including values like fundamental rights. Standards play a crucial role in tackling issues such as communication, transparency, testing, and managing AI systems throughout their lifecycle.

Rania highlighted the importance of harmonized standards within the European context, which provide a presumption of conformity, simplifying compliance with AI Act requirements. She outlined the approach to the standardisation request from the European Commission, focusing on developing a comprehensive body of standards to ensure companies can be certified as compliant with the AI Act.

The urgency of the AI Act has accelerated the timeline for developing these standards.

Emilia Tantar - CEN-CLC JTC 21

Emilia Tantar, convener of Working Group 2 on operational aspects within [CEN-CLC JTC 21](#) and President of the Luxembourg National Mirror Committee on Artificial Intelligence, provided an overview of the EU AI legislative framework and its impact on standardisation. Representing [Small Business Standards](#), which supports over 40 million SMEs in Europe, she focused on how standards play a crucial role in supporting the European AI Act.

Emilia explained that the EU AI Act adopts a risk-based approach, categorizing AI systems into levels of risk: unacceptable, high, limited, and minimal. Standards, while not mandatory, help clarify requirements and support compliance with these regulations, especially for high-risk AI applications. They provide technical specifications to aid in conformity assessment and ensure that AI products meet safety and ethical standards before entering the market.

She emphasized the distinction between legislation and standards. Legislation is mandatory and created by public authorities, while standards are voluntary, consensus-based, and developed by independent organisations. Standards offer detailed specifications for testing, quality management, and risk management, complementing existing regulations like GDPR and the Digital Services Act.

Emilia also highlighted the collaboration between European and international standardisation bodies, such as CEN, CENELEC, and ISO, to harmonise standards and support regulatory compliance. She discussed the role of standards in risk and quality management and stressed that they help reduce compliance costs and provide a structured approach to meeting legislative requirements.

In conclusion, Emilia encouraged engagement with standardisation processes and invited those involved in AI development to participate in ongoing discussions and contribute to the development of relevant standards.

Cedric Gouy-Pailler, KINAITICS Project

The [KINAITICS](#) project focuses on the intersection of artificial intelligence and cybersecurity, addressing the challenges and opportunities posed by AI in protecting critical infrastructures.

The project, initiated 18 months ago, aims to safeguard systems that integrate physical, cyber, and AI components. This involves addressing vulnerabilities introduced by AI in systems that impact both the digital and physical worlds, such as railways where AI decides on train operations based on physical measurements.

Cedric highlighted the project's collaboration with KU Leuven on legal and standardisation aspects, particularly the need to go beyond existing legislation. Following feedback from the European Commission, the KINAITICS team sought

assistance from HS Booster to identify relevant standardisation initiatives. HS Booster provided crucial support by connecting the project with appropriate working groups and experts, offering recommendations, and facilitating communication with ongoing standardisation efforts.

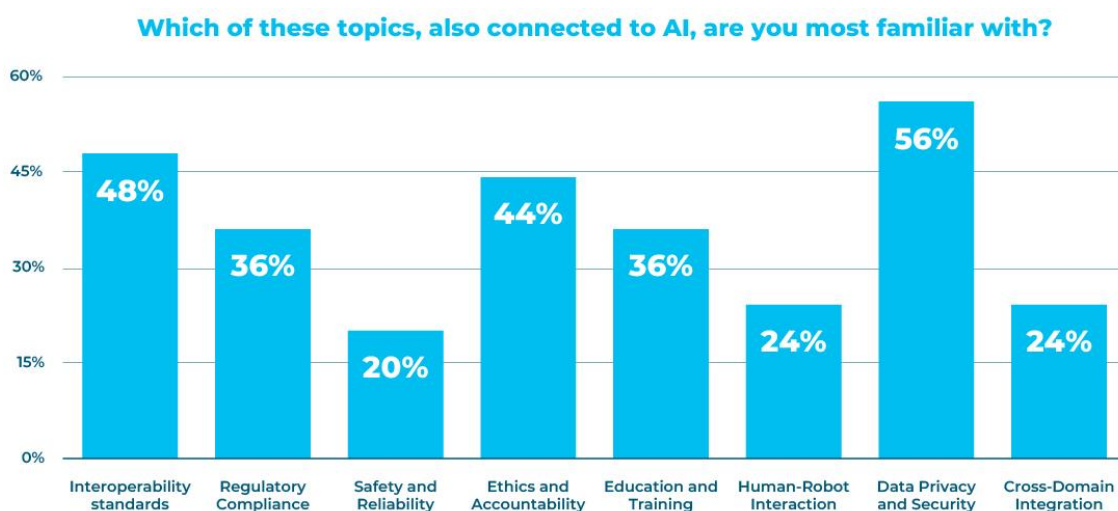
It was also discussed the integration of insights from another European project, [Safe4Soc](#), which focuses on cybersecurity standards. The KINAITICS Project aims to apply the standardisation methodologies to its own use cases, such as railways, enhancing both the project's technical and standardisation processes.

