International Conference on Progressive Computational Intelligence, Information Technology, and Networking (Com-IT-Con 2024)

Standardization in Emerging technologies (EU & India)
(AI, Quantum, Data and Sustainability)

Mr. Dinesh Chand Sharma

Director – Standards & Public Policy (SESEI)

Outline:

- EU Project SESEI?
- Standards Basics: Why and What?
- Key Act/Policies & Standardization: AI, Quantum & Data etc.

EU Project SESEI is a local presence in India

SESEI (**S**econded **E**uropean **S**tandardization **E**xpert in **I**ndia)
is a local face for the European standardization community in India: Dinesh Chand Sharma

Why SESEI: India is a major trade partners for EU/EFTA, Increasing role of standards to gain market access, evolving & complex nature of regulatory and standardization landscapes, sharing best practices, and work together as partners

Priority Sectors/topics: Aligned with EU-INDIA TTC, Connectivity Partnership

Digitization: Strategic technologies, digital governance, and digital connectivity

Smart Cities/Urban Development, ITS, **Quantum Technologies**, Smart Grid/Meter, **Artificial Intelligence**, **5G/6G**, Open RAN, M2M/IoT (Cyber-Physical Systems), DECT, **Data Privacy**, Satellite Communication, Blockchain, Digital Signature, Smart Manufacturing, e-Accessibility, cybersecurity, digital skills, digital platforms including Research and Innovation etc.

Green & Clean technologies : Clean Energy, Energy Efficiency (Green ICT), Environment, **Sustainability**, Circular Economy including Resource Efficiency, Waste Management, Energy storage technologies, Electric mobility, Green Hydrogen, Advanced biofuels including R&I etc.

Other topics of mutual interests such as Rail, Ropeways, Machinery Safety etc.

www.sesei.eu , www.sesei.in

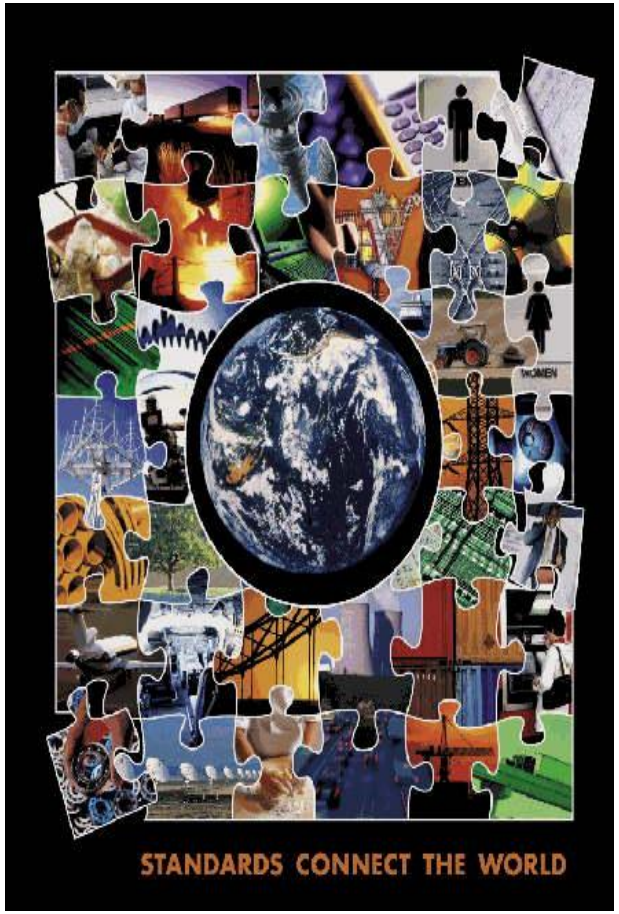
What is a standard?

It is a document that defines technical or quality requirements with which current or future products, production processes, services or methods may comply

- Always voluntary & Consensus based
- Established by all interested parties & Driven mainly by Industry
- Drafted by technical experts
- Approved by a recognized, independent standardization body

Why standards?

