ISO/IEC JTC 1 "Information technology"
Secretariat: **ANSI**
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JTC 1/SC 42 Business Plan - 2024

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Description

This document is circulated for review and consideration at the November 2024 JTC 1 Plenary.

SC 42 Strategic Business Plan
Artificial Intelligence

Period Covered: October 2023 through September 2024

1 Executive Summary

Background and Overview

At the 32nd ISO/IEC JTC 1 Plenary in Vladivostok, Russia, Resolution 12 established SC 42 as a system integration entity for Artificial Intelligence subject to ISO TMB and IEC SMB approval. The resolution also appointed Mr. Wael William Diab (US) as Chair of the committee. ISO was assigned as the administrator of the committee. Ms. Heather Benko (ANSI) was appointed as the Committee Manager.

The inaugural meeting was held in Beijing, China, 18th – 20th April 2018, during which resolutions were adopted to address comments from the ISO TMB review. The resolutions and associated contributions were ratified by JTC 1 and provided to the ISO TMB and IEC SMB, who then completed the ratification and establishment of SC 42 in May of 2018. Specifically, a resolution (SC 42 N078 Beijing Resolution 2) for the inclusion of societal concerns in SC 42 program of work was passed. This resolution was approved by ISO TMB resolution 53/2018.[1]

Further, a resolution (SC 42 N078 Beijing Resolution 1) to endorse the JTC 1 resolution (JTC 1 Vladivostok Resolution 13) to transfer the Big Data work program from JTC 1/WG 9 to SC 42 was passed. Based on the two resolutions and in consultation with the TMB Secretary, the JTC 1 Secretary transferred the Big Data program of work to SC 42 on May 7th 2018 and JTC 1/WG 9 was disbanded (SC 42 N088 and JTC 1 N13712).

The second, third and fourth plenary meetings were held in Sunnyvale, Dublin, and Tokyo. The fifth through the tenth plenary meetings were held virtually in response to the global COVID-19 pandemic. Following the pandemic, SC 42 returned to a hybrid plenary format meeting in Berlin, Vienna and Seoul respectively for the eleventh through the thirteenth plenary meetings.

At the end of the plenary meetings a number of projects were approved and an updated structure for the program of work was established to reflect the approvals. The committee's leadership team, that consists of the committee chair and committee manager, the subgroup convenors and secretariats, and the editors, then works proactively to implement the agreed upon work program.

The scope of SC 42 is:

Standardization in the area of Artificial Intelligence

- Serve as the focus and proponent for JTC 1's standardization program on Artificial Intelligence
- Provide guidance to JTC 1, IEC, and ISO committees developing Artificial Intelligence applications

Scope of the Business Plan

This business plan focuses on the output of the committee since the last version submitted in 2023.

[1] IEC indicated that no further action is needed on their part as the original approval included societal concerns

2 Environment

Fueled by technologies like AI, the digital transformation promises to change how we live, work and play for the better. Nonetheless, this transformation has also changed the landscape for standardization as the underlying technologies become ubiquitous in their use. For instance:

- Emerging non-technical requirements such as ethical and societal considerations and the ability to design trustworthy systems are key aspects
- Stakeholder diversity has increased considerably (e.g. regulatory, social science, economic etc.)
- Early engagement by the various stakeholders has become the norm
- The application domains and associated use cases have increased dramatically
- Understanding uses, proving business cases and developing standards are now concurrent
- The "data ecosystem" is as important as hardware, software and operational technologies
- Enabling certification, 3rd party audit and increasing end-user confidence increasingly important

In response to the changing landscape and in an effort to address barriers to adoption while simultaneously dealing with emerging challenges, SC 42 has adopted a holistic ecosystem approach. This approach takes into account the context of use of the technology to develop technical requirements by looking at both technology capability and emerging non-technical trends and requirements. Moreover, the horizontal and foundational deliverables that SC 42 produces can bridge innovation communities such as application SDOs, research, and open-source communities.

The promise of digital transformation coupled with the continued and rapid innovation in AI has also changed the dynamic of how AI systems are being deployed. Traditionally, AI systems focused on large scale problems that were either too hard and complex to solve with traditional compute methods or were in specialized niche areas. This is no longer the case ML and GenAI have widened AI's applicability. Digital transformation has created an unprecedented demand for AI-based services and more intelligent analytics. Fueled by efficiency gains and an ability to turn what used to be science fiction to science faction, AI innovation and adoption continue to accelerate. **Simply put, AI is changing how we live, work and play**.

AI applications are numerous and diverse touching every vertical from consumer, retail, digital assistants to expert systems such as smart grid, marketing intelligence tools, enterprise, manufacturing, transportation, financial, healthcare etc. The **transformative effect has yielded economic and societal benefits across geography and verticals**. Illustrative examples include:

- Trustworthy AI expert systems are helping **healthcare** professionals make better decisions for patients
- AI in **smart manufacturing** is driving higher efficiencies by allowing robots to safely work alongside human workers
- AI-powered **financial applications** have brought enterprise banking services to a wider community and increased financial coverage

Thus, it is not surprising that IDC estimates by 2025, Global 2000 (G2000) organizations will allocate over 40% of their core IT spend to AI-related initiatives, leading to a double-digit increase in the rate of product and process innovations. The market is forecast to accelerate further where worldwide spending on AI solutions will grow to more than $500 billion in 2027. **AI technology is becoming ubiquitous and the ecosystem continues to be ripe for standardization**.

3 Accomplishments and benefits

SC 42 received the prestigious ISO LDE award in 2023. This reflects the leadership, strategic management, outreach and execution that SC 42 has undertaken. The committee leadership team, project teams and national bodies, whose experts are essential to our work, have done an outstanding job leading in this space and adjusting to an ever-changing technological landscape. SC 42 has continued to apply the best practices that led to this achievement and reinforce the ISO and IEC strategies.

3.1 Accomplishments

Since the last report, SC 42's key accomplishments and highlights include

- Publications
  - Progress across **program of work:** ***Foundational*** ISO/IEC 42001 **MSS**; ***Data*** ISO/IEC 5259 **Data Quality** series -1, -3, -4**;** ***Trustworthiness*** ISO/IEC 25058 **SQuaRE**; ISO/IEC 8200 **Controllability**; ISO/IEC 24029-2 **Robustness**; ***Applications*** ISO/IEC 24030 **Use Cases**; ISO/IEC 5338 **AI system life cycle**; ISO/IEC 5339 **Guidance for AI Applications**; ***Computational*** ISO/IEC 5392 **Knowledge Engineering**; ISO/IEC 17903 **ML Computing Devices**
- Growth by the numbers
  - **Projects: 32** published (12 since last update). **44** active of which **23** new projects added to the work program since last update

  - **Participation: 65** NBs (40P/25O) ~10% growth. **>250** at meetings. **800+** unique experts, **70+** liaisons (17 Cat A/ 2 Cat C). **1** new JWG **NLP**. **1** new JAG **Sustainability**
- Growth in the diversity of the work program and ecosystem coverage
  - **Extension** of existing areas including: additions to **portfolio to enable responsible, auditable and certifiable AI systems**; amendments for **generative AI**; **neural networks; SQuaRE**; **evaluation metrics for use cases and applications; performance measurement**; concepts and terminology part 2 on **healthcare**; 3-part series on **functional safety**;
  - **New areas** include **taxonomy**; **system logging**; **nudging; de-identification of training data**; **generated data for analytics and ML**; **ODD**; **labels**; **reliability**; **human oversight**; use cases of **human-machine teaming**; **hybrid AI inference**; **lightweight AI systems; model training efficiency; uncertainty quantification**; **natural language processing;**
  - Healthy **pipeline of new ideas** for additional projects and roadmap planning at the **SC and WG** levels. All SC 42 subgroups go through **annual strategic planning**
- ISO/IEC Workshop Series
  - Bi-annual workshop series bringing AI luminaries to discuss AI ecosystem including emerging trends, technology, requirements, applications and the role of standards. ~800 registrations per session. Application areas covered: 4th – cinema; 5th healthcare. Registration for 6th workshop in December is open
- Extensive outreach activities, media/comms coverage and collaborations (internal and external)
  - 20+ articles and multimedia engagements. These include IEC / ISO published content and external publications. **>2K *new* SC 42 LinkedIn followers!!**
    - **Thank you to IEC Comms (Mike, Clare, Laura, Yusra, Gabriella), ISO Comms (Liz, Vivienne, Catherine), IEC Academy (Ian, Giulia)!**
  - Strategic outreach including ATxSummit Singapore, CoE, OECD, G7, MLCommons, WTO policy dialogue, various NBs and NB hosted workshops
  - Collaborations: IEC: 65A, CAB, SMB AHG. ISO: GA, 37, 68, SMCC, CASCO. JTC 1: 7, 27, 29, 32, 37, 38, 39, 41. EC, UNESCO, WTO, WEF, OCEANIS
- Meeting hosts planned through 2026. In addition, SC 42 continues to receive hosting offers from NBs.