Overall, the collaboration with HS Booster enabled the KINAITICS Project to navigate complex regulatory and standardisation landscapes, align its efforts with European and international standards, and improve its approach to integrating AI and cybersecurity.

5. Analysis of poll results

An online poll was conducted to gather insights from the participants on the evolving needs within the domain of AI standardisation during the three workshops. The primary goal of the poll was to evaluate the current maturity levels of key elements in AI standardisation and identify areas where additional support or development is required. By collecting and analysing this data, we aim to better understand participant perspectives and address emerging challenges in the field.

General familiarity of participants



The poll results offer a generalist view of the participants (n=25) familiarity of the areas within AI and standardisation. Not surprisingly, **Data Privacy and Security**, covering standards like GDPR and ISO/IEC 27001, emerges as a top topic with **56%** familiarity indicating significant emphasis on cybersecurity in AI applications.

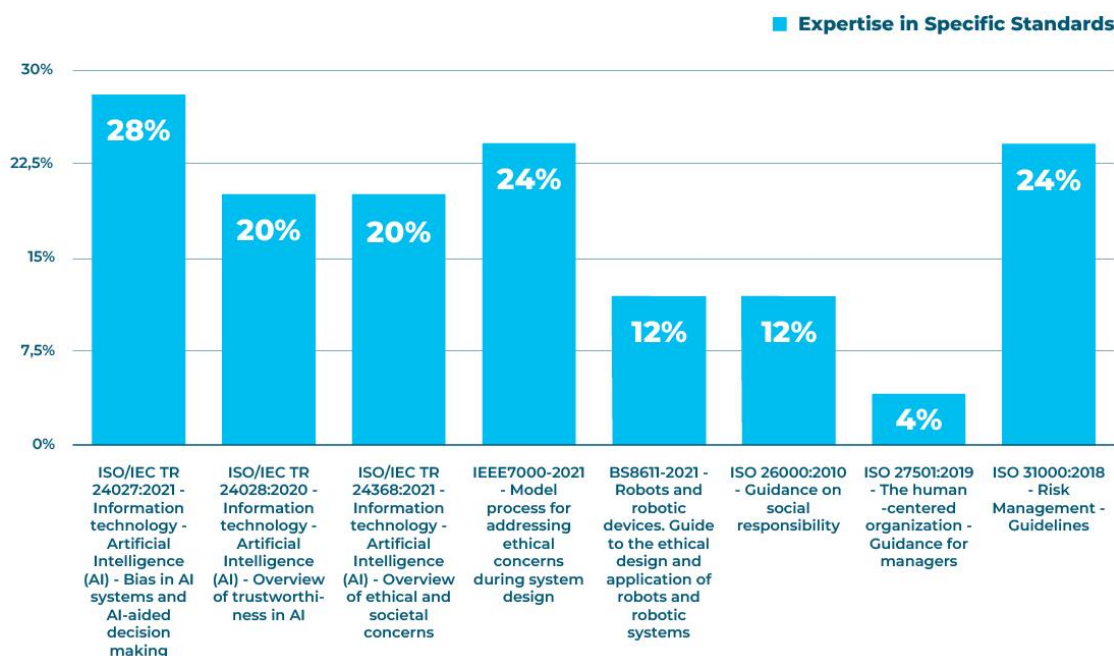
Interoperability also ranks high, with **48%** valuing the seamless integration of systems through standards like ISO/IEC 27001 and IEEE 802.11. The importance of ethical guidelines is underscored by the **44%** who prioritize **Ethics and Accountability**, reflecting ongoing concerns about the moral implications of AI.

