



Indian Standardization Landscape

(Research integration into Standardization)



Agenda

- EU Project SESEI
- Indian Standardisation Bodies & their integration with International Standards Organisations
 - BIS , TEC , TSDSI
- Why Research integration into Standards & Activities Undertaken by India
 - DST, BIS , C-DOT , MEITY
- EU-India Partnership Instruments
- Conclusion



EU Project SESEI is a local presence in India

SESEI (Seconded European Standardization Expert in India): local face for the European standardization community in India



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



Indian Standardisation Bodies

BIS, TEC and TSDSI



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Main Standardization bodies in India in ICT Sector

**Indian
Standardization**

**Bureau of Indian standards
(BIS)**



**Telecommunication
Standards Development
Society for India (TSDSI)**



**Telecommunication
Engineering Centre (TEC)**



Integrated with International

Objective - Avoid duplication of work at International and European levels with an aim for a identical worldwide standards



“Vienna Agreement” with
Chemistry, Material, Energy, Environment, Transport,
Construction, Services, eMobility etc



Founding member of
ISO and working with
IEC since 1911



“Frankfurt Agreement” with
Electricity, Electro-technical



MoU for telecommunications sector (ITU-T),
Agreement on radio-communication
sector (ITU-R)
Information & Communication Technologies (ICT)



DoT/TEC are member
of ITU-T and WPC for
ITU-R



Founding Partner to 3GPP & oneM2M



Organisational Partner
of 3GPP and Partner
Type 1 of oneM2M



Bureau of Indian Standards (BIS)



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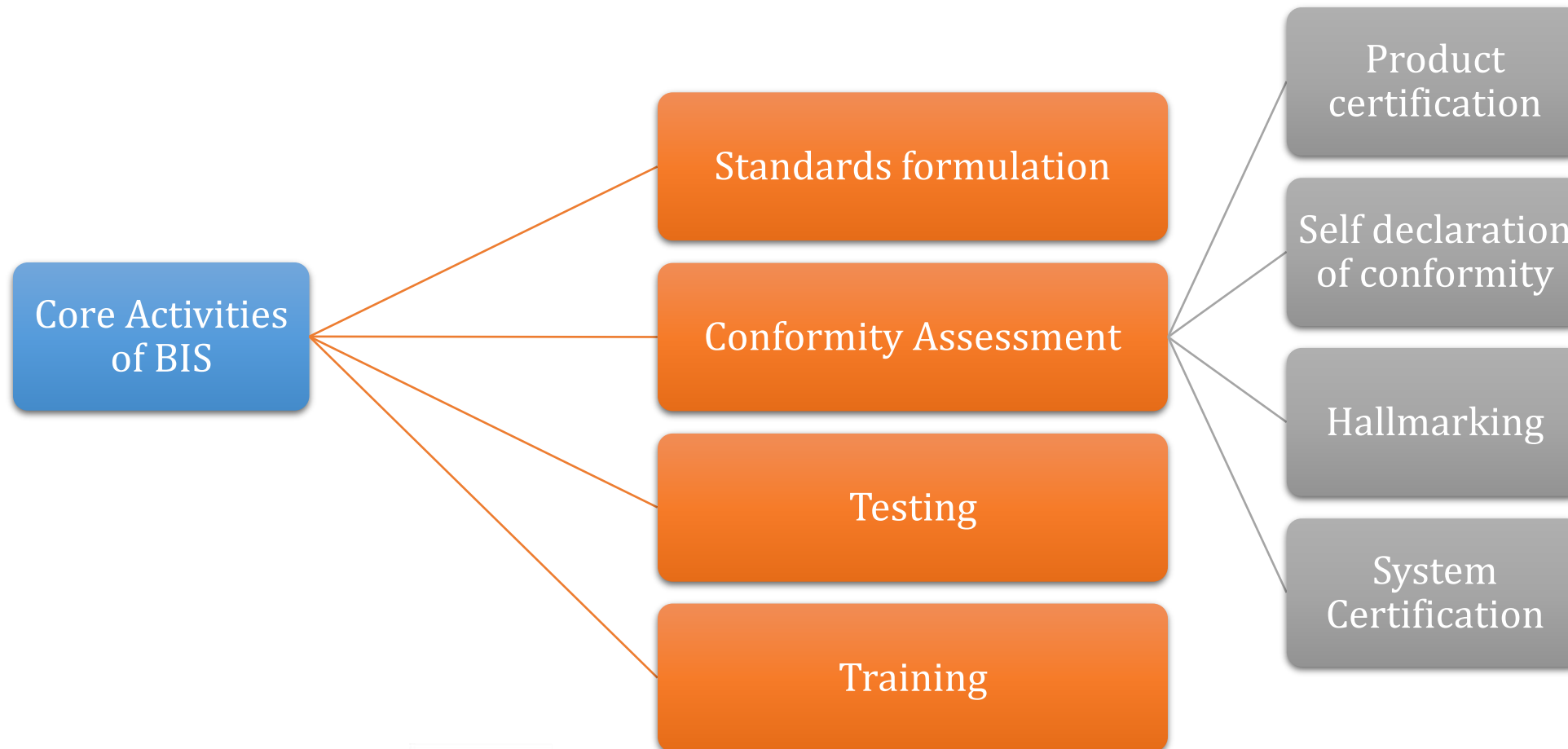
ETSI