3.2 UN SDGs

Projects support of the majority of UN SDGs

- Currently 13 of the 17 (1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 16) are directly supported
- New projects anticipated to continue to support these SDGs as well as other ones
- Not surprising as AI is a key enabler to digital transformation. Broad responsible adoption helping improve the way we live, work and play
- AI enables all stakeholders to make prompt and assist better decisions as they get adopted into vertical domains. From that perspective **all UN SDGs would be supported** through application domain standards that leverage SC 42 work

Examples of How SC 42 is Supporting the UN SDGs

- Foundational (WG 1) supporting goals 5, 7, 8, 9, 10, 12, 14 via ISO/IEC 42001 and goals 5, 8, 9, 10, 12 through 42005
- Data (WG 2) directly and indirectly (applications of the AI data and Big Data projects) supporting goals 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 15. ISO/IEC 5259 data quality series provides standard tools and methods to organizations in management and operation to assess and improve the quality of data used for analytics and ML via the data life cycle
- AI use cases and applications (WG 4) a relevant SDG is indicated for each of the use cases included in TR 24030:2021 (and TR 24030 ed.2). Most of the goals are covered by the use cases. “Industry, Innovation and Infrastructure” has the highest number of use cases and “Good Health and Well-Being” the second
- Computational are (WG 5) support for UN SDG Goal 8: Decent Work and Economic Growth and Goal 9: Industry, Innovation and Infrastructure by providing practical methodologies and theoretical reference architecture that leverage performance of AI computational approaches and computing devices to support industrialized implementation

SC 42 has setup a joint advisory group (JAG) with SC 39 to roadmap in the area of AI and sustainability. The JAG will look at the application of AI to global sustainability challenges as well as the sustainability of AI.

A full list of the SC 42 projects contributing to the SDGs can be found at the SC 42 website (https://www.iso.org/committee/6794475.html).

4 Participation and cooperation/collaboration

4.1 Participation and membership

As of this report, SC 42 has 45 P-members and 25 O-members. This represents **~10% growth** in national bodies participating in SC 42 since the last report. The membership of the committee has experienced a healthy and steady growth every year since its inception. SC 42 continues to maintain **>33% developing country** NB participation. For a complete current list of membership, please refer to the ISO website: https://www.iso.org/committee/6794475.html.

In addition, the attendance at hybrid plenaries is **~250** attendees split evenly between physical and virtual. There are **800+** unique experts across the committee.

4.2 Collaboration

SC 42 has built an extensive ecosystem of over 70 liaisons that include 17 Cat A and 2 Cat C. This is a growth of **~15%** since last year. A detailed list of liaisons can be found on the committee's website (https://www.iso.org/committee/6794475.html).

It is anticipated that the liaison partnerships will continue to grow over the next year.
SC 42 develops horizontal standards. SC 42 works closely with ISO and IEC committees enabling AI applications
Examples include

- ISO/IEC JTC 1/SC 40. Governance implications of AI. Status: JWG. Completed
  - JWG 1 administered by SC 42. Work is complete
- ISO/IEC JTC 1/SC 7. Testing of AI-based based systems. Status: JWG. Ongoing
  - JWG 2 administered by SC 42. 2 projects currently assigned (ISO/IEC 29119-11 and 17847)
- ISO TC 215. AI-Enabled Health Informatics. Status: JWG. Ongoing
  - JWG 3 administered by SC 42. 2 projects currently assigned (ISO/IEC 18988 and 22989-2)
- IEC SC 65A. Functional safety for AI Systems. Status: Collaboration on TR (published). Status: JWG. Ongoing
  - JWG 4 administered by SC 42. 4 projects currently assigned (ISO/IEC 22440 multipart series -1, -2 and -3, and 25223)
- ISO TC 37. Natural Language Processing. Status: JWG. Ongoing
  - JWG 5 administered by SC 42. 2 projects currently assigned (ISO/IEC 23281 and 23282)
- ISO/IEC JTC 1/SC 39. Liaison input on SC 42 sustainability project. Joint AG on AI Sustainability. Ongoing
  - JAG administered by SC 42. In addition, ISO/IEC 20226
- ISO/IEC JTC 1/SC 27. Security, cybersecurity and privacy protection for AI. Status: Enhanced liaison. Ongoing
- IEC CAB to enable conformity assessment based on SC 42 standards. Convened IEC CAB AI TF WG 1. Ongoing
- Supports a variety of IEC, ISO and JTC 1 committees on projects related to AI through liaison e.g. JTC 1/SC 29, JTC 1/SC 38, JTC 1/SC 41, ISO TC 204, IEC SyC AAL, IEC ACOS Collaborative Safety TF, ISO SMCC etc.

Examples of discussions for future collaboration

- ISO TC 68. JWG for AI and Financial Services
- ISO TC 36. AI and Cinematography. Liaison established. Possible joint work in the future

In addition, SC 42 has setup temporary or long-term AHGs/AGs for specific collaborations such as with SC 27, SC 38 and CEN/CENELEC JTC 21. Furthermore SC 42 has assigned representatives to various JTC 1, ISO and IEC initiatives such as SMCC, ACOS, SMB AHGs and JTC 1 AHGs/AGs as well as reviewed and provided input to ISO and IEC initiatives such as the UN framework.

5 Objectives and strategies to achieve them

5.1 Overview

As noted in section 1, SC 42 considers the entire AI ecosystem when developing its strategy. Technologies like AI, Big Data and associated analytics are anticipated to positively change how we live, work and play enabling the next wave of digital transformation. The anticipated broad use requires a new approach to standardization that

- Considers *context of use* of the technology
  - Looks at technology capability, non-technical requirements (e.g. business, regulatory, policy, ethics) and a wide cross section of application domain needs and representative use cases
- Translates the above into *technical requirements*

- Creates a platform of *foundational horizontal standards* that communities can leverage e.g. terminology, use cases, application guidance, MSS, frameworks and reference architectures
- Provides a *forum for innovation* and facilities *an ecosystem of partners* by bringing communities together (e.g. research, SDOs and open-source communities) and providing building blocks

The result simultaneously *accelerates technology adoption* while considering context of use to ensure *responsible adoption.*

SC 42 has adopted this **holistic ecosystem approach** providing the glue between requirements and technical requirements through the platform of horizontal deliverables the committee develops. The diagram below summarizes SC 42's novel approach.

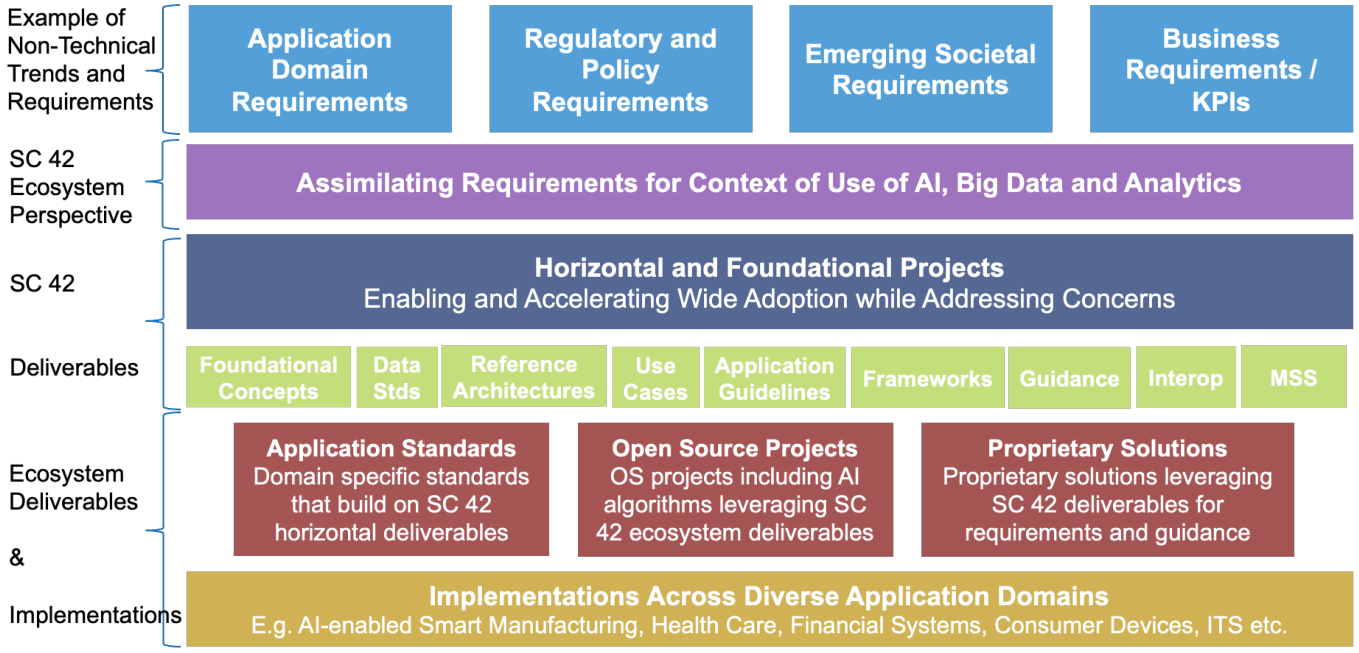


Figure 1: Bridging the Gap – An Ecosystem Approach

Looking forward, SC 42 continues to strategically focus on the following aspects:

- Strategic
  - Identifying additional horizontal technologies: innovation is rapidly driving changes, and enhancements to AI technology and it is crucial for SC 42 to keep up on the standardization front
  - Extensions of existing work projects: to ensure more comprehensive standards coverage
  - Further application domain (vertical) collaboration: to leverage ISO and IEC's family of committees covering a wide range of applications and ensuring broad responsible adoption across sectors
  - Continued focus on conformance, governance, regulatory, societal concerns and ethical aspects: to ensure responsible adoption while realizing the societal benefits of AI innovation
  - Identifying emerging areas and trends e.g. sustainability projects
  - Continue to engage new stakeholders in the development of SC 42 deliverables
  - Continue to engage national bodies: to expand coverage and participation:
    - Bring in new NBs
    - Engagement with existing NBs to ensure broader and deeper participation e.g. through targeted outreach and workshops
  - Outreach to support the above
    - Build on successful workshop program. Including
      - Identifying new application domains
      - Working with comms to transform materials into easily consumable content e.g. short videos
      - Engagement with broader media outlets and diversify medium usage
    - Continue with successful outreach program and promotion in partnership with ISO and IEC comms
- Operational
  - Execution: Timely execution on the program of work
  - Quality: Maintaining quality of work products as program of work continues to expand
  - Groups: Ensure new groups setup, effective and operational. Identify cross-WG issues. Refine metrics for brainstorming
  - Committee: Meeting dates / hosts established through 2026. Pre-COVID commitments reverified and schedule adjusted accordingly

