SESEC V

Report on SAC/TC28 Plenary Meeting 2025

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Seconded European Standardisation Expert in China

(SESEC)

Report on the SAC/TC28 Plenary Meeting 2025

1. Overview

On July 15, 2025, the National Information Technology Standardization Technical Committee (SAC/TC28), mirroring ISO/IEC/JTC1, commenced its first "Standards Week" event of 2025. The SAC/TC 28 plenary meeting was successfully held during the event, which was marked by the announcement of ***Information Technology Standardization Report*** summarizing the achievement of the TC28 in the past 5 years.

Over the past 5 years, TC28 has initiated 395 standards projects and published 338 national and sector standards. The TC has also facilitated the establishment of the first international subcommittee on brain-computer interfaces in the field of information technology.

During the plenary meeting, *"Information Technology Standardization Work Report"* was released, reviewing global IT industry trends and outlining SAC/TC28's progress in standardization across 4 key areas - **software applications, electronic information, emerging technologies, and future industries**.

2. Information Technology Standardization Work Report

(1) Overview of SAC/TC 28

The National Information Technology Standardization Technical Committee (SAC/TC28), founded in 1983, is China's leading body for IT standardization and mirrors to ISO/IEC JTC 1 (except SC27 and SC32). Covering standards from information processing and storage to system design and testing, it supports major state agencies under the joint guidance of the State Administration for Market Regulation (SAMR) and the MIIT.

Over four decades, SAC/TC28 has grown into one of China's largest and most influential standardization committees, driving IT industry development with strong global impact. TC28 has 20 technical sub-committees, 24 working groups and 4 research groups. Its subordinate organizations bring together leading forces across the industry, with members covering all key segments of the IT value chain, including research institutes, universities, leading enterprises, and innovative companies. To date, membership has expanded to over 2,000 organizations and entities.