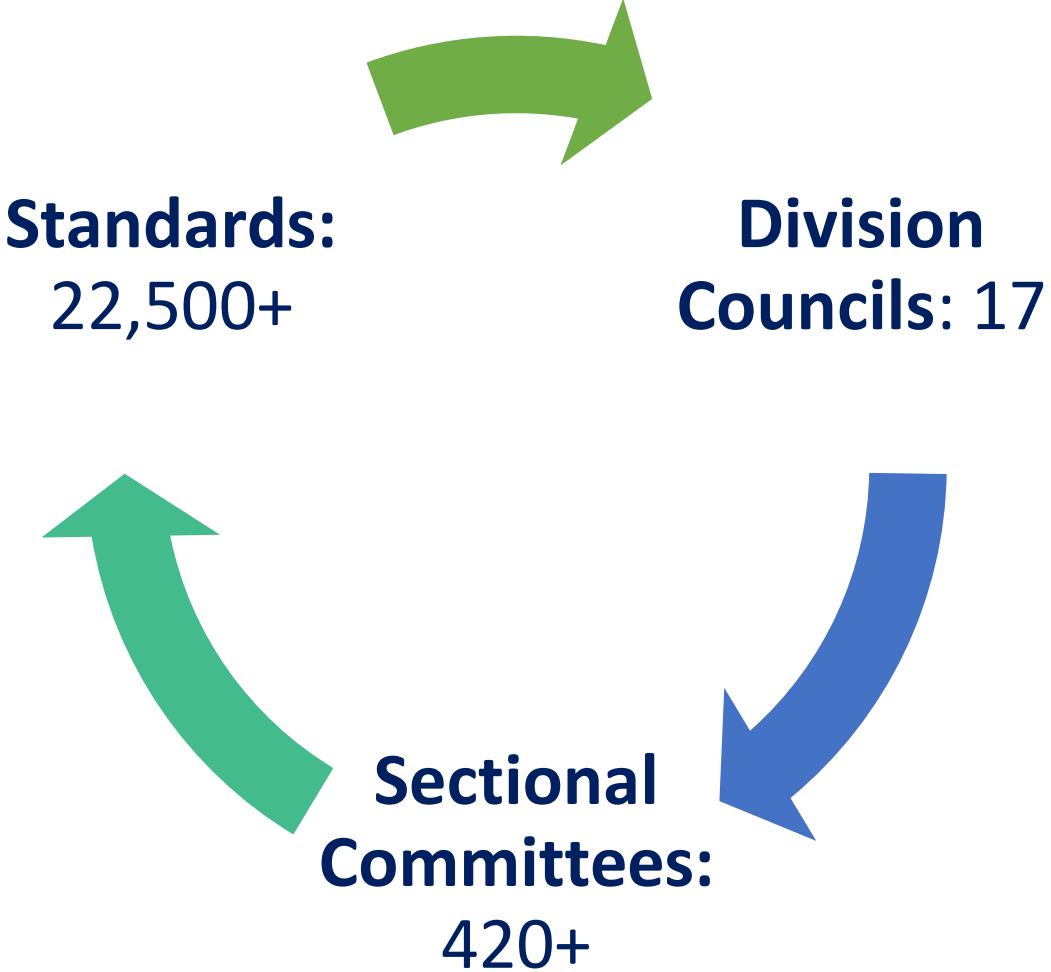
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Bureau of Indian Standards (BIS)