- Enhance safety of products
- Promote common understanding
- Facilitate trade by reducing TBs
- Promote interoperability of products and services
- Benefits of economies of scale
- Support environmental sustainability
- Facilitate the uptake of innovation and reflect the outcome of research and development



Standards vs Législation

Standards :

1. Voluntary & Consensual
2. Developed by independent organisations
3. Revised every 5 years
4. Provide specifications and test methods (interoperability, safety, quality, etc.)

Legislation :

1. Mandatory & Imposed by Law
2. Established by public authorities
3. Revised when legislators decide
4. Gives requirements to protect public interests

Three ESOs

Recognition by EU Regulation 1025/2012
= European standardization as a tool for the European single market and the Private Public Partnership

Global Alignment

In brief

- Emerging technologies are rapidly transforming industries and societies, driving innovation and growth.
  - Key areas include **AI**; **Quantum Computing** and **Data Privacy & Security etc**.
- In this world of emerging technologies, data is the engine driving innovation and transformation.
  - Emerging technologies are not only reshaping how data is collected and analysed but also influencing the skills and knowledge that future graduates will need to succeed.
- AI's real-time data analysis will optimize Data networks, enhancing performance, reliability, and energy efficiency.
- Standardization plays a crucial role in development and adoption of emerging technologies by providing a framework that ensures compatibility, interoperability, safety, and scalability.

Key Act/Policies: AI

Europe

- **EU strategy on AI** was published on 25th April 2018
  - ✓ aims at making the EU a world-class hub for AI and ensuring that AI is human-centric and trustworthy.
- In December 2018, Commission presented a **Coordinated Plan on AI**
  - ✓ to maximize the impact of investments at EU and national levels, to encourage synergies and cooperation across the EU, and to foster the exchange of best practices.
- In April 2021, Commission presented its AI package, covering:
  - ✓ Communication on fostering an European approach to AI;
  - ✓ a review of the Coordinated Plan on AI (with EU Member States);
  - ✓ Regulatory framework proposal on AI and relevant Impact assessment.
- In January 2024, Commission launched AI innovation package to support AI startups and SMEs.
- **EU AI Act** came into force on 1 August 2024.
  - ✓ aims to foster responsible AI development and deployment in EU.

India

In Feb 2018, MEITY formed 4 committees to prepare a roadmap for AI

- ✓ Committees addressed citizen centric usage, data platform, skilling, reskilling, R&D, legal, regulatory, ethical and cybersecurity. Committees' reports are available **here**

In June 2018, NITI Aayog unveiled its **discussion paper on National Strategy on AI** to guide R&D in new and emerging technologies:

- ✓ Identified five sectors including Healthcare, Agriculture, Education, Infrastructure and Transportation that can benefit from the adoption of AI

India AI Mission

- ✓ A comprehensive national-level program to democratize and catalyze the AI innovation ecosystem in the country and ensure the global competitiveness of India's AI startups and researchers.

National AI Portal Launched by MEITY along with National e-Governance Division (NeGD), and NASSCOM in May 2020.

- ✓ serves as a platform for AI-related news, learning, publications, events, and activities in India and abroad.

AI Standardization

Europe

CEN/CLC/JTC 21 - Artificial Intelligence is responsible for producing standardization deliverables for AI and related use of data, produced below and is developing another set of 28 ENs (9 from ISO/IEC)

- EN ISO/IEC 22989:2023- Artificial intelligence concepts and terminology
- CEN/CLC ISO/IEC/TR 24027:2023- Bias in AI systems and AI aided decision making
- CEN/CLC ISO/IEC/TR 24029-1:2023- AI - Assessment of the robustness of neural networks - Part 1: Overview
- EN ISO/IEC 8183:2024- AI - Data life cycle framework
- EN ISO/IEC 25059:2024 - Software engineering - Systems and software Quality Requirements and Evaluation (SQuaRE) - Quality model for AI systems
- EN ISO/IEC 23894:2024 - AI - Guidance on risk management
- EN ISO/IEC 23053:2023- Framework for AI Systems Using ML