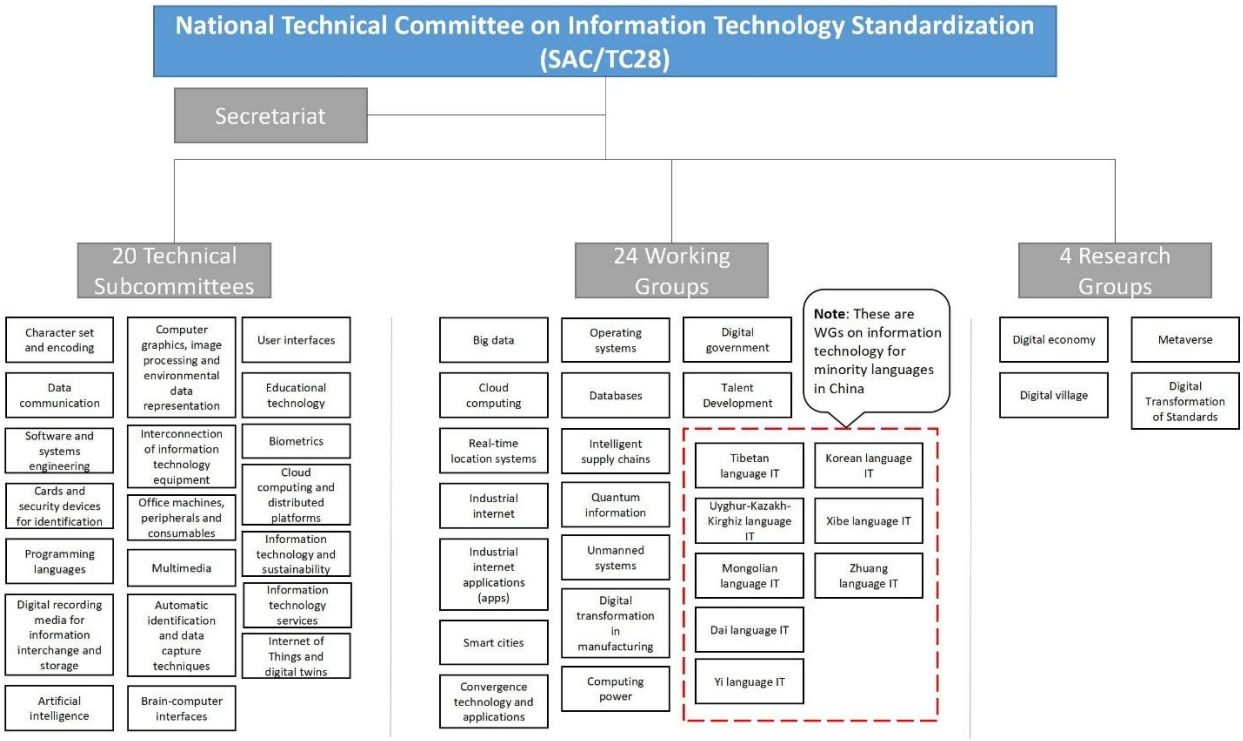

Figure 1. Organizational Structure of TC28

(2) TC 28 Information Technology Standards System

Information technology standards in China are classified and managed across **six levels**:

- Foundation,
- Technology,
- Products,
- Applications,
- IT services, and
- Management

These 6 levels are further divided into **48 sub-levels**.