National Standards Body of India, driven by the Bureau of Indian Standards Act 2016

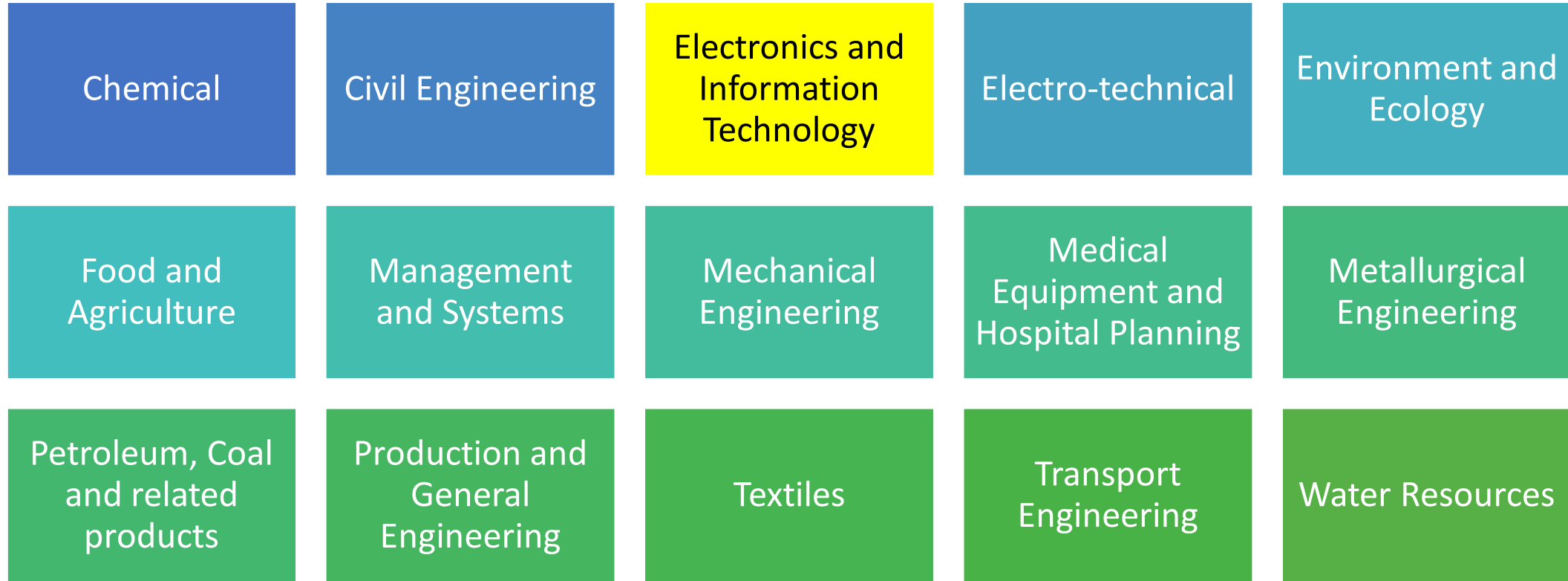


Standards development at a glance



Technical Divisions at BIS for Standardization

Standards are set by 420+ technical committees under 17 division councils



New Initiatives (1)

Standards National Action Plan (SNAP) 2022-27

- SNAP provides a set of actions that would enable BIS to help meet the objectives of making standardization processes efficient, increase awareness and implementation of standards, increasing participation and involvement in national and international standardization and ensure harmonious standardization activities in the country.

Creation of BIS Standardization Chairs in Premier Technical/Educational Institutions

- BIS has entered into MoU with Premier Technical Institutions of the country to develop collaborative activities in the field of Standardization and Conformity Assessment and has also appointed a Standardization Chair in these institutes.
- This is expected to provide leadership in coordinating R&D efforts towards development of standards in new and emerging technologies and undertaking review of Indian Standards involving thorough analysis of technical developments.

Institutionalization of Annual Programme for Standardization

- To broad-base the stakeholder participation in formulation and review of standards, BIS now closely working with Government Ministries and premier industry associations to provide an Annual Programme for Standardization to BIS, addressing the products/processes/ systems/services on which BIS needs to formulate or revise Indian Standards.

Mapping of Standards against Missions, Programmes and Schemes of Government

- This is aimed at preparing an inventory of the Indian standards formulated, standards under development and the subjects in the need of standardization for various government missions, programmes and schemes for optimum clarity on the role and relevance of the standards in creating a vibrant quality ecosystem in the country.