ETSI Technical Committee on Securing AI (ISG SAI) : responsible for developing technical specifications to mitigate threats arising from deployment of AI throughout multiple ICT-related industries

- ETSI TR 104 225 V1.1.1 (2024-04); Privacy aspects of AI/ML systems
- ETSI TR 104 067 V1.1.1 (2024-04); Proofs of Concepts Framework
- ETSI TR 104 066 V1.1.1 (2024-07); Security Testing of AI

ETSI ISG ENI (Experiential Networked Intelligence): aims to help operators facilitate their network deployment by using AI techniques

- ETSI GR ENI 009 V1.2.1 (2023-05); Definition of data processing mechanisms
- ETSI GS ENI 002 V3.2.1 (2023-04); ENI requirements
- ETSI GS ENI 001 V3.2.1 (2023-05); ENI Use Cases
- ETSI GR ENI 010 V1.2.1 (2024-06); Evaluation of categories for AI application to Networks

India

Bureau of Indian Standards (BIS) technical committee LITD 30 on Artificial Intelligence is responsible for standardization in area of AI and Big Data. It is the National Mirror Committee for ISO/IEC JTC1/SC42 with same Title & Scope.

- IS/ISO/IEC 22989: 2022: AI concepts and terminology
- IS/ISO/IEC/TR 24029-1: 2021: AI Assessment of the robustness of neural networks Part 1: Overview
- IS/ISO/IEC 8183: 2023: AI Data life cycle framework
- IS/ISO/IEC 25059: 2023: Software engineering Systems and software Quality Requirements and Evaluation SQuaRE Quality model for AI systems
- IS/ISO/IEC 23894: 2023: AI Guidance on risk management
- IS/ISO/IEC 23053: 2022: Framework for AI Systems Using Machine Learning ML

Telecommunication Engineering Centre (TEC) under Department of Telecom (DoT), Ministry of Communications

- Formed a committee on “standardisation in AI technologies” to develop necessary “AI standards”. ⇔ Released “Indian AI Stack discussion paper” with the intention of mitigating impediments in AI deployment and essentially make AI uniform for application across sectors.
- Released a Standard (No. TEC 57050:2023) for “Fairness Assessment and Rating of Artificial Intelligence Systems” in July 2023. This Standard enumerates detailed procedures for accessing and rating artificial intelligence systems for fairness.

Key Act/Policies: Quantum technologies (QT)

Europe

- Quantum Technologies Flagship, launched in 2018
  - It is a large-scale, long-term research initiative that brings together research institutions, industry and public funders, consolidating and expanding European scientific leadership and excellence in this field.
- Since June 2019, all 27 EU Member States have signed the European Quantum Communication Infrastructure (EuroQCI) Declaration,
  - To work together, with the Commission and with the support of the European Space Agency, towards the development of a quantum communication infrastructure covering the whole EU (EuroQCI).
- As part of the European High Performance Computing Joint Undertaking (EuroHPC JU), the Commission is now planning to build state-of-the-art pilot quantum computers.
  - These computers will act as accelerators interconnected with the Joint Undertaking's supercomputers, forming 'hybrid' machines that blend the best of quantum and classical computing technologies.