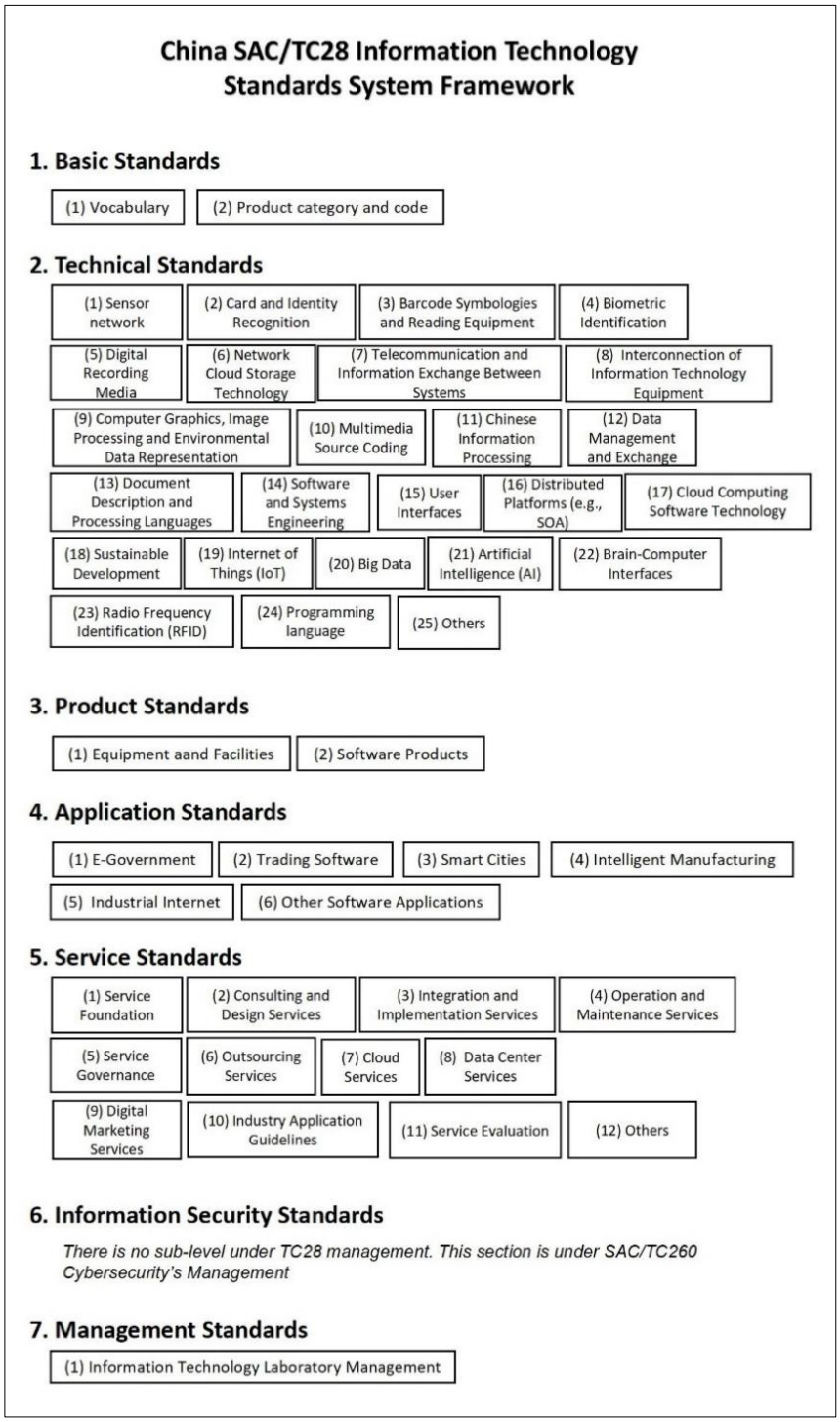

Figure 2. Framework of TC28 Information Technology Standards System

The standards system adopts a **"1+2+N" model:**

- "**1**"**:** a comprehensive and well-structured standard system is established (6 levels shown in Figure 2).
- **"2"**: annual standardization plans are formulated and dynamically updated based on execution results and proposals from subordinate organizations, with progress reported to the Department of Information Technology Development and the Department of Electronic Information under MIIT.
- **"N"**: sub-systems are built within each domain to ensure standards are effectively implemented at the vertical level (48 sub-levels shown in Figure 2).

As a result, a series of national standardization policies and standard documents came to fruition under the 1+2+N approach:

- *National Artificial Intelligence Industry Integrated Standardization System Construction Guidelines (2024 Edition)*
- *Cloud Computing Integrated Standardization System Construction Guidelines (2025 Edition)*
- *Internet of Things Standards System Construction Guidelines (2024 Edition)*
- *GB/T 45993-2025 Metaverse – Reference architecture*

(3) Standards Development

Since the inception of TC28, the technical committee has published **1631 national standards** and launched **237 standard development and revision projects** under the guidance of MIIT. In the past 5 years, 392 national standards and 14 industry standards were released, accounting for 23% of the total number of released standards. These standards are mainly distributed in fields such as **artificial intelligence, information technology services, biometric identification, software and systems engineering, cards and identity recognition security devices**.

There are 198 national standards and 41 industry standards under development, which are primarily concentrated in areas including **the Internet of Things, data communication, artificial intelligence, biometric identification, cloud computing, and interconnection of information technology equipment**.

Due to factors such as industrial development needs, technological innovation-driven forces, expansion of application scenarios, requirements for security and governance, the impact of international competition, and policy guidance, the proportion of standards in emerging technology fields among the national and sector standards released or under development in the past five years have increased significantly.