5.2 Strategic Planning and Management

To quickly meet the evolving demands that stem from emerging requirements and technology trends, SC 42 sets its work priorities by gaining insights from a variety of methods that include:

- National bodies: NB contributions guiding the direction of work (top-down)
- Strategic planning / road-mapping: To complement the other modes of collecting insights, SC 42 introduced an annual strategic planning exercise across all of its subgroups. This bottoms-up approach allows for the established groups to look at their areas of work and enables the stakeholders in those groups to weigh into the planning process. (bottom-up)
- ISO/IEC AI Workshop Series: Bi-annual workshop series described in item 4. Insights derived from these workshops are used by the committee and its subgroups. The tracks are setup to present the portfolio of work related to AI where non-committee members, including many from application areas/TCs, can provide insights (inside-out) and on topics that are broad and may lead to new work in SC 42 (outside-in)
- Liaisons: In addition to reviewing documents, liaisons play an important role to our committee in gathering insights from both vertical domains that are interested in AI applications as well horizontal technologies that co-exist with AI. By better understanding the demands in application domains, SC 42 can make better decisions on what standards to work on next (outside-in)
- Outreach: SC 42 does significant outreach to a variety of audiences from professional conferences to invitations to industry organizations to policy organizations. In addition to informing external groups of our work and enabling liaisons to be established, these activities also provide insights about AI (outside-in)
- Use-cases: SC 42 published ISO/IEC 24030:2021 and as second edition in 2024 which contained over 185 use cases. These use cases help in deriving insights of where the work of the committee can go and is often a great way for domain experts to express their needs. Our projects often refer to representative use cases from this document. Moreover, SC 42 adapted the use case template to allow for inclusion of ethical related information (outside-in)

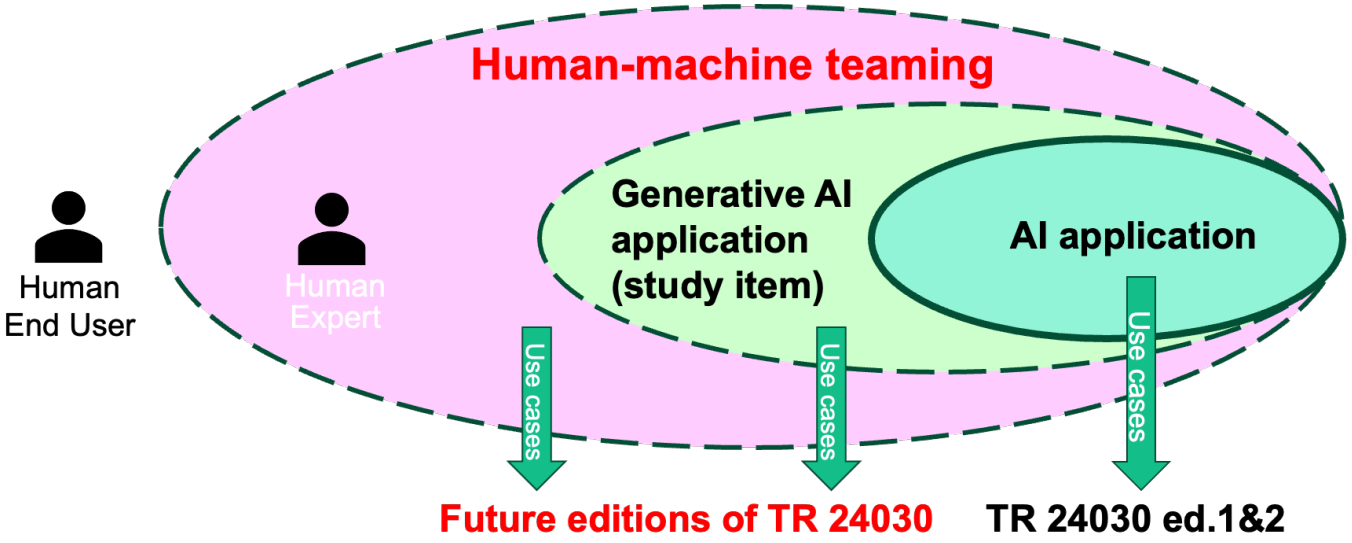
5.3 Examples of subgroup strategic road-mapping

As noted above, the committee's subgroups go through an annual road-mapping exercise that was instituted a few years ago. Below are examples from this year's exercise:

- WG 1
  - ISO/IEC 42001 Handbook for SMEs
  - AI process maturity model and related concepts
  - PWI 42114 "Guidelines for auditing of AI management system based on ISO/IEC 42001"
  - Trustworthy AI systems evaluation criteria (TAISEC)
  - Trustworthy AI systems evaluation methodology (TAISEM)
  - Implementation guidance for ISO/IEC 42001
- WG 2
  - WG 2 has incorporated road-mapping discussions as a standing agenda item in its regular meeting
  - WG 2 has been exploring the need for common description frameworks for data, data requirements, data usage, and models
  - WG 2 continues to discuss additional topics that include
    - Potential standard for testing of data used for AI specifically testing training data for bias.
    - Data management for AI data – Are there unique aspects for how data used for AI systems needs to be managed. Also, how data generated by AI systems needs to be managed.
    - Transformation of data sets between storage and computation structures – How data is organized for efficient retrieval/update is often very different than how it needs to be organized for computation.
    - How to establish/build dataset for training/tuning LLMs
    - High level view of data in the AI/ML domain mapping
    - Quantum computing and data – This specifically concerns the potential instability of data in the quantum environment – quantum computers need to deal extensively with data error corrections. Convenor will reach out to Committee Manager on efforts happening in JTC 3 Quantum Technologies
    - Group to review output of AHG 7 and their work with JTC 21 for potential collaboration
  - Potential new topics include
    - Data Quality and Integrity: Standards for ensuring the quality and integrity of the data used to train generative AI models. This includes guidelines for data cleaning, anomaly detection, and the removal of biased or sensitive information.
    - Bias Detection and Mitigation: Developing methodologies for detecting and mitigating biases in generative AI systems. This involves creating frameworks for regular auditing of AI outputs to identify potential biases based on gender, race, ethnicity, or other factors.
    - Privacy Preservation: Standards related to preserving the privacy of individuals whose data may be used in training datasets. This includes anonymization techniques, compliance with regulations like GDPR (General Data Protection Regulation), and methods for secure data sharing.

- Data Provenance: Establishing clear guidelines for tracking the origin (source) of datasets used in training generative AI models. This helps in ensuring transparency about how data is collected, processed, and utilized.
- Interoperability: Creating standards that ensure generative AI systems can work across different platforms and with various datasets without compatibility issues. This includes standardizing APIs (Application Programming Interfaces), data formats, and communication protocols. – Relate format back to taxonomy, and model

- WG 4
  - Human-machine teaming
    - Exploring potential projects on human-machine teaming
  - Use cases
    - Considering future editions of TR 24030



- WG 5
  - Investigating potential standardization in **computational approaches in AI and fields of AI**.
    - existing items: [TR 24372 Overview, TS 42112 model training efficiency, 5392 knowledge engineering]
    - potential new areas: **[Inference, lightweight modelling],** pre-trained model, multimodal learning, etc.
  - Investigating potential standardization in **assessment of AI model applicability and performance**, including but not limited to accuracy, efficiency, throughput, latency.
    - existing items: classification [TS 4213], regression, clustering, recommendation [4213]
    - potential new areas: time series, reinforcement learning, association rules etc.
  - Investigating potential standardization in **computing resources and infrastructure for AI** models and tasks
    - existing item: ML computing devices [TR 17903]
    - potential new area: **AI computing infrastructure**
- JWG 2
  - JWG 2 expert have worked to design a collaborative roadmap for AI and testing
  - JWG 2 agreed that they want to demonstrate that this is a truly joint initiative between committees and that would be best achieved by creating a new multi-part series.
  - This would target the series at an “AI” rather than exclusively “testing” audience;
  - Potential future items
    - -1: Introduction to standards on testing AI
    - -2: Overview of testing AI systems (ex-TS 29119-11)
    - -3: Verification and validation analysis of AI systems (ex-TS 17847)
    - -4: Testing ML systems without continuous learning
    - -5: Testing ML systems with continuous learning
    - -6: Testing KE systems
    - -7: Exploratory testing of LLMs (aka red teaming) – NWIP under discussion
    - -8: Capabilities of AI testing tools
- JWG 3
  - The road-mapping AHG developed and reviewed a short list of ten possibilities for consideration. In some cases these related to multiple items in the work programme. The aim of the review was to try and reduce the number of items for inclusion as roadmap items to no more than 5 and then test those recommendations with

the JWG3 membership prior to advising the SC42 Chair. Based on the discussions in the Ad Hoc Roadmap Group the recommended items for inclusion in the roadmap are:

- ISO/IEC 22989:2022 Information technology — Artificial intelligence — Artificial intelligence concepts and terminology. *This NWIP is already approved*
- A document on the healthcare domain use of ISO/IEC 42001:2023 Information technology — Artificial intelligence — Management system and ISO/IEC DIS 42005 Information technology — Artificial intelligence — AI system impact assessment. *Identified as a priority by TF 5.*
- A document on healthcare domain use of ISO/IEC TR 5469:2024 Artificial intelligence — Functional safety and AI systems, noting there are current AWIs on this topic. *By definition, functional safety is specific to particular domains and their related use cases.*
- A new Technical Report on generalizability of AI models to new populations in healthcare taking account of ISO/IEC TR 24027:2021 Information technology — Artificial intelligence (AI) — Bias in AI systems *and* AI aided decision making and ISO/IEC DTS 12791.2 Information technology — Artificial intelligence — Treatment of unwanted bias in classification and regression machine learning tasks. *The inability of models to generalize appropriately and safely to other population settings is a major concern in healthcare.*
- JWG3 to collaborate with WG4 in the development of ISO/IEC AWI TR 42109 Information technology — Artificial intelligence — Use cases of human-machine teaming. *There are many domain specific requirements for healthcare which can contribute to the general understanding of this topic.*

- Two other areas were the subject of review and discussion, and they may be considered in the future
  - Regarding the SC 42 standards on ethics, it was considered that while there are possibly more mature and sophisticated requirements demonstrable in healthcare their use is considered adequately managed through other avenues. It was suggested that the health perspective could potentially enrich the current horizontal documents.
  - While there are potentially healthcare specific requirements for the use of natural language processing and synthetic data, in each case the associated AWIs are in an early stage of development. It may be appropriate to discuss with the project teams how JWG 3 could collaborate in their development. Some commentary on the AWIs that has been provided by Professor Karin Verspoor, Dean of Computing Science at RMIT who is an expert member of the Australian Technical Subcommittee, IT-014-21 Artificial Intelligence in healthcare.

JWG3 discussed the recommended items and have include the recommended five items into the roadmap shown below.

JWG3 Work Item	SC42	Stage	Rationale	Project Editor	Schedule
AWI TR18988 Artificial intelligence — Application of AI technologies in health informatics		20.20	TR for AI-enabled health informatics	Peter Williams and Ken Imai	Ongoing
ISO/IEC 22989:2022 Information technology — Artificial intelligence — Artificial intelligence concepts and terminology– Part 2: Healthcare .	ISO/IEC 22989:2022 Information technology — Artificial intelligence — Artificial intelligence concepts and terminology	60.60	This NWIP has now been endorsed at ballot closed on 29 July.	Eric Sutherland	Commencing now
A document on the healthcare domain use of ISO/IEC 42001:2023 Information technology — Artificial intelligence — Management system and ISO/IEC DIS 42005 Information technology — Artificial intelligence — AI system impact assessment.	ISO/IEC 42001:2023 Information technology — Artificial intelligence — Management system ISO/IEC DIS 42005 Information technology — Artificial intelligence — AI system impact assessment	60.60	Identified as a priority by TF5	Michael Glickman	Commencing Jan 2025
A document on healthcare domain use of ISO/IEC TR 5469:2024 Artificial intelligence — Functional safety and AI systems, noting there are current AWIs on this topic.	ISO/IEC TR 5469:2024 Artificial intelligence — Functional safety and AI systems ISO/IEC AWI TS 22440-1 Artificial intelligence — Functional safety and AI systems — Part 1: Requirements ISO/IEC AWI TS 22440-2 Artificial intelligence — Functional safety and AI systems — Part 2: Guidance ISO/IEC AWI TS 22440-3 Artificial intelligence — Functional safety and AI systems — Part 3: Examples of application	60.60	By definition, functional safety is specific to particular domains and their related use cases.	To be determined	Commencing July 2025
A new Technical Report on generalizability of AI models to new populations in healthcare taking account of ISO/IEC TR 24027:2021 Information technology — Artificial intelligence (AI) — Bias in AI systems and AI aided decision making and ISO/IEC DTS 12791.2 Information technology — Artificial intelligence — Treatment of unwanted bias in classification and regression machine learning tasks.	ISO/IEC TR 24027:2021 Information technology — Artificial intelligence (AI) — Bias in AI systems and AI aided decision making ISO/IEC DTS 12791.2 Information technology — Artificial intelligence — Treatment of unwanted bias in classification and regression machine learning tasks Possible new TR for Healthcare	60.60	The inability of models to generalize appropriately and safely to other population settings is a major concern in healthcare.	Jeremy Petch	Commencing Jan 2025
JWG3 to collaborate with WG4 in the development of ISO/IEC AWI TR 42109 Information technology — Artificial intelligence — Use cases of human-machine teaming.	ISO/IEC AWI TR 42109 Information technology — Artificial intelligence — Use cases of human-machine teaming	20.0	There are many domain specific requirements for healthcare which can contribute to the general understanding of this topic. WG4 have presented to JWG3 on the scope of this work	(Yuchang Chen)	Ongoing

5.4 Consumer stakeholder engagement

As interest in AI continues to be strong, SC 42 continues to engage new stakeholders to ensure robust and comprehensive deliverables reflecting a diversity of stakeholder input. As an example, SC 42 has engaged the consumer sector since its formation. This has included outreach to COPOLCO when the committee was formed, implementing their recommendation for specific liaisons (e.g. CI) and inviting speakers with that expertise to our workshops. SC 42 looks forward to engaging the new JTC 1 committee in the consumer space once it is setup.

6 Factors affecting completion and adoption of the work program

The last business plan readout for SC 42 identified a number of challenges. In this section, the challenges identified from 2023 are reviewed, an overview of challenges for the upcoming year is presented along with opportunities and plans.

Key challenges identified in the 2023 business plan successfully resolved

- 2023 challenge: Balancing the expansion of the work program and executing on existing projects efficiently
  - Resolution: In addition to enhancements reported last year, CM holding training for editors at next plenary
- 2023 challenge: Broader engagement with ISO and IEC application focused committees
  - Resolution: In addition to enhancements reported last year, which include the bi-annual workshop series and keynotes to SC 42 plenaries, SC 42 leadership has dedicated significant time to working with other committees. We now have 4 active JWGs with the possibility for 2 more. This is in addition to the JWG that completed its work and the enhanced liaison with SC 27 and TC 215. Of note over the past cycle is the discussions with ISO TC 36 and 68. We now have almost *an equal number of direct WGs and JWGs* reflecting the importance of adoption of SC 42 work in vertical domains.
- 2023 challenge: Opportunity to engage additional interest categories such as consumer segments and societal as well as diversity
  - Resolution: In addition to enhancements reported last year, for interest categories we have had targeted outreach with the help of ISO CS and IEC CO. This includes targeted articles such as in consumer and regulatory publications. We have continued to build liaisons with partners that complement our perspective such as WEF. Finally, SC 42 is happy to report that 33% of its member countries represent developing nations. This reflects interest in the technology beyond those developing it
- 2023 challenge: Addressing emerging AI-specific needs and challenges with international standards
  - Resolution: In addition to enhancements reported last year, SC 42 conducted its 1st bottom-up strategic planning where all subgroups provided input
- 2023 challenge: As the program of work grows, implications on our work program, meetings and call fatigue / overlap
  - Resolution: Continued to refine meeting plenary template and the non-overlapping slots for subgroup meetings in between plenaries
- 2023 challenge: Applicability of Vienna and Frankfurt agreements w.r.t. CEN/CENELEC
  - Resolution: With support from ISO CS revisited applicability at a plenary and continue to refine operation of AHG dedicated to looking at collaboration with CEN/CENELEC JTC 21. Invited EC to present at plenaries and the ISO/IEC workshop series

Challenges looking forward

The challenges identified and addressed over the past cycle may continue to persist as the committee and program of work continues to grow, SC 42 recognizes that some of these challenges like continuing to expand stakeholder diversity, collaboration and balancing high quality efficient output with growth of the program are not one time issues and may evolve as the committee work grows.

In addition, economic headwinds may also persist. SC 42 will continue with the approaches highlighted above that have worked and do a regular assessment throughout the year to refine as needed.

SC 42 thus far has been fortunate to have high interest in its work with a flow of new project proposals. Nonetheless, this does create a few unique challenges

- Scaling: As the program of work continues to grow, training new editors and ensuring quality across all the deliverables while maintaining efficient execution presents its own set of challenges
- Identifying gaps in the work program especially relative to emerging areas not already covered in the existing work program / WGs

7 Structure, current projects, and publications

7.1 Structure

SC 42 set its initial structure at the inaugural plenary meeting and updated at subsequent plenaries. SC 42 has and will continue to utilize AGs and ad-hoc groups as needed. SC 42 will continue to evaluate its structure in response to the work program. A summary[2] of the current structure appears in the table below:

SC 42 Subgroup	Title	Notes
SC 42/WG 1	Foundational standards	Formed at the 1st plenary
SC 42/WG 2	Data	Formed at 2nd plenary Updated at 5th
SC 42/WG 3	Trustworthiness	Formed at the 2nd plenary
SC 42/WG 4	Use cases and applications	Formed at the 2nd plenary
SC 42/WG 5	Computational approaches and computational characteristics of AI systems	Formed at the 3rd plenary
SC 42/SC 40 JWG 1	Governance implications of AI	Confirmed by JTC 1 Resolution – November 2018. Disbanded April 2022
SC 42/SC 7 JWG 2	Testing of AI-based Systems	Confirmed by JTC 1 Resolution
SC 42/ISO TC 215 JWG 3	AI-enabled Health Informatics	Confirmed by resolutions of ISO TC 205 (July 2022) and SC 42 (Aug 2022)
SC 42/IEC TC 65/SC 65A JWG 4	Functional safety and AI systems	Confirmed by resolutions of IEC SC 65A (July 2023) and SC 42 (April 2023)
SC 42/ISO TC 37 JWG 5	Natural language processing	Confirmed by resolutions of ISO TC 37 and SC 42 (April 2024)

[2] For simplicity and brevity, the SC 42 working groups are listed. AGs and AHGs are not listed here. For a complete list please refer to the ISO committee website: https://www.iso.org/committee/6794475.html.