New Initiatives (2)

Strengthening Standardization Cells as Institutional Mechanisms

- Standardization Cells created in Industry Associations facilitate consultations and dialogue among the members of the industry as well as with the professional bodies, scientific organizations, and domain area experts related to that field on the identification of new areas for development of standards as well as for revision of existing standards.
- Standardization cells are expected to become active drivers of national standardization efforts.

Aligning the standards to the Sustainable Development Goals

- BIS is transforming the way, the Standards are formulated and making concerted efforts through experts to ensure that the sustainability dimension to the Indian Standards is deeply ingrained so that it leads to inclusive growth of the industry and results in achieving orderly and sustainable development.

Recognition of SDOs

- Convergence of standardization efforts leading to a single standard in the country is of strategic importance in establishing a strong India brand identity in the realm of quality in the global market.
- BIS has introduced a SDO recognition scheme which allows BIS to recognize other domain specific SDOs (complying with the WTO-TBT Code of Good Practices) including in emerging technological areas and to also recognize where required, the standards of such SDOs as Indian Standards



International Cooperation

- Founder member of ISO
- Represents India through Indian National Committee (INC) in the IEC as a member
- Participating (P) member of 500+ committees and Observer (O) member in 180+ committees of ISO
 - India holds the Secretariat of 11 ISO committees and Convenorship of 21 ISO working groups.
- Participating member of 120 Technical Committees and observer member in 54 Technical Committees of IEC.
 - India holds the Chairmanship of the IEC Systems Committee on 'Low Voltage Direct Current (LVDC) and LVDC for electricity access' and of IEC/TC 33 'Power capacitors and their applications'
- Member of regional standards bodies like Pacific Area Standards Congress (PASC) and South Asian Regional Standards Organization (SARSO).
- 31 Memorandum of Understanding (MoU) & 8 Bilateral Agreements
 - MoU b/w [ETSI↔BIS](#), [CEN-CENELEC↔ BIS](#) and [CEN \(EN-115\)↔BIS](#)



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Telecommunication Engineering Centre (TEC)



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TEC - Introduction

TEC is the technical wing of DoT (Department of Telecommunications), Ministry of Communications and acts as a National Standards Body (NSB) for Telecom sector

Functions:

- Specification of common standards for Telecom network equipment, services and interoperability.
- Prepare and Publish Generic Requirements (GRs), Interface Requirements (IRs).
- Issuing Interface Approvals, Certificate of Approvals, Service Approvals & Type Approvals.
- Formulation of Standards and Fundamental Technical Plans.
- Interact with multilateral agencies like APT, ETSI and ITU etc. for standardization.
- Develop expertise to imbibe the latest technologies and results of R&D.
- Provide technical support to DOT and technical advice to TRAI & TDSAT.
- Coordinate with C-DOT on the technological developments in the Telecom Sector for policy planning
- Designated National Enquiry point for WTO-TBT for telecom sector

TEC has four Regional Centres (RTECs): RTEC (NR) at New Delhi, RTEC (ER) at Kolkata, RTEC (WR) at Mumbai and RTEC (SR) at Bengaluru



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TEC - Technical Activities

Technical activities are carried out through various specialized core divisions of TEC

List of divisions in TEC

- [6G Technologies](#)
- [Access Lab \(AL\)](#)
- [Administration \(A\)](#)
- [Control Lab \(CL\)](#)
- [Convergence & Broadcasting \(C&B\)](#)
- [Customer Premises Equipments & Terminals Lab \(CPE & TL\)](#)
- [Fixed Access \(FA\)](#)
- [Future Networks \(FN\)](#)
- [Indigenous Manufacturing Promotion & TBT Enquiry Point \(IMP & TEP\)](#)
- [Industry Coordination \(IC\)](#)
- [Information Technology \(IT\)](#)
- [Internet of Things \(IoT\)](#)
- [Mobile Technologies \(MT\)](#)
- [MTCTE](#)
- [Personnel & Training \(P&T\)](#)
- [Radio \(R\)](#)
- [Regional Coordination \(RC\)](#)
- [Safety Lab \(SL\)](#)
- [Standardization \(SD\)](#)
- [Telecom Security \(TS\)](#)
- [Telecom Skill Development \(TSD\)](#)
- [Transmission \(TX\)](#)
- TEC is also responsible for [conformity Assessment](#) activities and has been appointed as Designating Authority (DA) for Telecom Equipment
- M2M WGs at TEC have released various [Technical Reports](#) (Release 1, Release 2 and Release 3).
- TEC has signed MoU with AMRITA UNIVERSITY and IIIT Delhi, to drive innovation in the realm of Trustworthy and Responsible Artificial Intelligence Systems.