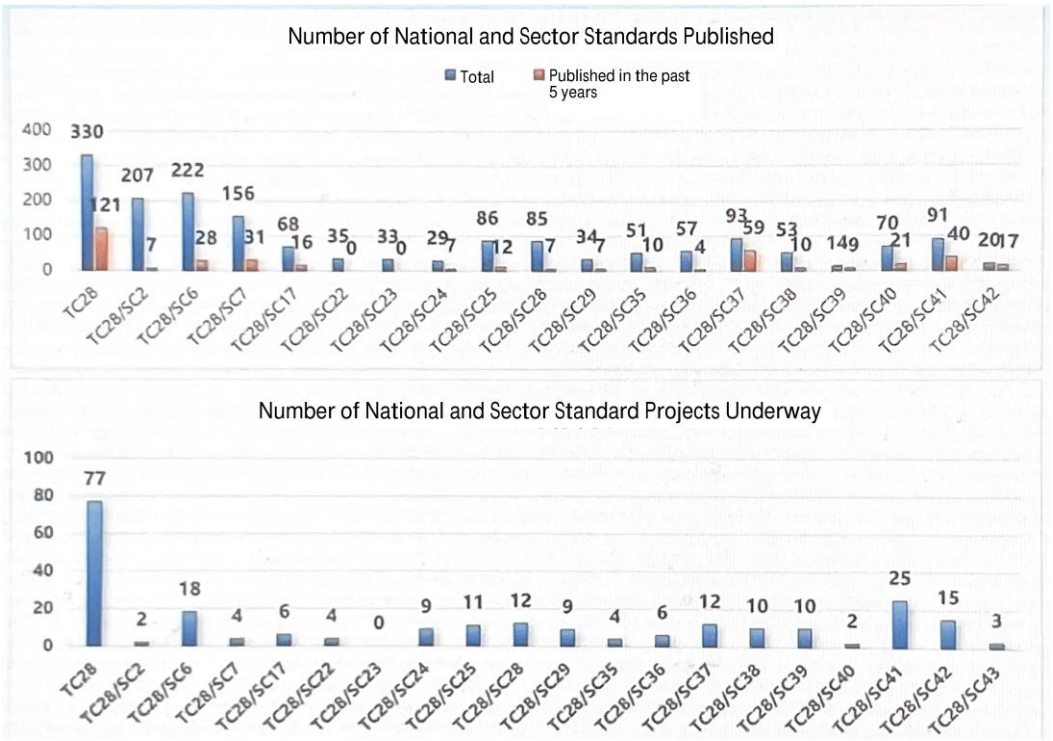

Figure 3. Statistics from TC 28

(4) International Standardization

Since 2021, China has significantly expanded its leadership in ISO/IEC/JTC 1 standardization, driving the release of **69 international standards in 5 years** - representing 55% of China's total 125 standards and marking a 116% increase from the 32 standards established during 2016-2020. These standards cover critical technological domains including **cybersecurity, IoT, data management, multimedia coding, cloud computing, AI, system interoperability, smart cities,** and **brain-computer interfaces**. Concurrently, **China has proposed 57 new international standard projects in JTC 1**, a 58% growth from the previous period's 36 projects, with focus areas spanning multimedia technologies, IoT, IT equipment interconnection, user interfaces, educational technology, AI, and BCI systems.

Figure 4. Statistics from TC 28

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China's standardization leadership is further demonstrated through its strong expert representation, with 34 Chinese professionals holding key leadership positions across JTC 1 committees. The country has registered over 1,000 international experts in JTC 1 and its subcommittees, achieving complete coverage across all working groups - a distinction shared with only five other nations (the U.S., Germany, South Korea, India, and Japan) among the 45 participating member countries. This comprehensive representation spans the entire IT industry chain, including academia, research institutions, and industrial organizations.

A prime example of this leadership is TC28's pivotal role in emerging technology standardization, having established three key bodies:

- In 2016, **ISO/IEC JTC1/WG11 Smart Cities** was established where CESI experts hold the secretary position. Currently, TC28 is advancing formation of a new joint technical committee on Smart Cities, JTC 4 under ISO/IEC.
- In 2020, **ISO/IEC JTC1/WG14 Quantum Information Technology** was established with a CESI convenor; and
- In 2022, **ISO/IEC JTC1/SC43 Brain-Computer Interfaces** was established where CESI experts occupy both the president and secretary roles, solidifying China's position at the forefront of cutting-edge technology standardization.

3. Standards Development in Each Technology Sector

(1) Software applications

Under MIIT's guidance, TC 28 had advanced standardization across several key areas:

Basic software: published 9 sector standards on safety and trustworthy requirements of basic software.

Software and system engineering: released 144 national standards and 20 sector standards that establish full-stack software engineering standards framework. Established two new working groups: Automotive Industry Software Standards Working Group (TC28/SC7/WG7) and Intelligent Software Engineering Standards Working Group (TC28/SC7/WG8).

In recent years, based on the specific circumstances of software system development in China, TC28 has developed **four major standard conformity assessment systems**. These systems have empowered over 100 enterprises in sectors such as software, finance, insurance, industry, energy, and education to achieve high-quality software development:

- *GB/T 25000 Series System and software engineering – Systems and software Quality Requirements and Evaluation* (**SQuaRE**)
- *T/CESA 1159-2021 Software Maturity Standard* (also known as, Chinese Software Process Maturity Model, **CSMM**, Chinese version of CMMI)
- *GB/T 42560 – 2023 System and software engineering – Development and operations – Capability maturity model* (**DOMM**)
- *GB/T 36964 – 2018 Software engineering – Specification for software development cost measurement*

Internationally, TC28 experts have taken up the convenor role in **ISO/IEC JTC1/SC7 Software and Systems Engineering** and contributed to the establishment of **AHG11 Low Code Development**. China has participated in development of 20 international standards and led development of 7 international standards. Notably, the international standards of **Low code** and **DevOps** were converted from Chinese national standards.
Industrial software: To support MIIT's 14th Five-Year Plan for developing software and information technology service industry, TC28 developed a guideline for constructing standards system of industrial software and published in 2022. These guidelines outlined 6 major aspects of the standards system framework: foundational and general standards, data models, core components, products, application support, and sector-specific applications.