India

- ✓ National Quantum Mission (NQM) 2023 aiming to seed, nurture and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in QT.
  - ✓ Establishment of Four Thematic Hubs (T-Hubs) – Quantum Computing, Quantum Communication, Quantum Sensing & Metrology and Quantum Materials & Devices.
- ✓ **National Supercomputing Mission (NSM) 2015** envisages empowering the academic and R&D institutions spread over the country by installing high-performance computing facilities.
  - ✓ **Application areas:** Climate Modelling, Weather Prediction, Disaster Simulations and Management, Big Data Analytics, Computational Chemistry, Computational Material Science and Nanomaterials, Large Complex Systems Simulations and Cyber Physical Systems, Information repositories/ Government Information Systems, among others.
- ✓ **Quantum-Enabled Science & Technology (QuEST) program:** to develop quantum technology
- ✓ Quantum Computing Applications Lab (QCAL): to accelerate the adoption of quantum computing by providing access to quantum computers, tools, and resources to researchers and developers.
- ✓ QSim- Quantum Computer Simulator Toolkit: to allow researchers and students to write and debug Quantum Code for developing Quantum Algorithms

Quantum technologies Standardization

Europe

CEN/CLC/JTC 22: Quantum Technologies is responsable for producing standardization deliverables in the field of quantum technologies.

ETSI ISG Quantum Key Distribution (QKD)

- ETSI GS QKD 016 V2.1.1 (2024-01)- QKD; Common Criteria Protection Profile - Pair of Prepare and Measure Quantum Key Distribution Modules
- ETSI GS QKD 015 V2.1.1 (2022-04)- QKD; Control Interface for Software Defined Networks
- ETSI GS QKD 018 V1.1.1 (2022-04)- QKD; Orchestration Interface for Software Defined Networks
- ETSI GS QKD 004 V2.1.1 (2020-08)- QKD; Application Interface
- ETSI GS QKD 012 V1.1.1 (2019-02)- QKD; Device and Communication Channel Parameters for QKD Deployment
- ETSI GS QKD 014 V1.1.1 (2019-02)- QKD; Protocol and data format of REST-based key delivery API
- ETSI GR QKD 007 V1.1.1 (2018-12)- QKD; Vocabulary

India

Bureau of Indian Standards (BIS):

- ✓ BIS LITD C : P5 Quantum Computing

Telecom Engineering Centre (TEC), DoT has released following standards in the field of quantum technologies.

- ✓ TEC 91010:2023: Standard for Generic Requirements- Quantum-Safe and Classical Cryptographic Systems:
  - The standards for Post Quantum Cryptography system provide the specifications for a cryptographic mechanism to ensure secured communication against vulnerabilities posed with the advent of Quantum computing.

- ✓ TEC 91000:2022: Standard for Generic Requirements- Quantum Key Distribution System:
  - This document describes the generic requirements and specifications for Quantum Key Distribution (QKD) systems as per, ITU-T Y.3801-3804 Recommendations for use in Indian telecom network.

Key Act/Policies: Data

Europe

- European strategy for data aim to "create a single European data space – a genuine single market for data and is open to data from across the world
- **EU Data Act** address the fairness aspect and, also includes requirements to ensure interoperability within and across data spaces.
- **EU Data Governance Act** provides a framework to enhance trust in voluntary data sharing for the benefit of businesses and citizens.
  - ✓ Both personal and non-personal data are in scope of the DGA, and wherever personal data is concerned, the General Data Protection Regulation (GDPR) applies.
- General Data Protection Regulation (GDPR) sets out detailed requirements for companies and organizations on collecting, storing and managing personal data.
- Regulation on a framework for the free flow of non-personal data in the EU aims at removing obstacles to the free movement of non-personal data between different EU countries and IT systems in Europe.
- Open Data Directive regulates the re-use of publicly available information held by the public sector.

India

- **India Data Accessibility and Use Policy** aims to "radically transform India's ability to harness public sector data
- **National Data Governance Framework Policy** establishes principles for ethical and fair data use and sets up a mechanism for citizens to request datasets and register grievances.
- Open Government Data (OGD) Platform India includes a Data Management System (DMS) that allows government agencies to contribute data catalogs, and a Content Management System (CMS) for managing and updating the platform's content.
- **Digital Personal Data Protection Act 2023** protects individuals' personal data by establishing principles like obtaining consent for data use, limiting data collection, and ensuring data accuracy