On the other hand, **Safety and Reliability** receive comparatively less familiarity at **20%**, suggesting a potential area for increased awareness and development. Similarly, **Cross-Domain Integration** and **Human-Robot Interaction** both stand at **24%**, indicating these are less known items. The results for **Regulatory Compliance** and **Education and Training** both at **36%**, highlight a slightly better awareness in complying with legal standards and enhancing skill sets in the AI field.

However, noting maximum percentage above as 56%, it is clear that work on familiarising the stakeholders with standards should continue while the figure above indicates areas of less focus versus areas more advertised and more developed.

Specific knowledge of standards

Only 10 out of 25 participants answered questions related to specific standards. Reflecting this in the total percentage, the following chart is produced:



The revised survey data offers a look at the concerns within the domain of artificial intelligence, highlighting varied levels of focus on ethical and regulatory issues. **ISO/IEC 24027:2021**, addressing bias in AI systems, shows a notable awareness level at **28%**, emphasizing the ongoing challenge of ensuring fairness in AI-driven decision-making. The attention to **ISO/IEC TR 24028:2020** and **ISO/IEC TR 24368:2021**, both standing at **20%**, reflects significant awareness of the need for

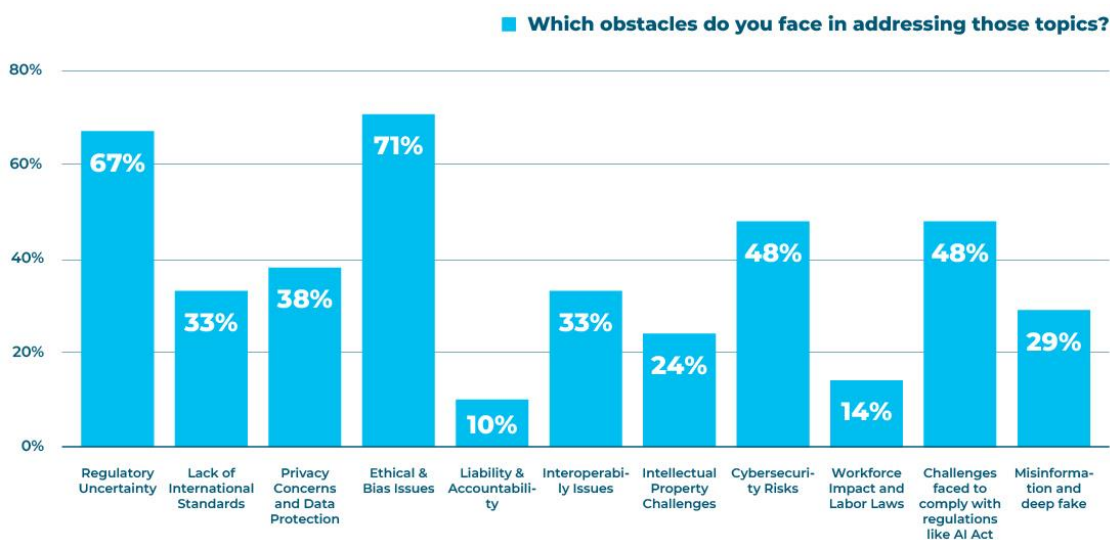
trustworthiness and a thorough understanding of ethical and societal implications in AI applications.