Meanwhile, 1 national standard is under development:

- *20193195-T-269 Industrial software—Quality requirement*

1 national standard is published:

- *GB/T 43738-2024 Industrial internet platform—Heterogeneous protocol compatible adapter requirements*

Technology for Integration and digitalization of manufacturing: In 2022, TC28/WG29 Integrated Technology and Application was established. This working group focuses on standard formulation and development of standards system for integrated technology and its application. The working group published ***GB/T 42562-2023 Selection requirements of industrial internet platform, IIPS***, which is the first national standard within the field. This standard sorts out 27 capability items from four dimensions, technology, business, deployment and safety.

In 2024, TC28/WG35 Digitalization of Manufacturing Industry was established. This working group focuses on standards formulation, research of standards system and standards application. This working group is currently working on 1 national standard which is ***20240601-T-469 Capability requirements of digital transformation service providers*** and about to launch 6 more standard projects.

(2) Electronic information

Computing and storage: In terms of basic standards, TC28/SC28 Computing technology has published over 80 national and association standards. The standards cover products such as complete machines, components, and peripheral consumables, and carries out the development of standards for common technologies, support services,

and evaluation methods. These efforts underpin and guide the advancement of computing technology and its industry.

TC28/SC23 Storage technology supports higher-level administrative bodies by conducting research on data storage development, producing industry reports, supply chain analysis reports, and a comprehensive panorama of the data industry. These outputs serve as key references for the formulation of future industrial policies.

Green intelligent computing: TC28/SC39 Information Technology and Sustainable Development mirrors ISO/IEC JTC1/SC39. The work of SC39 is divided into two main directions:

- sustainability within the field of information technology itself and
- leveraging information technology to advance sustainability in other domains.

Within the IT sector, its sustainability efforts focus primarily on standardization for computing infrastructure.
In recent years, TC28/SC39 has been dedicated to support policy drafting. SC39 has supported MIIT with policy documents such as Guiding Opinions on Strengthening the Construction of Green Data Center (2019) and several energy-efficiency-related policies.

SC39 has assisted 6 government bodies, including MIIT, the National Government Offices Administration, the National Energy Administration, and the Ministry of Commerce, in carrying out the selection process of national green data centers and developing relevant evaluation guidelines. SC39 has also participated in the drafting of the *"Special Action Plan for Green and Low-Carbon Development of Data Centers"*(published in 2024*)* led by the National Development and Reform Commission.

Over the years, SC39 has been accelerating the development of national standards in areas where they are currently lacking, such as liquid cooling technology, computing energy efficiency, water efficiency, carbon assessment, and the use of green electricity. Strengthen research and standardization efforts in cutting-edge fields like computing-power grid coordination and the application of green microgrids.

Here is a list of standards research projects that SC39 has been doing. Some of the projects do not reveal a project code or the codes are not approved yet:

- *20242363-T-469 Technical specifications for cold plate liquid cooling system of data center*
- *Alternating current microgrid – Part 1: Methods of assessing power quality*
- *Computing-Power Grid Coordination Part 2: General requirements*
- *Data center – Resource utilization – Part 5: Carbon Usage Effectiveness*
- *Water-saving enterprise – Data center sector*
- *Information technology – Green electricity system application – Part 1: Accounting methods*

In 2025, SC39 published the country's first national standards on green data-center evaluation:

- *GB/T 44989-2024 Evaluation for Green Data Center*

(3) Emerging technologies

Information technology service: In 2014, TC28/SC40 Information Technology Service was established. Till today, there are 9 working groups and 108 committee members under SC40. SC40 develops ITSS Standard system 5.0, that aligns with development trends of information technology.

In the past five years, TC28/SC40 has published **22 national standards** and **10 association standards** covering areas such as general requirements, consulting, integration, operations and service management and control, and service outsourcing, etc.