Summary[3] *of Current SC 42 Officers*

Officers

Position	Officer Name	Originating National Body
SC 42 Chair	Wael William Diab	USA (ANSI)
SC 42 Committee Manager	Heather Benko	USA (ANSI)
SC 42/WG 1 Convenor	Paul Cotton	Canada (SCC)
SC 42/WG 2 Convenor	David Boyd	USA (ANSI)
SC 42/WG 3 Convenor	David Filip	Ireland (NSAI)
SC 42/WG 3 Secretary	Aditya Mohan	Ireland (NSAI)
SC 42/WG 4 Convenor	Fumihiro Maruyama	Japan (JISC)
SC 42/WG 4 Secretary	Nobuhiro Hosokawa	Japan (JISC)
SC 42/WG 5 Convenor	Ning Sun	China (SAC)
SC 42/JWG 2 Convenor (SC 42)	Adam Smith	United Kingdom (BSI)
SC 42/JWG 2 Convenor (SC 7)	Stuart Reid	United Kingdom (BSI)
SC 42/JWG 3 Convenor (SC 42)	Shusaku Tsumoto	Japan (JISC)
SC 42/JWG 4 Convenor (SC 42)	Riccardo Mariani	Italy (UNI)
SC 42/JWG 5 Convenor (SC 42)	Lauriane Aufrant	France (AFNOR)
SC 42/JWG 5 Convenor (ISO TC 37)	Avashlin Moodley	South Africa (SABS)

7.2 Publications and new projects

Note: Please refer to section 3 for a summary of the list of publication and new project areas. Below is a detailed list.

Numbers

32 published (12 since last update)
44 active of which **23** new projects added to the work program since last update
Reference: https://www.iso.org/committee/6794475.html

Publications (2024)

ISO/IEC 5259-1:2024 Artificial intelligence — Data quality for analytics and machine learning (ML) Part 1: Overview, terminology, and examples

- Publication date: 2024-07
- What is ISO/IEC 5259-1?

ISO/IEC 5259-1 is the foundational part of the ISO/IEC 5259 series, **focusing on data quality for analytics and machine learning** (ML). This standard provides an overview, terminology, and illustrative examples to help organizations understand and apply the entire series effectively. It establishes the **framework for assessing and enhancing data quality** across different phases of the data life cycle, crucial for reliable analytics and ML outcomes.

- Why is ISO/IEC 5259-1 important?

ISO/IEC 5259-1 is crucial because it addresses the foundational need for high data quality in an era dominated by data-driven decision-making. As data become the raw material for analytics and machine learning, ensuring their quality directly impacts the accuracy and reliability of analytical models and ML systems. This standard equips organizations with the necessary **tools and methods to assess, manage, and improve data quality, ensuring that the data used are fit for their intended purpose**. It provides a common language and set of practices that facilitate effective data quality management, crucial for achieving consistent and reliable analytics outcomes.

- Benefits
  - Improved **reliability and accuracy** of ML models and analytics
  - Standardized **data quality assessment** across various sectors and applications
  - Enhanced organizational capability in **managing data quality**
- Who should refer to ISO/IEC 5259-1?

Organizations of all sizes and sectors that use data analytics and machine learning technologies to inform decision-making and want to ensure their data quality meets required standards.

- Can ISO/IEC 5259-1 be used independently of other standards??

While ISO/IEC 5259-1 can provide valuable guidance independently, it is **designed to be used in conjunction with other parts of the ISO/IEC 5259** series and related standards like ISO/IEC 25012 for a comprehensive approach to data quality.

ISO/IEC 5259-3:2024 Artificial intelligence — Data quality for analytics and machine learning (ML) Part 3: Data quality management requirements and guidelines

- Publication date: 2024-07

This document specifies requirements and provides guidance for establishing, implementing, maintaining and continually improving the quality of data used in the areas of analytics and machine learning.

[3] For simplicity and brevity, the SC 42 working groups are listed. AGs and AHGs are not listed here

This document does not define a detailed process, methods or metrics. Rather it defines the requirements and guidance for a quality management process along with a reference process and methods that can be tailored to meet the requirements in this document.

The requirements and recommendations set out in this document are generic and are intended to be applicable to all organizations, regardless of type, size or nature.

ISO/IEC 5259-4:2024 Artificial intelligence — Data quality for analytics and machine learning (ML) Part 4: Data quality for analytics and machine learning (ML)

- Publication date: 2024-07

This document establishes general common organizational approaches, regardless of the type, size or nature of the applying organization, to ensure data quality for training and evaluation in analytics and machine learning (ML). It includes guidance on the data quality process for:

— supervised ML with regard to the labelling of data used for training ML systems, including common organizational approaches for training data labelling;
— unsupervised ML;
— semi-supervised ML;
— reinforcement learning;
— analytics.

This document is applicable to training and evaluation data that come from different sources, including data acquisition and data composition, data preparation, data labelling, evaluation and data use. This document does not define specific services, platforms or tools.

ISO/IEC TR 17903:2024 Information technology — Artificial intelligence — Overview of machine learning computing devices

- Publication date: 2024-05

This document surveys machine learning (ML) computing devices, including the following:

— ML computing device terminology and characteristics;
— existing approaches to the setting and use of characteristics for optimizing ML computing device performance.

ISO/IEC TR 24030:2024 Information technology — Artificial Intelligence (AI) — Use cases

- Publication date: 2024-04
- What is ISO/IEC TR 24030?

ISO/IEC TR 24030 is a comprehensive document providing a **collection of artificial intelligence (AI) use cases across various domains**. It encompasses an extensive range of applications, illustrating the applicability and potential of AI in different sectors and contributing significantly to the field of AI standardization.

- Why is ISO/IEC TR 24030 important?

This technical report plays a pivotal role in showcasing the **diverse applications of AI**, facilitating the development of AI standards, and promoting collaboration and understanding of AI's potential and challenges across industries.

- Benefits
  - Offers a broad perspective on **AI applications** in various domains
  - Supports the **development and refinement of AI standards**
  - Enhances **collaboration and knowledge sharing** in AI technology
- Who should refer to ISO/IEC TR 24030?

Professionals and organizations **involved in AI** across different sectors.

- Does ISO/IEC TR 24030 cover specific AI applications?

Yes, it includes a range of **AI applications and deployment models**, demonstrating AI's versatility.

ISO/IEC TS 8200:2024 Information technology — Artificial intelligence — Controllability of automated artificial intelligence systems

- Publication date: 2024-04

This document specifies a basic framework with principles, characteristics and approaches for the realization and enhancement for automated artificial intelligence (AI) systems' controllability.

The following areas are covered:

— state observability and state transition;
— control transfer process and cost;
— reaction to uncertainty during control transfer;
— verification and validation approaches.

This document is applicable to all types of organizations (e.g. commercial enterprises, government agencies, not-for-profit organizations) developing and using AI systems during their whole life cycle.

ISO/IEC TS 5392:2024 Information technology — Artificial Intelligence (AI) — Reference architecture of knowledge engineering

- Publication date: 2024-03

This document defines a reference architecture of knowledge engineering (KE) in artificial intelligence (AI). The reference architecture describes KE roles, activities, constructional layers, components and their relationships amongst themselves and other systems from systemic user and functional views. This document also provides a common KE vocabulary by defining KE terms.

ISO/IEC TS 25058:2024 Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Guidance for quality evaluation of artificial intelligence (AI) systems

- Publication date: 2024-01

This document provides guidance for evaluation of artificial intelligence (AI) systems using an AI system quality model. The document is applicable to all types of organizations engaged in the development and use of AI.

ISO/IEC 5339:2024 Artificial intelligence (AI) — Guidance for AI applications

- Publication date: 2024-01

This document provides guidance for identifying the context, opportunities and processes for developing and applying AI applications. The guidance provides a macro-level view of the AI application context, the stakeholders and their roles, relationship to the life cycle of the system, and common AI application characteristics and considerations.

ISO/IEC 5469:2024 Information technology — Artificial intelligence — Functional safety and AI systems

- Publication date: 2024-01

This document describes the properties, related risk factors, available methods and processes relating to:
— use of AI inside a safety related function to realize the functionality;
— use of non-AI safety related functions to ensure safety for an AI controlled equipment;
— use of AI systems to design and develop safety related functions.

Publications (2023 – since last report)

ISO/IEC 42001:2023 Information technology — Artificial intelligence — Management system

- Publication date: 2023-12
- What is ISO/IEC 42001?

ISO/IEC 42001 is an international standard that specifies requirements for establishing, implementing, maintaining, and continually improving an Artificial Intelligence Management System (AIMS) within organizations. It is designed for entities providing or utilizing AI-based products or services, ensuring responsible development and use of AI systems.

- Why is ISO/IEC 42001 important?

ISO/IEC 42001 is the world's first AI management system standard, providing valuable guidance for this rapidly changing field of technology. It addresses the unique challenges AI poses, such as ethical considerations, transparency, and continuous learning. For organizations, it sets out a structured way to manage risks and opportunities associated with AI, balancing innovation with governance.

- Who is ISO/IEC 42001 for?