Data Standardization

Europe

CEN-CENELEC/JTC 13 'Cybersecurity and data protection' **produced below and is developing another set of 21 ENs (15 from ISO/IEC)**

- EN 17529:2022- Data protection and privacy by design and by default
- EN 17740:2023 - Requirements for professional profiles related to personal data processing and protection
- EN 17799:2023 - Personal data protection requirements for processing operations

CEN/TC 224 'Personal identification and related personal devices with secure element, systems, operations and privacy in a multi sectorial environment' **produced below and is developing 10 (all homegrown),**

- CEN/TS 15480-2:2012 - Identification card systems - European Citizen Card - Part 2: Logical data structures and security services
- EN 1545-1:2015- Identification card systems - Surface transport applications - Part 1: Elementary data types, general code lists and general data elements

CEN and CENELEC JTC 25- Data management, Dataspaces, Cloud and Edge

CEN/TC 468 'Preservation of digital information' **is developing two ENs**

ETSI TC Electronic Signatures and Trust Infrastructures (ESI)

- ETSI EN 319 412-1 Certificate Profiles; Part 1: Overview and common data structures
- ETSI TS 119 512 Protocols for trust service providers providing long-term data preservation services

ETSI TC CYBER

- ETSI TR 103 305-5 Critical Security Controls for Effective Cyber Defence; Part 5: Privacy and personal data protection enhancement
- ETSI TS 103 523-3 Middlebox Security Protocol; Part 3: Profile for enterprise network and data centre access control
- ETSI TS 103 458 Application of Attribute Based Encryption (ABE) for PII and personal data protection on IoT devices, WLAN, cloud and mobile services - High level requirements

Many more…….

India

LITD 17 : Information Systems Security And Privacy

- IS/ISO/IEC 27001 Series Information security, cybersecurity and privacy protection Information security management systems- Requirements
- IS 17428 (Part 1 and Part 2) Data Privacy Assurance Engineering and Management

LITD 16 Identification & Data capture techniques, Cards and Security Devices

- IS 14202 (Part 6) : 2018/ ISO/IEC 7816-6:2016 Identification cards — Integrated circuit cards — Part 6: Interindustry data elements for interchange

LITD 15 Data Management System

- IS 18743 : 2024 / ISO/IEC TR 9789 : 1994 Information technology - Guidelines for the organization and representation of data elements for data interchange Coding methods and principles
- IS/ISO/IEC 21778 : 2017 Information Technology The JSON Data Interchange Syntax

LITD 27 : Internet of Things and Digital Twin

- ISO/IEC 30161-1:2020 Data exchange platform for IoT services - Part 1: General requirements and architecture

LITD 31- Cloud Computing, IT and Data Centres Sectional Committee

- IS/ISO/IEC 19944-1:2020: Cloud computing and distributed platforms – Data flow, data categories and data use — Part 1: Fundamentals
- ISO/IEC 19944-2:2022: Cloud computing and distributed platforms — Data flow, data categories and data use — Part 2: Guidance on application and extensibility

Conclusion

- As more and more of us access the digital world, generating more and more data, a supportive digital infrastructure will be needed.

- Global Industry Alliances & Standards Bodies should work together capitalizing global SDOs (3GPP, ISO/IEC/JTC, ITU) to develop and promote standards for emerging technologies

    - One Standard for All

EU -India Trade and Technology Council:

- Under the **EU -India Trade and Technology Council**, collaboration on 5G/6G and other related emerging technologies such as AI, Quantum computing, Security and Data Privacy etc. have been identified as part of digital dialogue & partnership.

Dinesh Chand Sharma
(Seconded European Standardization Expert in India)
Director – Standardization & Public Policy
SESEI C/O AltF, 2ND Floor (TR-211 && 214), 101
Ishwar Nagar, Okhla, New Delhi 110044
Mobile: +91 98100794610
dinesh.chand.sharma@sesei.eu
www.sesei.eu ⇔ www.sesei.in