So far, over 40 assessment centers in 34 cities have officially adopted ITSS conformity assessment. Nearly 6000 enterprises have been certified under ITSS conformity assessment system. The ITSS Operation and Maintenance series of standards introduced a four-element service capability model—People, Process, Technology, and Resources (PPTR). It established both technical and management frameworks for the operation of data centers and application systems, driving breakthroughs in core technologies and fostering the development of over 140 independent operation and maintenance software products.

Cloud computing and distributed platform: TC28/SC38 Cloud Computing and Distributed Platform rolled out standardization work in four directions.

Firstly, the SC continuously improve top-level design of the standards system and iterate the structure of cloud computing standards system. SC38 will publish *Guidelines for Construction of a Standardization System for Cloud Computing (2025 revision)* soon.

Secondly, SC38 has been prioritizing development of critical and urgent national standards. So far, the SC has published over 60 national and association standards. Between 2024 and 2025, they have published 6 national standards:

- *GB/T 32399-2024 Information technology – Cloud computing – Reference architecture (NEQ of ISO/IEC 22123-3:2023)*
- *GB/T 44158-2024 Information technology – Cloud computing – Functional requirements of cloud native application support platform*
- *GB/T 45400-2025 Information technology – Cloud computing – General requirements of HPC in cloud*
- *GB/T 45399-2025 Information technology – Cloud computing -General technical requirements of hyper converged infrastructure system*
- *GB/T 44271-2024 Information technology – Cloud computing – General technical requirements of edge cloud*
- *GB/T 44229-2024 Basic requirements of community service system based on cloud computing in major public health emergency*

Thirdly, SC38 has formed standards system framework for **open source**. Standards planning will be carried out from five dimensions: basic and generic, governance, application, supply chain and security. SC38 established Mulan Open-Source Community and developed Mulan Permissive Software License Family. Mulan PSL v2, from the license family, became the first OSI certified English Chinese bilingual international license for open-source technology.

Internationally, SC38 has led the formation of 2 international standards, participated in the editing of 3 international standards and accumulated over 30 registered experts.

IoT and digital twin: TC28/SC41 IoT performs standardization work in 3 aspects.

(1) Policy support

SC41 supported MIIT with drafting *Guidelines for Construction of a Standard System for Internet of Thing (2024 version)*. To date, China's IoT standardization landscape can be summarized into three points:

i. Foundation standards are nearing completion. These standards comprehensively cover terminology for the IoT and sensor networks, reference architectures, interfaces, classification of application services, identification, evaluation, security, and talent development.
ii. Technical standards are largely established. They pertain to sensing technologies, network and communication technologies, data processing technologies, as well as emerging technologies.
iii. Application standards are progressing steadily. These involve domains such as smart cities, smart agriculture, smart energy, public safety, intelligent transportation, smart construction, smart cultural tourism, smart homes, and smart education.

(2) Developing Standards for IoT and fulfilling industrial demands

SC41 has published 87 national standards, 3 sector standards (1 in a foreign language). Currently, SC41 is developing 19 national standards and 11 sector standards. These standards cover fundamental and application aspects. Fundamental standards include architecture, transfer, interoperability, gateway, interface, labeling, testing and evaluation. Application standards cover industry, agriculture, forestry, smart home, smart city, smart energy, smart metering, smart healthcare and financial pledging.

(3) International standardization

TC28/SC41 mirrors ISO/IEC JTC1/SC41. China has led development of 17 international standards out of 49 published standards and 36 ongoing standard projects. The 17 standards led by China include basics, interoperability, application, sensor network and underwater acoustic network.

Extended reality (XR) and virtual digital humans: TC28/SC24/WG2 and WG3 perform XR and virtual digital human related standardization work. Both WGs have published 11 national standards and are undertaking 9 national standard projects.