Organizations of any size involved in developing, providing, or using AI-based products or services. It is applicable across all industries and relevant for public sector agencies as well as companies or non-profits

ISO/IEC 5338:2023 Information technology — Artificial intelligence — AI system life cycle processes

- Publication date: 2023-12

This document defines a set of processes and associated concepts for describing the life cycle of AI systems based on machine learning and heuristic systems. It is based on ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 with modifications and additions of AI-specific processes from ISO/IEC 22989 and ISO/IEC 23053.

This document provides processes that support the definition, control, management, execution and improvement of the AI system in its life cycle stages. These processes can also be used within an organization or a project when developing or acquiring AI systems. When an element of an AI system is traditional software or a traditional system, the software life cycle processes in ISO/IEC/IEEE 12207 and the system life cycle processes in ISO/IEC/IEEE 15288 can be used to implement that element.

New Projects (since last report)

- ISO/IEC 42102: Information technology — Artificial intelligence — Taxonomy of AI system methods and capabilities
- ISO/IEC 22989:2022/Amd 1: Information technology — Artificial Intelligence — Artificial intelligence concepts and terminology — Amendment 1
- ISO/IEC 23053:2022/Amd 1: Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML) — Amendment 1
- ISO/IEC 24970: Artificial Intelligence — AI System Logging
- ISO/IEC PWI 42114: Information technology — Artificial intelligence — Guidelines for auditing of AI management system based on ISO/IEC 42001
- ISO/IEC PWI 45259: Information Technology — Artificial Intelligence — De-identification of training data for ML

- ISO/IEC PWI 42116: Information Technology — Artificial Intelligence — Framework for use of generated data for analytics and machine learning
- ISO/IEC 42105: Information technology — Artificial intelligence — Guidance for human oversight of AI systems
- ISO/IEC 24029-3: Artificial Intelligence (AI) — Assessment of the robustness of neural networks — Part 3: Methodology for the use of statistical methods
- ISO/IEC 25059:2023 Revision: Software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality model for AI systems
- ISO/IEC 22443: Information technology — Artificial Intelligence (AI) — Guidance on addressing societal concerns and ethical considerations
- ISO/IEC 25029: Artificial intelligence — AI-enhanced nudging
- ISO/IEC PWI 42108: Artificial intelligence — Operational design domain (ODD)
- ISO/IEC PWI 42117: Artificial intelligence — Trustworthiness fact labels for AI systems
- ISO/IEC PWI 42118: Artificial intelligence — Reliability of AI Systems
- ISO/IEC PWI 24029-5: Artificial intelligence — Assessment of the robustness of neural networks — Part 5: Applicability of the methodology to other artificial intelligence algorithm
- ISO/IEC TR 20226: Information technology — Artificial intelligence — Environmental sustainability aspects of AI
- ISO/IEC TR 21221: Information technology — Artificial intelligence — Beneficial AI systems
- ISO/IEC TR 42109: Information technology — Artificial intelligence — Use cases of human-machine teaming
- ISO/IEC PWI 42113: Artificial intelligence — Evaluation metrics for AI use cases and applications
- ISO/IEC 42112: Information technology — Artificial intelligence — Guidance on machine learning model training efficiency optimization
- ISO/IEC 4213 Revision: Performance measurement for AI classification, regression, clustering and recommendation tasks
- ISO/IEC TS 42111: Information technology — Artificial intelligence — Guidance on lightweight AI systems
- ISO/IEC TS 25258: Information technology – Artificial intelligence – Hybrid AI inference framework for AI systems
- ISO/IEC 22989-2: Artificial intelligence — Concepts and terminology — Part 2: Healthcare
- ISO/IEC TS 22440-1: Artificial intelligence — Functional Safety and AI systems — Part 1: Requirements
- ISO/IEC TS 22440-2: Artificial intelligence — Functional Safety and AI systems — Part 2: Guidance
- ISO/IEC TS 22440-3: Artificial intelligence — Functional Safety and AI systems — Part 3: Examples of application
- ISO/IEC TS 25223: Information technology — Artificial intelligence — Guidance and requirements for uncertainty quantification in AI systems
- ISO/IEC 23281: Artificial Intelligence — Overview of AI tasks and functionalities related to natural language processing
- ISO/IEC 23282: Artificial intelligence — Evaluation methods for accurate natural language processing systems

7.3 Select publications and new projects to highlight

SC 42 considers all of its projects and publications to be important. The following selections were made based on their anticipated impact and/or representing new areas of AI standardization.

Publications

ISO/IEC 42001:2023 Information technology — Artificial intelligence — Management system

- Publication date: 2023-12
- What is ISO/IEC 42001?

ISO/IEC 42001 is an international standard that specifies requirements for establishing, implementing, maintaining, and continually improving an Artificial Intelligence Management System (AIMS) within organizations. It is designed for entities providing or utilizing AI-based products or services, ensuring responsible development and use of AI systems.

- Why is ISO/IEC 42001 important?

ISO/IEC 42001 is the world's first AI management system standard, providing valuable guidance for this rapidly changing field of technology. It addresses the unique challenges AI poses, such as ethical considerations, transparency, and continuous learning. For organizations, it sets out a structured way to manage risks and opportunities associated with AI, balancing innovation with governance.

- Who is ISO/IEC 42001 for?

Organizations of any size involved in developing, providing, or using AI-based products or services. It is applicable across all industries and relevant for public sector agencies as well as companies or non-profits

ISO/IEC 5259-1:2024 Artificial intelligence — Data quality for analytics and machine learning (ML) Part 1: Overview, terminology, and examples

- Publication date: 2024-07
- What is ISO/IEC 5259-1?

ISO/IEC 5259-1 is the foundational part of the ISO/IEC 5259 series, **focusing on data quality for analytics and machine learning** (ML). This standard provides an overview, terminology, and illustrative examples to help organizations understand and apply the entire series effectively. It establishes the **framework for assessing and enhancing data quality** across different phases of the data life cycle, crucial for reliable analytics and ML outcomes.

- Why is ISO/IEC 5259-1 important?

ISO/IEC 5259-1 is crucial because it addresses the foundational need for high data quality in an era dominated by data-driven decision-making. As data become the raw material for analytics and machine learning, ensuring their quality directly impacts the accuracy and reliability of analytical models and ML systems. This standard equips organizations with the necessary **tools and methods to assess, manage, and improve data quality, ensuring that the data used are fit for their intended purpose**. It provides a common language and set of practices that facilitate effective data quality management, crucial for achieving consistent and reliable analytics outcomes.

- Benefits
  - Improved **reliability and accuracy** of ML models and analytics
  - Standardized **data quality assessment** across various sectors and applications
  - Enhanced organizational capability in **managing data quality**
- Who should refer to ISO/IEC 5259-1?

Organizations of all sizes and sectors that use data analytics and machine learning technologies to inform decision-making and want to ensure their data quality meets required standards.

- Can ISO/IEC 5259-1 be used independently of other standards??

While ISO/IEC 5259-1 can provide valuable guidance independently, it is **designed to be used in conjunction with other parts of the ISO/IEC 5259** series and related standards like ISO/IEC 25012 for a comprehensive approach to data quality.

ISO/IEC TR 24030:2024 Information technology — Artificial Intelligence (AI) — Use cases

- Publication date: 2024-04
- What is ISO/IEC TR 24030?

ISO/IEC TR 24030 is a comprehensive document providing a **collection of artificial intelligence (AI) use cases across various domains**. It encompasses an extensive range of applications, illustrating the applicability and potential of AI in different sectors and contributing significantly to the field of AI standardization.

- Why is ISO/IEC TR 24030 important?

This technical report plays a pivotal role in showcasing the **diverse applications of AI**, facilitating the development of AI standards, and promoting collaboration and understanding of AI's potential and challenges across industries.

- Benefits
  - Offers a broad perspective on **AI applications** in various domains
  - Supports the **development and refinement of AI standards**
  - Enhances **collaboration and knowledge sharing** in AI technology
- Who should refer to ISO/IEC TR 24030?

Professionals and organizations **involved in AI** across different sectors.

- Does ISO/IEC TR 24030 cover specific AI applications?

Yes, it includes a range of **AI applications and deployment models**, demonstrating AI's versatility.

Current Projects

- ISO/IEC 22989 amendment and part 2. ISO/IEC 22989:2022 is an important foundational International Standard that establishes terminology and concepts for artificial intelligence (AI). Both of these can be very important in shaping public expectations about this technology. SC 42 request to make it freely available was granted. In the rationale, the committee stated that "AI technology has garnered significant attention from the media, with corresponding attention from the public, policy makers and regulators. The baseline terminology and concepts in ISO/IEC 22989:2022 will be invaluable to inform these stakeholders and will very likely encourage the adoption of many other JTC 1 standards that reference ISO/IEC 22989:2022." This is still true today and is reflected by the collaboration with ISO TC 215 to transform this into a series with the NP for ISO/IEC 22989-2 being recently approved and will build on the base standard for *healthcare*. Further, SC 42 is amending the base standard to add *generative AI* concepts and terminology. This reflects SC 42's efforts to address both emerging AI technology trends (generative AI) and its system integration mission (collaboration with ISO TC 215 with part 2's focus on healthcare).
- Beneficial AI and sustainability: ISO/IEC 20226 and 21221, assigned to WG 4, are examples of initial projects to look at new trends. In this case, one is looking at a framework for beneficial AI and the other on environmental sustainability. In addition, SC 42 is collaborating with SC 39 via a joint AG to road-map AI and sustainability from both the perspectives of the sustainability of AI systems and how AI can be applied to global sustainability challenges.
- ISO/IEC 23281 and 23282 are projects relating to natural language processing. In addition to addressing a growing market need, technological trends and collaborating with ISO TC 37 through a JWG, these projects are also being done via parallel development with CEN/CENELEC JTC 21. This represents a very high level of collaboration both internally (ISO TC 37) and externally (CEN/CENELEC).
- The ISO/IEC 22440 series builds upon the successful ISO/IEC 5469 project that addressed functional safety and AI, which was done with close liaison input with IEC TC 65/SC 65A. The series not only expands on the collaboration through a joint working group, it addresses a fundamental need for many application domains where safety is paramount. This series will help enable broad responsible adoption in these sectors where it may otherwise be difficult. In addition, it can be an enabler for applying the impact assessment, ISO/IEC 42005, in those sectors

SC 42 Strategic Business Plan
Artificial Intelligence

Annex: Additional Links and Information

Committee Information Online
The following committee information is updated regularly and is available on ISO's website, ISO Online.

