

Emerging technologies and standardization



As we all know, the global pandemic has accelerated the digital transformation in all sectors and areas. While the pandemic has disrupted society on an unprecedented level, it is also requiring us to take a fresh look at trends impacting the global economy, public health, education, and the future of work. It is important for standards community to keep track of future emerging technology trends and adjust standardization activities or initiate new activities. Standards play a key role in expanding market access and promoting successful deployment of new technologies and products by ensuring interoperability, safety, and reliability. In addition, standards can accelerate the speed at which innovations become more than ideas.

There was a global rise of additive manufacturing during the COVID-19 pandemic to help resolve supply chain disruptions and produce life-saving critical products such as personal protective equipment (PPE) or testing equipment – like a face shield, mask, or nasal swab. While the use of additive manufacturing has been growing, one of the barriers for broader adoption has been lack of standards. The interrelation of standardization and innovation needs to be recognized and appreciated to assist in the development of standards roadmaps, coordination and collaboration opportunities and timely and efficient implementation of standards to support emerging technologies.

ISO/IEC JTC 1, entitled "Information technology", is a joint technical committee of the International Organization for Standardization and the International Electrotechnical Commission. ISO/IEC JTC 1 develops standards that support information and communication technology advancement across multiple industry sectors. The U.S. plays a leading role in JTC 1, with ANSI serving as Secretariat and 35 national bodies participating. ISO/IEC JTC 1 has established Advisory Group 2 on JTC 1 Emerging Technology and Innovation (JETI), to:

- assess the technology opportunities to identify the relevant standardization issues and priorities that warrant immediate action and those that should be watched for potential consideration later by JTC 1,
- monitor the future considerations from JTC 1 SCs/WGs/AGs (e.g. through their business plans, and/or alternative information sources) to perform successful execution of standards development and planning with an appropriate coordination in JTC 1, and
- make recommendations on actions to JTC 1.

JETI is mandated to seek opportunities to facilitate JTC 1 standards development for future emerging and innovation technologies as a technology watch group in JTC 1. ISO/IEC JTC 1/AG 2 JETI carries out an information collection via market research reports, information from business plans of JTC 1 SCs, other SDOs and compiles a list of technologies. The list then gets prioritized for top technologies via an internal survey to JTC 1 National Bodies and JTC 1 SCs/WGs/AGs. The survey responses then get analyzed within the advisory group to make proposals to write Technology Trend Reports (TTRs). TTRs are reports from JETI to JTC 1 about specific technology topics for consideration of standards development and include a robust set of recommendations for JTC 1 to act on which are then reviewed during the next JTC 1 Plenary meeting. This process has allowed ISO/IEC JTC 1 to identify standardization or coordination/collaboration needs for emerging technologies and initiate standards project at the right time. TTRs typically include relevant current standardization activities (if applicable), any standards gaps, and recommendations to JTC 1.

The 2021 JTC 1 survey identified top 25 technologies. The top 10 technologies include data privacy, remote education/learning, digital health, telehealth/telemedicine, green tech, AI as a service, cybersecurity mesh, distributed cloud, edge cloud, and intelligent computing. Some of these identified areas already include ongoing projects while others have little to no standards activity. The following relevant potential standardization areas were noted in the survey along with some of the ongoing activities within JTC 1 for some of these top 10 areas:

- **Data privacy:** There is already some ongoing standards activities in ISO/IEC JTC 1/SC 38: Cloud computing and distributed platforms, SC 27: Information security, cybersecurity and privacy protection, SC 37: Biometrics. However, there is still room for standardization in areas such as managing, characterizing, and safeguarding data, and brain computer interface data privacy protection.
- **Edge cloud:** There is already some ongoing standards activities in ISO/IEC JTC 1/SC 38: Cloud computing and distributed platforms, and SC 42: Artificial intelligence. However, there is still room for standardization in areas such as applications in smart cities, multi access edge computing, network connectivity, edge computing security, privacy enhancing technologies, privacy engineering, and identity management.
- **Digital health:** There is already some ongoing standards activities in ISO/IEC JTC 1/SC 27: Information security, cybersecurity and privacy protection, and WG 12: 3D printing and scanning. However, there is still room for standardization in areas such as digital therapeutics, microfluidics, AI in healthcare, smart and connected devices, AI and machine learning in medical technology, VR/AR and brain computer interface for medical sector. IEC has also recently established Standardization Evaluation Group 12: Bio-digital convergence.
- **Telehealth/Telemedicine:** There is already some ongoing standards activities in ISO/IEC JTC 1 SC 27: Information security, cybersecurity and privacy protection, and SC 37: Biometrics. However, there is still room for standardization in areas such as brain computer interface for telehealth, VR-based training systems, VR-based medical systems, VR-based health information systems, remote clinical service, and use of biometrics.
- **Cybersecurity mesh:** There is already some ongoing standards activities in ISO/IEC JTC 1 SC 27: Information security, cybersecurity and privacy protection. However, there is still room for standardization in areas such as decentralized identify, VR/AR security, and applications in smart cities.



JETI continues to investigate the technology landscape and will soon begin a survey of 2022 top technologies. The list of top technologies for 2022 includes data-intensive computation, open source, cloud-native platforms, metaverse, NFT, Web3, etc. The survey is expected to be analyzed in Q3 of 2022 and brings the results to the November JTC 1 Plenary meeting for further consideration in terms of future emerging technologies in JTC 1.