Internationally, SC24 is leading the development of 2 international standards:

- *ISO/IEC AWI 24940 Information technology – Computer graphics, image processing and environmental data representation – Computer vision terminology*
- *ISO/IEC AWI 23595 Computer graphics, image processing and environmental data representation – User Experience Design in AR/MR/VR*

and co-editing 1 international standard:

- ISO/IEC CD 24931-1 Information technology – Metaverse – Part 1； Concepts, definitions and terminology

(4) Future industries

Brain-computer interface: In 2022, ISO/IEC JTC1/SC43 was established. Chinese experts took over its presidential position. Over 130 experts across 24 countries participated in the JTC1/SC43. Moreover, China led development of 9

international standards, 1 has been published, 3 under development, 5 under pre-research phase. In Dec 2023, SAC/TC28/SC43 was established, mirroring JTC1/SC43.
TC28/SC43 has 6 working groups, and they are: general group, hardware, data, application, ethics and security, and international working group. Three voluntary national standards have been established for the following areas: reference architecture, multimodal data formats, and visual evoked potential encoding/decoding.

Metaverse: In May 2022, Metaverse standard research group was established under SAC/TC28. The research group developed *Guidelines on Construction of Metaverse Standards System* which laid the foundation for China's metaverse standards development. Until today, the research group has published 1 national standard:

- *GB/T 45993-2025 Metaverse – Reference architecture*
  launched 1 national standard project:

- *20251304-T-469 Guidelines for virtual spatial computing*

So far, the WG is undertaking standard discussions and drafting work for several standards:

- *Guidelines for Virtual Spatial Computing*,
- *Grading Requirements for Large-Space Capabilities in the Metaverse*, and
- *Classification and Grading of Virtual Digital Humans in the Metaverse*.

Open source: SAC/TC28/SC38 Cloud Computing and Distributed Platforms is working on three open-source sector standards:

- ***Artificial intelligence – Key functional technologies – Large language model technology stack open source and openness tier evaluation specification:***

This standard takes precedence over the other two standards due to the widespread use and rapid development of LLM applications such as ChatGPT and DeepSeek. It addresses the full lifecycle layer and classifies the stack open source and openness into 4 tiers based on Completeness and Openness. The standard also specifies different evaluation items for different tiers. However, it faces challenges posed by the fast iteration of large models, and the lack of clear or established technical foundations.

- ***Information technologies – Basic capability requirements for software bill of materials* (SBOM):**

This standard is structured around three core aspects: what is it (data format); how to build it (technical implementation); how to use it (application implementation). The standardization of SBOM aims to promote consistent sector-wide development and improving transparency of software supply chain.

- ***2024-1400T-SJ Information technologies – Implementation guideline for software bill of materials:***

This is the initial standard in the SBOM sector standard series, which has been submitted for final approval. It defines the SBOM data format, covering basic document information, software composition information, environmental information and extended information. The standard is designed to guide the generation, storage, maintenance and delivery of SBOM.

Low-altitude economy: In 2024, SAC/TC28 established a new standard working group for Unmanned System, working on the technical and standard research for Unmanned System related technology.

This year, the working group organized a thematic discussion on *Smart Low-Altitude: Innovative Applications of Artificial Intelligence and Unmanned Systems*. The discussion was conducted around topics of low-altitude intelligent networking systems, 5G-A applications, and autonomous drone systems, along with practical use cases like power inspection.

Moving forward, this WG will focus on fulfilling needs of developing low-altitude economy, accelerating the establishment of unmanned systems standards, and providing standardization support for cultivating a profitable low-altitude economy. The meeting helped build important consensus aimed at promoting technological innovation and high-quality industrial development in unmanned systems.

Quantum information: In October 2023, SAC/TC28/WG 34 Quantum Information was established. The working group is responsible for establishing and improving the quantum information standards system, conducting research on quantum information technologies, organizing the development and revision of national, industry, and international standards, as well as promoting the dissemination and implementation of these standards.

The working group consists of four specialized panel groups (foundation, technical research, product, and application) and one task force dedicated to international standardization. It comprises 34 member institutions and has 58 registered experts.

To date, WG34 has launched 16 approved projects for new sector standards to fulfill the urgent need for quantum development.

Meanwhile, WG34 has published one standardization research report:

- *Research Report on the Development of Quantum Information Technology Standardization*

Another standardization report is undertaken by the foundation panel group. This report will provide valuable insights into the quantum information technology standardization framework:

- *Research Report on the Roadmap of Quantum Information Technology Standardization*

Internationally, TC28/WG 34 has led the establishment of global quantum information organizations and drives the development of international standards in quantum computing.
Key milestones include:

- In 2020, the WG led the proposal of ***ISO/IEC 4879:2024 Information Technology – Quantum Computing – Vocabulary***. This standard was published in May 2024.
- In 2021, the WG led the proposal of ***ISO/IEC TR 18157 Information Technology – Introduction to Quantum Computing*** and proposed the Quantum Machine Learning Dataset and Quantum Simulation Platform PWI Project.