Click on the links below to find the following information:

- About (Secretariat, Secretary, Chair, Date of creation, Scope, etc.)
- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Work program (published standards and standards under development)

- SC 42 Committee website
- ISO/IEC AI LinkedIn page
- ISO/IEC AI Workshop Series website
- ISO/IEC AI Wikipedia page
- ISO/IEC AI Committee wins prestigious ISO award and accompanying SC 42 Chair's op-ed
- Press Coverage Related to SC 42 Overview and Program of Work
  - IEC news AI and sustainability: hear the experts' views in latest workshop (Jun 17th 2024)
  - IEC news New expert advisory group focuses on AI and sustainability (Jun 11th 2024)
  - AI Verify New crosswalk with ISO/IEC 42001: 2023 shows international alignment (May 30th 2029)
  - IEC news New experts, projects and liaisons for AI joint committee (May 29th 2024)
  - IEC news ISO/IEC workshop on how AI can benefit society (May 22nd 2024)
  - IEC news Global AI experts unite to discuss challenges, trends and standardization (April 22nd 2024)
  - IEC news Understanding the challenges and potential of AI applications (April 16th 2024)
  - IEC news New standard for knowledge engineering in AI (April 5th 2024)
  - JTC 1 newsletter Contribution to inaugural newsletter "Artificial Intelligence, keeping it in check" (April 4th, 24)
  - IEC news How standards are enabling responsible AI worldwide (April 2nd 2024)
    - Interviews with HoDs from Australia, Germany, India, Japan, Korea, Turkey, UK , USA and SC 42 chair
  - IEC e-tech Keeping artificial intelligence safe and trustworthy (Mar 7th 2024)
  - IEC news Artificial intelligence for global good (Feb 16th 2024)
  - IEC news Evaluating the quality of AI systems (Feb 6th 2024)
  - IEC news Building trust in AI applications (Jan 18th 2024)
  - ISO/IEC 42001 – Publication of a first-of-its kind international AI management systems standard
    - IEC news Novel AI international standard that enables certification and responsible adoption (Dec 12th)
      - IEC video ISO/IEC JTC 1/SC 42 experts tell us about 42001:2023, the new management system standard for AI
    - ISO news AI management systems: What businesses need to know (Dec 2023)
    - ANSI news Using AI Responsibly (Dec 27th 2023)
  - IEC news New standard to increase safety of AI (Jan 16th 2024)
  - IEC news Creating a strong foundation for trusted AI applications (Jan 5th 2024)
  - ISO AI special edition of our newsletter
    - ISO article What is AI? All you need to know about artificial intelligence
    - ISO article Building responsible AI
    - ISO video Get the basics of ISO/IEC 42001 (interview of with ISO Head of Publishing, Hussain Hadi)
    - ISO op-ed Forging a positive AI mindset
  - ISO/IEC 4th AI Workshop
    - IEC news Standardization work of joint IEC and ISO committee highly relevant to EU AI Act (Dec 21st 23)

    - IEC news ISO/IEC workshop hears how AI is saving lives through early disease detection (Dec 13th 2023)
    - IEC news AI experts explore global trends and applications: register to participate! (Nov 29th 2023)
- ISO quote cards promoting AI with partners and industry (e.g. WEF)
- IEC blog Artificial intelligence: why terminology matters (Dec 15th 2023)
- IEC news The importance of sustainable AI (Dec 7th 2023)
- IEC news IEC and ISO joint committee for AI expand programme of work (Nov 1st 2023)
- IEC news IEC and ISO launch working group to advance functional safety of AI systems (Oct 19th 2023)
- IEC news Global experts meet to address AI standardization opportunities and challenges (Oct 17th 2023)
- IEC news The importance of functional safety (October 11th 2023)
- ISO news Forging a positive AI mindset (September 21st 2023)
- ISO news ISO/IEC JTC 1/SC 42 (AI) wins prestigious ISO award (September 12th 2023)
- IEC news Artificial intelligence: enhancing the trustworthiness of neural networks (August 10th 2023)
- IEC news Essential guidance on AI data lifecycle management (August 1st 2023)
- IEC e-tech The promise of synthetic data for AI (July 6th 2023)
- IEC news New international standard for ensuring the quality of AI systems (July 4th 2023)
- IEC news UN Digital Compact Deep Dive on AI: Standards are part of the solution (June 8th 2023)
- IEC news ISO/IEC workshop hears how AI is saving babies (June 16th 2023)
- IEC news ISO/IEC AI Workshop to explore cutting-edge AI applications and responsible standardization (June 7th 2023)
- IEC e-tech ISO/IEC AI plenary expands programme of work (May 12th 2023)
- IEC e-tech Understanding the potential of synthetic data for artificial intelligence (May 15th 2023)
- IEC e-tech Essential guidance on AI-related risk management (February 14th 2023)
- ANSI Article AI and the Importance of Standardization (December 19th 2022)
- RAPS Article Transforming industry and society through beneficial AI (December 2022)
    - HTML version of the article
- IEC e-tech ISO/IEC AI meeting discusses sustainability, ethics and emerging regulation (November 7th 2022)
- IEC e-tech New international standard provides process framework for managing big data analytics (November 24th 2022)
- IEC e-tech Artificial intelligence: getting ML classification models right (October 19th 2022)
- IEC e-tech New ISO/IEC report offers guidance on the responsible adoption of AI (August 23rd 2022)
- IEC e-tech International standards for artificial intelligence (August 16th 2022)
- IEC e-tech Foundational building blocks for AI systems (July 19th 2022)
- IEC video A governance framework for organizations deploying AI systems (June 7th 2022)
- IEC news SC 42 plenary: bringing stakeholders together to address the challenges of artificial intelligence (June 3rd 2022)
- IEC e-tech IEC and ISO work on artificial intelligence – Covering the entire AI ecosystem (May 20th 2022)
- IEC news A governance framework for organizations deploying AI systems (Apr 29th 2022)
- IEC news New report focuses on convergence of AI and Industrial IoT (Mar 10th 2022)
- ISO innovation article on Information technology growth and the role of AI and associated AI standards (Jan 2022)
- IEC e-tech Computational approaches for AI systems (Jan 25th 2022)
- ISO news Enabling An AI-Ready Culture - SC 42's Novel MSS Approach (Nov 2021)
- IEC e-tech Standards help address bias in artificial intelligence technologies (Nov 8th 2021)
- IEC news Growing AI standards committee concludes plenary (Oct 22nd 2021)
- IEC news IEC and ISO artificial intelligence plenary begins (Oct 22nd 2021)
- ISO publication White Paper on Smart Manufacturing (Oct 2021)
- RAPS Article Enabling the digital transformation of industry: The roles of AI, big data, analytics, and related data ecosystem (June 1st 2021)
    - IEC news International standards instill confidence in artificial intelligence technologies (July 22nd 2021)
- IEC news IEC and ISO artificial intelligence committee broadens standards work programme (May 17th 2021)
- IEC e-tech IEC and ISO publish over 130 emerging AI use cases (May 17th 2021)
- IEC news IEC/ISO standards committee for artificial intelligence begins spring plenary (Apr 30th 2021)
- IEC e-tech New standard to enhance trustworthiness of artificial intelligence systems (March 15th 2021)
- ISO news article on Getting Big on Data (Nov 5th 2020)
- IEC e-tech article on International standards committee for AI ecosystem expands into new areas (Sep 15th 2020)
- IEC e-tech article on IEC and ISO publish TR which provides overview of big data framework and reference architecture (Aug 24th 2020)
- IEC e-tech article on Achieving trustworthy AI with standards (June 8th 2020)

- ISO news SC 42 virtual plenary as an example of standards innovation during COVID-19 (May 15th, 2020)
- IEC news announcing the key outcomes of the 5th plenary and added focus on data ecosystem (May 7th, 2020)
- IEC e-tech article on SC 42's holistic ecosystem approach to AI standardization (Feb 2020)
- IEC e-tech article on New IEC and ISO Standard will enable big data adoption across industry sectors (Feb 15th 2020)
- IEC e-tech article on IEC and ISO AI committee (SC 42) expands programme of work (Jan 2020)
- ISO focus Nov/Dec 2019 magazine on AI and the SC 42 program of work (November 2019)
    - ISO focus landing page for edition including links to download PDF (above in English) in various languages and individual articles
- IEC news AI standards help accelerate digitalization of smart manufacturing (Dec 2019)
- IEC news announcing the key outcomes of the 4th plenary (Nov 11th, 2019)
- IEC e-tech article on Establishing trustworthiness is vital in our human-machine world (July 15th 2019)
- IEC e-tech article on Artificial intelligence and big data: a paradigm shift in healthcare (May 15th 2019)
- IEC news announcing the key outcomes of the 3rd plenary (April 23rd, 2019)
- IEC news announcing the start of the 3rd plenary (April 9th 2019)
- ISO news article (18th October 2018)
- JTC 1 press committee article (30th May 2018)