IEEE 7000-2021, which focuses on ethical concerns during system design, captures **24%** interest, indicating a strong commitment to embedding ethical considerations throughout the design process. **ISO 31000:2018**, also at **24%**, highlights the importance placed on robust risk management guidelines to mitigate potential downsides of AI technology deployment.

Less emphasized but still critical, **BS8611-2021** and **ISO 26000:2010** each garner **12%**, pointing to ongoing concerns about ethical robotics design and the broader implications of social responsibility. The least attention is given to **ISO 27501:2019** at only **4%**, suggesting minimal focus on human-centered management practices within the context of AI, which may indicate an area requiring further attention to ensure that AI advancements align with human-centric organizational goals. Noting that only 10 out of 25 participants responded to queries regarding specific standards suggests that a majority may lack either awareness or confidence in these areas. In contrast, the general familiarity indicated by the first plot reflects a broader level of topical understanding.

Overview of obstacles and barriers faced

When participants were asked about barriers faced and obstacles ahead the following responses were provided.



The survey sheds light on a range of obstacles related to artificial intelligence, with **Ethical and Bias Issues** leading at **71%**. This prominent concern underscores the challenge of maintaining ethical integrity and minimizing bias in AI systems. **Regulatory Uncertainty** also stands out at **67%**, reflecting the complexities and the dynamic nature of AI regulations which stakeholders find difficult to navigate.

Cybersecurity Risks and Organisation and Management Challenges are both notable at **48%**, highlighting the struggles with securing AI systems against cyber threats and adapting organizational frameworks to comply with stringent regulations like the AI Act. **Privacy Concerns and Data Protection** at **38%** emphasize the ongoing necessity to safeguard personal data against breaches in a heavily data-centric environment.

Further concerns include **Interoperability Issues and Lack of International Standards**, each at **33%**, indicating challenges in achieving seamless functionality across diverse systems and the need for universally accepted standards. The threat posed by **Misinformation and Deep Fake** technologies also draws considerable attention at **29%**, showcasing the growing need to manage the integrity of information in the digital age.

Other highlighted issues are **Intellectual Property Challenges** at **24%**, **Workforce Impact and Labor Laws** at **14%**, and **Liability and Accountability** at a mere **10%**, pointing to specific areas where the rapid advancement of AI technology impacts legal and human resource domains.

In addition to these ranked concerns, participants provided a set of keywords to express additional obstacles not explicitly listed in the survey options:

- **“Lack of resources” and “Lack of training”**, including specific training on AI ethics, suggest gaps in available support and educational measures for stakeholders.
- **“Prepare for changing job profiles” and “Formal Education”** emphasise the need for career adaptation and structured learning paths in response to evolving AI technologies.
- **“Lack of alignment in terminology” and “Overconfidence in AI”** indicate miscommunications and misplaced trust within the field.
- **“EU global competitiveness” and “Access to TCs”** (Technical Committees) highlight broader concerns about Europe’s position in the global AI market and accessibility issues related to essential regulatory bodies.

6. Recommendations for R&I projects, SMEs, SDOs, Policy makers

Based on the outcomes of the workshops and the analysis provided in the report, this chapter concludes with a set of recommendations for research projects, SMEs, and policymakers involved in AI standardisation

For Research Projects

- **Collaborate with standardisation bodies:** Establish partnerships with ongoing standardisation efforts (e.g., ISO, CEN-CENELEC) to ensure

research outcomes align with existing and emerging AI standards. Develop a roadmap to contribute research findings to technical committees, ensuring research outputs are compatible with industry standards.