In addition, TC28/WG34 was a key participant in the development of the *IEC White Paper on Quantum Information Technology*; acted as Co-Convener of IEC SEG 14/WG 3 and played a major role in drafting the *Quantum Technology Standardization Roadmap*.

Furthermore, the WG also acted as a two-way liaison representative between ISO/IEC JTC 1 and ISO/IEC JTC 3, with over 30 registered international standardization experts from China.

4. TC 28's Strategic Directions and Upcoming Plans:

(1) Advance IT standardization

- Improve standards systems for emerging and future industries.
- Collaborate with sector standardization bodies to align IT standards with practical needs.
- Promote adoption of CSMM and DCMM to establish their branding in the IT industries.

(2) Increase international influence

- Monitor JTC1/AG 2 tech trends to guide strategy and improve quality of international standard proposals. Strengthen agenda-setting and compete for international leadership.
- Expand global involvement. **Promote mutual EU-JTC 1 standard recognition.** Deepen cooperation with ASEAN and Africa. Accelerate standard alignment under *The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)* and *the Belt and Road Initiative*.
- Develop stronger expert teams. Support companies in international engagement, increase editorial roles, and train more experts to lead international standard development.

(3) Optimize organizational management

- Refresh committee memberships and improve composition per national management measures to raise effectiveness.
- Support member engagement in duties (e.g., voting) and activities to strengthen the committee's influence.
- Streamline standard development and revision processes. Update the committee charter and drafting procedures to accelerate and improve standard quality.

5. Conclusions

In conclusion, the SAC/TC28 Standards Week 2025 and the accompanying Information Technology Standardization Work Report mark a significant milestone in China's IT standardization efforts.

Over the past five years, SAC/TC28 has demonstrated substantial achievements through publishing 338 national and sector standards while initiating 395 new projects. The committee has helped China strengthen its international leadership in standardization by establishing the first international subcommittee on brain-computer interfaces.

The report outlines comprehensive progress across multiple domains including ***software applications, electronic information, emerging technologies,*** and ***future industries***. SAC/TC28 has developed robust standards frameworks through its "1+2+N" model, resulting in critical guidance documents and standards for artificial intelligence, cloud computing, IoT, and the metaverse.

Looking forward, SAC/TC28 will continue to advance IT standardization by improving standards systems for emerging industries, enhancing international collaboration and influence, and optimizing organizational management processes. These efforts will further solidify China's role in shaping global IT standards while supporting domestic industry development and technological innovation.

Introduction of SESEC Project

The Seconded European Standardisation Expert in China (SESEC) is a visibility project co-financed by the European Commission (EC), the European Free Trade Association (EFTA) secretariat and the three European Standardisation Organizations (CEN, CENELEC and ETSI). Since 2006, there has been four SESEC projects in China, SESEC I (2006-2009). SESEC II (2009- 2012), SESEC III (2014-2017), SESEC IV (2018- 2022) and SESEC V (2022-2025). Dr. Betty XU is nominated as the SESEC expert and will spend the next 36 months on promoting EU-China standardisation information exchange and EU-China standardisation cooperation.

The SESEC project supports the strategic objectives of the European Union, EFTA and the European Standardisation Organizations (ESOs). The purpose of SESEC project is to:

- Promote European and international standards in China;
- Improve contacts with different levels of the Chinese administration, industry and standardisation bodies;
- Improve the visibility and understanding of the European Standardisation System (ESS) in China;
- Gather regulatory and standardisation intelligence.

The following areas have been identified as sectorial project priorities by the SESEC project partners: Internet of Things (IoT) & Machine-to-Machine(M2M) communication, communication networks & services, cybersecurity & digital identity, Smart Cities (including transport, power grids & metering), electrical & electronic products, general product safety, medical devices, cosmetics, energy management & environmental protection (including eco-design & labeling, as well as environmental performance of buildings).