- Press Coverage Related to SC 42 Formation
    - IEC e-tech article (17th May 2018). Additional circulations
        - ISO retweeted the article (September 2018)
        - Published on ANSI (US National Body) website
        - Published on UNE (Spain National Body) website (September 2018)
        - Published on ILNAS (Luxemburg National Body) website (27th April 2018)
            - Note: not a direct reprint but used the photo
        - Published on Robotics Automation and News Magazine
    - ANSI news article on the formation of SC 42 (16th January 2018)
    - Introduction of SC 42 in the IEC MSB White Paper on Artificial Intelligence
- Press Coverage Related to SC 42 Participation at Key Industry and International Events
    - G20: International Standards Summit (October 2022)
        - G20 International Standards Summit 2022 hosted a number of panels. SC 42 presented on its work relative to the session on accelerating the digital transformation. The session focused on how international standards can promote digital transformation across many industries, sectors and cities, which enables a circular, inclusive and people-centric approach that empowers everyone, regardless of gender, age or ability, to benefit equally and equitably from new technologies.
    - World Trade Organization (October 2022)
        - WTO October 2022 event: SC 42 participated in an engaging panel hosted by the World Trade Organization. The SC 42 program of work as it relates to digitalization was presented
    - World Standards Day (October 2022)
        - World Standards Day, supported by JTC 1: SC 42 participated in the World Standards Day event that was supported by ISO/IEC/JTC 1 along with a number of other JTC 1 groups covering topics that included AI, IoT, cloud computing, trustworthiness, digital transformation and others. The focus was on the relation of the program of work to the UN SDGs (Sustainable Development Goals)
- Press Coverage Related to SC 42 Participation at Key Industry and International Events
    - IEC Medium Publications
        - IEC news on How standardization can contribute to an international framework for AI (Oct 20th 2021)
        - IEC news Young Professionals learn about international standards for artificial intelligence (Oct 15th 2021)
        - IEC blog on Webinar on regulations and artificial intelligence technologies (Dec 10th 2020)
        - IEC blog on AI standards on the agenda at IOT Solutions World Congress (Dec 8th 2020)
        - IEC blog on IEC and ISO present AI standardization work during event by European Commission (Oct 28th 2020)
        - IEC blog on Trustworthiness is key to services and products using AI and IoT technologies (Mar 3rd, 2020)
        - IEC blog on AI standards on the agenda at IOT Solutions World Congress (Nov 21st 2019)
        - IEC blog on AI and IoT industry leaders to consider a digital trust framework at Berlin forum (May 15th 2019)
    - Global Standards Collaboration (GSC-22) 2019 Session on Artificial Intelligence
        - ISO news on Standards cooperation is key to making AI and smart cities a reality (April 4th 2019)
        - IEC blog on 22nd Global Standards Collaboration meeting discusses need for standards to accelerate AI technology innovation and adoption (April 3rd 2019)
    - JTC 1 Info

        - JTC 1 info article on IEC and ISO present on the AI Ecosystem Standardization Program at the European Commission Workshop (Oct 16th 2020)
    - Industrial Internet Consortium (IIC)
        - IIC blog on from IEC on Standards for AI on the Agenda at IoT Solutions World Congress
    - IoT Solutions World Congress (IoTSWC)
        - IoTSWC promotion of the IEC blog on AI standards on the agenda at IOT Solutions World Congress
- Other media coverage
    - Twitter
        - ISO (@isostandards)
            - Tweet Chat on standards on Artificial Intelligence with Chair of SC 42 (25th October). Hashtags: #ISOchat #Standards4AI
        - IEC (@IECStandards)
            - Article on New international standard will help organization boards and executive managers ask and answer key questions about AI technologies (12th February 2019)
            - Article on International standards play a key role in addressing the ethical, technical, safety and security aspects (6th February 2019)
            - Article and video on Standardization can help eliminate data bias in AI (4th February 2019)
            - Article and video on Chair of SC 42 explains the growing influence of AI in Smart Manufacturing (4th February 2019)
            - Article on Chair of SC 42 will lead a session at the CEN/CENELEC workshop on Trustworthy Artificial Intelligence (10th Aug 2018)
    - IEC Medium Publications
        - IEC blog on New IEC and ISO Standard will enable big data adoption across industry sectors (Mar 30th, 2020)
        - IEC blog on Important questions around AI technologies in smart manufacturing (Jan 8th, 2020)
        - IEC blog on New IEC and ISO Standard will enable big data adoption across industry sectors (Mar 30th, 2020)
        - IEC blog on Trustworthiness is key to services and products using AI and IoT technologies (Mar 3rd, 2020)
        - IEC blog on How standards help people trust AI (Jan 15th, 2020)
        - IEC blog on Important questions around AI technologies in smart manufacturing (Jan 8th, 2020)
    - IEC Medium Publications
        - IEC blog on Establishing trustworthiness is vital in our human-machine world (Sep 9th 2019)
        - IEC blog on The need for Big Data Standards (April 24th 2019)
        - IEC blog on New international standard will offer risk management framework for AI (March 18th 2019)
        - IEC blog on Helping organization boards and executives ask and answer key questions about AI technologies (Feb 12th 2019)
        - IEC e-tech article on AI in healthcare: keeping data safe and building trust (January 25th 2019)
        - IEC blog on Making AI safe (January 23rd 2019)
        - IEC e-tech article on Healthcare needs doctors and machines (December 10th, 2018)
        - IEC e-tech article on Eliminating data bias from machine learning systems (November 13th 2018)
        - IEC e-tech article on Smart homes are getting smarter (November 6th 2018)
        - IEC e-tech article on Machine learning is not a synonym for AI (October 17th 2018)
        - IEC e-tech article on Rethinking the healthcare ecosystem (reference to SC 42)
        - IEC e-tech article on Standards development organizations play key role in enabling remote daily life
    - Publications referencing SC 42 work
        - IEC blog on Generative AI for genetics? (August 3rd 2023)
        - ISO Article on AI in Healthcare (April 16th 2023)
        - IEC e-tech on Luxembourg highlights role of technical standardization in adoption of artificial intelligence (Sep 21st 2021)
        - ILNAS white paper on AI and technical standardization
        - IEC e-tech article on How Standards Australia contributes to the global artificial intelligence ecosystem (Jan 20th 2021)
    - ISO Multimedia
        - ISO video interview with Chair of SC 42 on Standards and Artificial Intelligence (November 14th 2018)
            - Artificial Intelligence and the role of International Standards in the implementation of this technology
        - ISO video interview with Chair of SC 42 on Standards and Artificial Intelligence Continued (November 14th 2018)

        - Artificial Intelligence and easing the mind of end-users including AI trustworthiness, ethics and societal concerns
    - IEC Multimedia
        - IEC video A governance framework for organizations deploying AI systems (June 7th 2022)
        - IEC video interview with SC 42 Chair, SC 42/WG 3 Convener and ISO/IEC 24368 Editor on AI Ethics (Nov 2019)
        - IEC video interview with Chair of SC 42 on How can we ensure AI is safe for Healthcare? (April 6th 2019)
        - IEC video interview with Chair of SC 42 on Is it too early to use machine learning for cybersecurity? (April 5th 2019)
        - IEC video interview with Chair of SC 42 on To what extent is AI ready for standardization? (April 5th 2019)
        - IEC video interview with Chair of SC 42 on What are some of the challenges you see with AI? (March 26th 2019)
        - IEC video interview with Chair of SC 42 on How to Define Artificial Intelligence (March 26th 2019)
        - IEC video interview with Chair of SC 42 on Why do we need standards for AI? (March 26th 2019)
        - IEC video interview with Chair of SC 42 on Artificial Intelligence (February 4th 2019)
            - The growing influence of AI in Smart Manufacturing and the important role of standards
        - IEC video interview with Chair of SC 42 on Artificial Intelligence (February 4th 2019)
            - Standardization can help eliminate data bias in AI
- ISO Foresight
    - The world around us is changing and the pace of change is faster than ever before. The future has begun and those who do not want to get left behind must ensure their ability to look ahead. That is why ISO has developed a Standardization Foresight Framework; to help us look more systematically at the long-term and to encourage discussion and exchange within the ISO system about future opportunities for International Standardization. The following areas relate to the work of SC 42:
    - AI
    - Ethics
- ISO Sectors
    - Dedicated area on AI
    - The potential benefits and risks of AI are formidable, for society as well as for companies. Standards that enhance transparency, data quality, and system reliability are a way to mitigate risks and maximize rewards. Incorporating desired societal and ethical outcomes based on comprehensive stakeholder inputs, they can help bridge gaps in regulation

SC 42 Strategic Business Plan
Artificial Intelligence

Revision History

The following is the history of this document

- Initial version created by Wael William Diab (SC 42 Chair)
- Initial version reviewed and amended by Heather Benko (SC 42 Committee Manager)
- Submitted to SC 42 for review at the third plenary
- Concurrently submitted to JTC 1 for the November 2020 plenary based on the earlier deadlines and to SC 42 for review at its October plenary
- Concurrently submitted to JTC 1 for the November 2021 plenary based on the earlier deadlines and to SC 42 for review at its October plenary
- Updated by Wael (September 2022). Concurrently submitted to JTC 1 for the November 2022 plenary based on the earlier deadlines and to SC 42 for review at its October plenary
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