- **Ensure project teams include standardisation expertise:** Include members with expertise in standardisation within project teams. This can be achieved by hiring standardisation specialists or providing training to team members to develop these skills.
- **Develop prototypes with standards in mind:** During the prototyping phase, ensure that AI models adhere to recognised standards such as ISO/IEC 24027 for AI bias and fairness or ISO 31000 for risk management. This approach will ease the transition from research to industry application and reduce barriers to adoption.
- **Integrate risk management frameworks:** For high-risk AI systems (e.g., in healthcare or autonomous vehicles), incorporate risk assessment frameworks aligned with the AI Act and relevant standards. Addressing risks early in development can help ensure trustworthiness and regulatory compliance.
- **Embed ethical principles into AI design:** Incorporate ethical guidelines into AI system design by using tools like the IEEE 7000 standard for ethical design of autonomous systems. This will enhance public trust in AI technologies and help meet future regulatory requirements.
- **Develop use cases as standardisation examples:** Use project outputs as practical examples in the development or refinement of standards. Document and share use cases that highlight the project's contributions to standardisation.
- **Foster collaboration with similar projects:** Strengthen ties with other AI projects, sharing knowledge, data, and best practices around standardisation. Successful examples like the Synergy project in energy or the IDERHA project in healthcare demonstrate the value of aligning AI research with domain-specific standards.
- **Support cross-domain collaboration:** Encourage collaboration also between different Horizon Europe projects and across various domains to identify common standardisation needs. Foster synergies to streamline standardisation efforts.
- **Dissemination strategy:** Develop a dissemination strategy that includes the project's contributions to standardisation. This should target both technical audiences and policymakers to influence the adoption of standards.

- **Pathways for exploiting project outcomes:** Establish clear pathways for exploiting project results, focusing on practical adoption and contributions to existing or new standards.

For SMEs

- **Use standards to enhance competitiveness:** Engage actively in standardisation efforts to gain an edge in emerging fields like AI and IoT. Compliance with standards such as ISO/IEC 42001 for AI management systems can open new markets and reduce the costs of meeting regulatory demands.
- **Access practical guides for standards implementation:** Make use of simplified guidance on AI standards, such as those provided by ISO/IEC SC42. These guides offer actionable steps for SMEs to adopt standards without requiring deep technical expertise.
- **Prioritise data privacy and security:** Ensure that AI systems comply with data privacy regulations (e.g., GDPR) and standards like ISO/IEC 27001. Building privacy-conscious and secure systems will help SMEs establish user trust and meet regulatory expectations.
- **Invest in training and upskilling:** Provide employees with training on AI ethics, bias mitigation, and risk management. Upskilling workers on compliance with the AI Act and relevant standards will prepare SMEs for evolving AI regulations and practices.
- **Ensure interoperability for ecosystem integration:** Design AI systems to be interoperable with other systems, adhering to standards like IEEE 802.11. This will position SMEs to collaborate more easily with other players in the broader AI ecosystem.

For policymakers:

- **Promote AI standardisation as a policy tool:** Encourage the adoption of AI standards by creating incentives for companies, especially SMEs, to comply with key AI standards. This could include grants or tax incentives for organisations that follow standards like ISO/IEC 24027 (AI bias) or ISO 31000 (risk management).
- **Facilitate access to standardisation processes:** Support SMEs and research projects in engaging with technical committees (TCs) by simplifying access and offering subsidised participation. Make the standardisation process transparent and open to all stakeholders.

- **Streamline AI Act compliance through harmonised standards:** Work closely with European and international standards bodies to ensure harmonised standards provide a clear pathway to compliance with the AI Act. Reducing complexity will make it easier for stakeholders to navigate the regulatory landscape.
- **Support education and public awareness:** Develop education programs and public campaigns to raise awareness about the importance of AI standardisation in creating trustworthy, ethical, and secure systems. Encourage universities to include AI ethics and standardisation in their curricula.
- **Establish public-private partnerships for standardisation:** Create partnerships between public bodies and industry to facilitate the development and implementation of AI standards. These partnerships can help fast-track the market readiness of AI technologies by allowing businesses, particularly SMEs, to pilot solutions that meet standards.