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TEC - International collaboration

TEC participates & follow programmes of standardization bodies such as ITU, 3GPP, OneM2M, ETSI, IEEE, IETF, APT, OCEANIS etc. (directly/indirectly)

3rd Generation Partnership Project (3GPP)

- Adopted/adopting 3GPP standards transposed by Indian SDOs like TSDSI

OneM2M

- TEC has approved adoption of TSDSI transposed oneM2M Release 2 in September 2020 and Release 3 in August 2022.

International Telecommunication Union (ITU)

- National Working Groups (NWGs) have been constituted in TEC in line with ITU-T Study Groups
- Each NWG has members from the industry, academia, government, research organizations etc.



Telecommunication Standards Development Society, India (TSDSI)



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TSDSI - Introduction...

- Indian Telecom Industry, comprising operators and manufacturers, Academia and R&D organizations formed TSDSI on 7th January 2014, with an objective to contribute to next generation telecom standards and drive the eco-system of IP creation in India.
- It is an autonomous 'not for profit' SDO for Telecom products and services in India
- Department of Telecommunications (DoT) & Ministry of Electronics and Information Technology (MEITY), Govt. of India are jointly supporting TSDSI as India's Telecom/ICT SDO.

Functions:

- ✓ Develop standards to support new requirements based on research & innovation;
- ✓ Take Indian requirements to global standards organizations;
- ✓ transparent, open-to-all-members process for making standards;
- ✓ Creating and Safe-guarding related IPRs;
- ✓ to create standards-based manufacturing expertise in the country;
- ✓ Providing guidance and leadership to other developing countries;



TSDSI - Technical activities

Technical activities of TSDSI are conducted in two Study Groups

Study Group 1- Networks

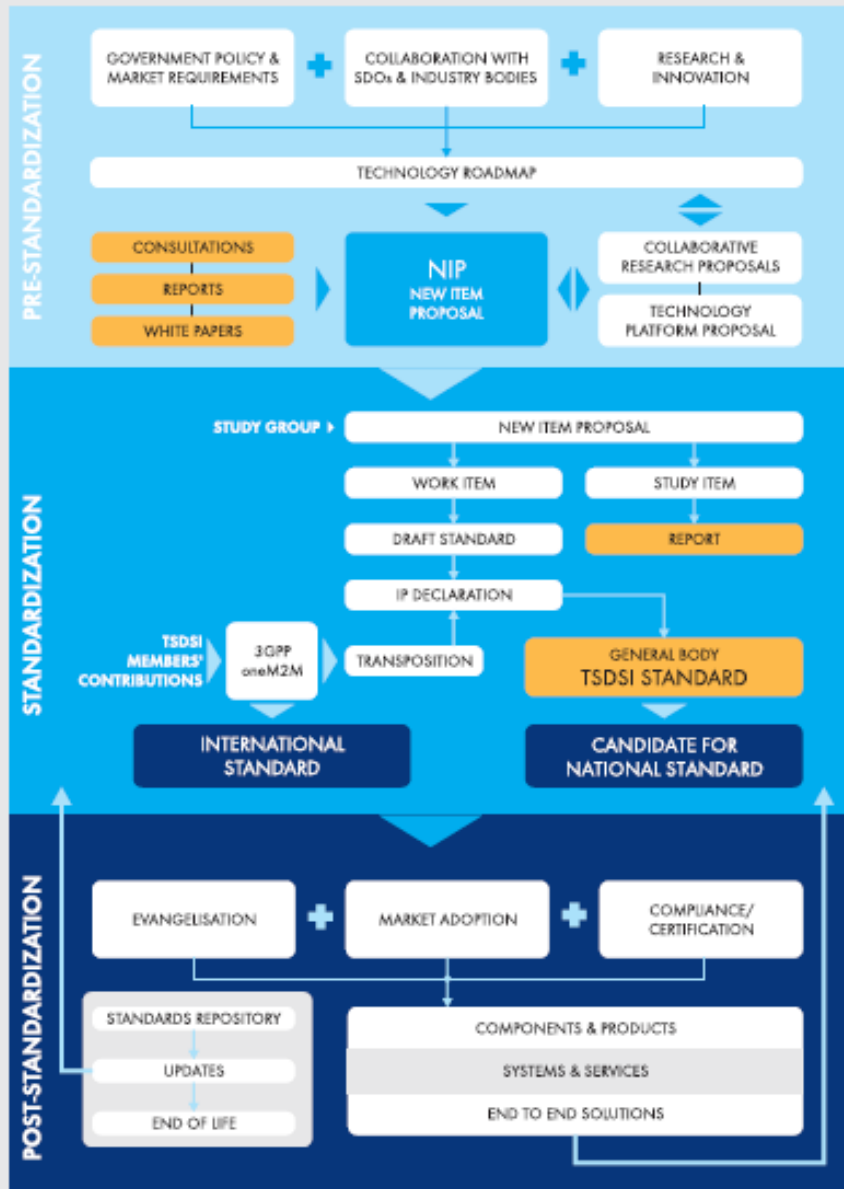
Key focus areas:

- Spectrum Studies
- 5G/5Gi Enhancements
- 6G
- Open Systems
- Broadcast offload
- Wireless Backhaul

Study Group 2- Services & Solutions

- Security-Trust-Privacy-Data Protection
- Applications and Service Layer Standards, AI/ML
- Smart Infra, Critical Communications, Cloud & IoT

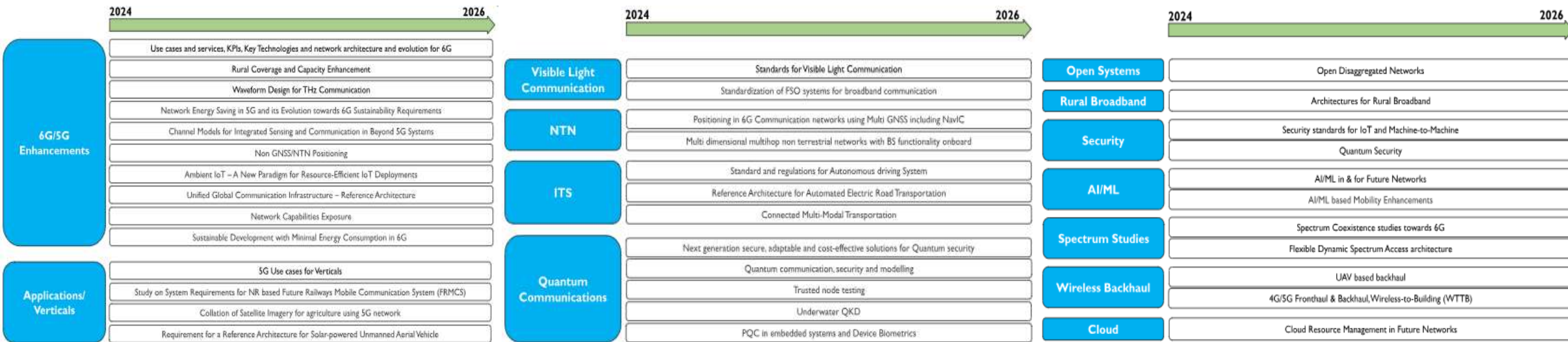
Standards Life Cycle



TSDSI standardization roadmap 3.0 (2024-26)

TSDSI released its [Standardization Roadmap 3.0 \(2024-2026\)](#) to identify technology topics that are strategically important for carrying out technical studies or developing standards

- Visualization of roadmap can be seen below, where the topics have been arranged into 13 broad technology areas or clusters.



TSDSI - International Collaborations

- Letter of Intent to Co-operate with ARIB (Japan), ATIS (US), CCSA (China), TTC (Japan)
- Cooperation agreements with international SDOs: ETSI (Europe), Open Connectivity Foundation (OCF)
- MoU with 5G IA, ATSC, GCF, IEEE-SA, TAICS, TIA (US), TTA (Korea), WWRF
- Member of ITU
 - Associate member of ITU-R SG5 and ITU-T SG15.
 - TSDSI members are also contributing to Focus Groups on Machine Learning for Future Networks (FG ML5G) and Autonomous Networks (FG AN).
- Organizational Partner (OP) of 3GPP
 - TSDSI has transposed 3GPP specifications from Release 10 to 17 (total 428 documents) into TSDSI Standards (<https://tsdsi.in/3gpp/>)
 - TSDSI's 5Gi standard has also been formally merged with the 3GPP 5G Standard and implemented into the 3GPP Rel-17 NR specifications.
- Partner Type I of oneM2M
 - TSDSI has Transposed oneM2M Specifications Rel. 2 and Rel. 3 into TSDSI Standards. (<https://tsdsi.in/onem2m/>)
- Constituent SDO of Global Standards Collaboration (GSC)



Why Research integration into Standards

- Standardization is an efficient way for taking research towards industrial exploitation
- Standards are vital in innovation and have the power to increase the impact of R&I projects
 - Impact and market access: applying existing standards and generating new ones increases the impact and market access of R&I projects and activities. It generates user trust and makes the project results more accessible to industry and societal actors
 - Network: participating in standardization enlarges the R&I network with relevant stakeholders sharing the standardization works
 - Recognition: Standardization helps the R&I community gain recognition for their work by acknowledging the participation in standardization works or including references to relevant scientific publications in standards.
- Indian SDOs i.e. BIS, TEC and TSDSI are offering support to research organizations and bodies to help engaging in the process.



Research - Department of Science & Technologies

Research & Development Programmes :

- [Nano Science and Technology \(NS&T\)](#) : Nano Science and Technology in the areas of Nano Science and Technology
- [National Geospatial Programme \(NGP\)](#): Promotion of R&D in emerging areas of Geospatial science and technology.
- [Cognitive Science Research Initiative \(CSRI\)](#) : Design of better software technologies and artificial intelligence devices, better learning tools and educational paradigms etc.

Innovation and Technology Development Programmes

- [S&T Entrepreneurship Development \(S&TED\)](#): To network agencies of the support system, academic institutions and Research & Development (R&D) organizations to foster entrepreneurship and self-employing using S&T with special focus on backward areas as well.
- [Technology Development and Transfer \(TD&T\)](#): Support R&D for development of innovative technologies in identified areas.
- [Technical Research Centres \(TRC\)](#): to provide techno-legal-commercial and financial support to scientists, entrepreneurs, and business fraternity to achieve translation of research into products and processes



Research - BIS

- Recognising the vital importance of R&D in standardisation process, BIS is intensifying its efforts to address the challenges posed by rapid technological advancements and the transformative changes in business and social spheres.
- BIS has entered into MoUs with premier research/educational institutions, including IITs and NITs, thereby tapping into the vast intellectual capital available with their faculty and research scholars.
 - Through these MoUs, [BIS](#) aims to promote R&D necessary for standards formulation while simultaneously supporting the research ecosystem within these educational institutions.
 - This strategic partnership facilitates a comprehensive approach to R&D, encompassing focus group discussions on chosen subjects for standardisation, and detailed field-level studies of current processes and practices in product manufacturing and service delivery.
- **82 Projects with Top Scientific Institutes Sanctioned to Boost Advanced Standardisation Efforts.** The focus areas of these projects include cutting-edge domains such as:
 - Artificial Intelligence, Blockchain Technology, Medical Devices, Renewable Energy, Sustainability, Smart cities, Digital Transformation.



Department of Telecommunications (DoT) Initiatives

- **July 2023, Ministry of Communications** announced **Bharat 6G Alliance (B6GA)**, a collaborative platform comprising public and private companies, academia, and research institutions to advance **6G technology**
- **Aims and Objectives**
 - To enable India to become a leading global supplier of IP, products and solutions of affordable 5G and 6G and other future telecom solutions;
 - To support and energise Indian participation in standard development organizations;
 - To build coalitions with similar 6G Global Alliances and other global technology alliances and associations;
 - To address India's priorities for contribution to 6G and other future technology-related global standards, deployments, products, operations and services;
 - To study and recommend national requirements and enable their inclusion in Indian and international standardization bodies;
 - To identify priority areas for research by involving all stakeholders including industry, academia, and service providers, spanning theoretical and simulation studies, proof-of concept prototypes and demonstrations, and early market interventions led by start-ups etc.
- **DoT is also planning to launch a new initiative to assist organizations and startups in adopting emerging Industry technologies.**
 - By identifying sector-specific needs in at least 10 sectors and providing targeted support, the initiative aims to establish a robust ecosystem capable of capitalizing on AI, IoT, cloud computing, and integrating 5G and 6G networks.



Research - Centre for Development of Telematics

- C-DOT is the premier telecom R&D centre of Department of Telecommunications, Ministry of Communications, Government of India
- In line with the initiative of Gol, 'Atma Nirbhar Bharat' C-DoT has enabled programs to bring together academia, industry, startups and other research bodies in the area of telecommunications and other associated technologies.
 - The aim is to promote innovation, research and indigenous product development reaching out to remote and rural areas.
- **Integrated R&D Programs:**
 - **Telecom Technology Development Fund (TTDF)**, Gol scheme driven by funds received under USOF/DoT scheme for collaborative R&D to enable affordable broadband and mobile services in rural and remote areas.
 - C-DoT facilitates, monitors and drives the collaborative R&D for the development of such projects.
 - **C-DoT Collaborative Research Program (CCRP):** Programs under CCRP scheme are funded by C-DoT to promote indigenous R&D development.
 - **C-DoT's Incubation Programs** to create a world-class startup ecosystem by leveraging its telecom expertise/resources for hand-holding and collaborating with prospective start-ups for synergetic innovation.

[Source>>](#)



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Research - Ministry of Electronics & IT

- MEITY promotes R&D in Emerging areas of Information Technology for development of new technologies/ software.
- Divisions under R&D in Electronics Group:
 - [Electronics Systems Development & Application](#) , [R&D in Medical Electronics and Health Informatics](#) , [Electronic Materials & Components Development](#) , [Microelectronics Development](#) , [Nano-Technology Initiative](#) , [High Performance Computing\(HPC\)](#)
- Major thrust areas includes:
 - Quantum Technology, Blockchain based solutions, Non-financial Web3 Applications, Perception and Cognitive Engineering, AR/VR/ Metaverse, Digital Twin, Multisensory Immersion, Deepfake, Application of Artificial Intelligence (AI), Artificial Wisdom, Edge computing, Industry 5.00++, Society 5.00++, Big Data Analytic, Green Computing, Digital Preservation, Free and Open Source Software
- Centre for Development of Advanced Computing (C-DAC): Meity R&D institution
 - High Performance Computing, Strategic Electronics, Multilingual & Heritage, Computing, Software Technologies, Cyber Security & Forensics, Quantum Computing, Health Informatics, Education & Training



EU-India Partnership Instruments

EU-India Strategic Partnership: A Roadmap to 2025 , Joint Declaration of May 2021

- Cooperation around Standardisation and its harmonisation to International Standards and promotion of existing international standards is key.
- Cooperation on digital standards and network security, 5G technology and beyond 5G, Joint Task Force on Artificial Intelligence, Quantum and High-Performance Computing, protection of personal data and privacy etc.

EU -India Trade and Technology Council:

- Under the **EU -India Trade and Technology Council (TTC) WG-1**, collaboration on Digital Connectivity, AI, 5G/6G, High Performance and Quantum Computing, Semiconductor, Cloud Systems, Cyber Security, Digital Skills and Digital Platforms etc have been identified as part of digital dialogue & partnership.
 - Under TTC, India and EU signed an MoU on Semiconductor on November 21, 2023.

EU-India Connectivity Partnership aligned with EU's Global Gateway

- Support sustainable digital, transport and energy networks, based on Sustainable Development Goals principles and commitment to implementing relevant international standards, to ensure a level playing field.



Conclusion

- Integrating research into the standardization (Standards based Research) is crucial to identify and address emerging topics in technology
- India's SDOs—BIS, TEC, and TSDSI—are proactively integrating research into standardization through multiple channels such as below among others:
 - Signed MoUs with various research/educations institutes to stay updated on cutting-edge technologies.
 - It also encourages research-driven participation in standardization by involving research bodies in its technical committees.
 - Collaborating with International SDOs to adopt International standards to ensure that standards are based on the latest research and technological advancements.
 - Organizing “Standards Awareness Workshops/seminars/webinars” to raise awareness about Standard Development Process and the crucial role of Standards in innovation and success in today's digitally driven ecosystem.
 - Goal is to bring together researchers, industry professionals, and policymakers to discuss the latest research trends and integrate them into the standardization process.
 - Encouraging Innovation through Research Projects, Focusing on Emerging Technologies and Research Integration, Developing Research and Standardization Roadmaps
- BIS and CEN/CENELEC/ETSI MoU, TSDSI & ETSI, ETSI & COAI, BIF, CEN-CENELEC-ISGF are instrumental in enhancing the cooperation b/w EU and India



Thank you!

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

