Society 5.0: For Human Security and Well-Being

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The Japanese Cabinet's "Society 5.0" initiative seeks to create a sustainable society for human security and well-being through a cyber-physical system. Keidanren (Japan Business Federation) is well aligned to proactively deliver on the United Nations' Sustainable Development Goals to end poverty, protect the planet, and ensure prosperity for all through the creation of Society 5.0. Typical collaborative ecosystem activities for Society 5.0 in Japan are outlined in this column.

Today, more than ever, advances through innovations in science and technology, such as the dramatic increase in computing power, are contributing to improvements in business and society. At the same time, the world is facing global-scale challenges such as depletion of natural resources, global warming, growing economic disparity, and terrorism. We live in a challenging age of uncertainty, with complexity growing at all levels. Thus, it's critical that we leverage ICT to its fullest to gain new knowledge and create new values by making connections between "people and things" and between the "real and cyber" worlds to effectively and efficiently resolve issues in society, create better lives for its people, and sustain healthy economic growth. Overcoming these challenges by encouraging various stakeholders at multiple levels to share a common future vision will be vital to realizing such a society through digitalization.
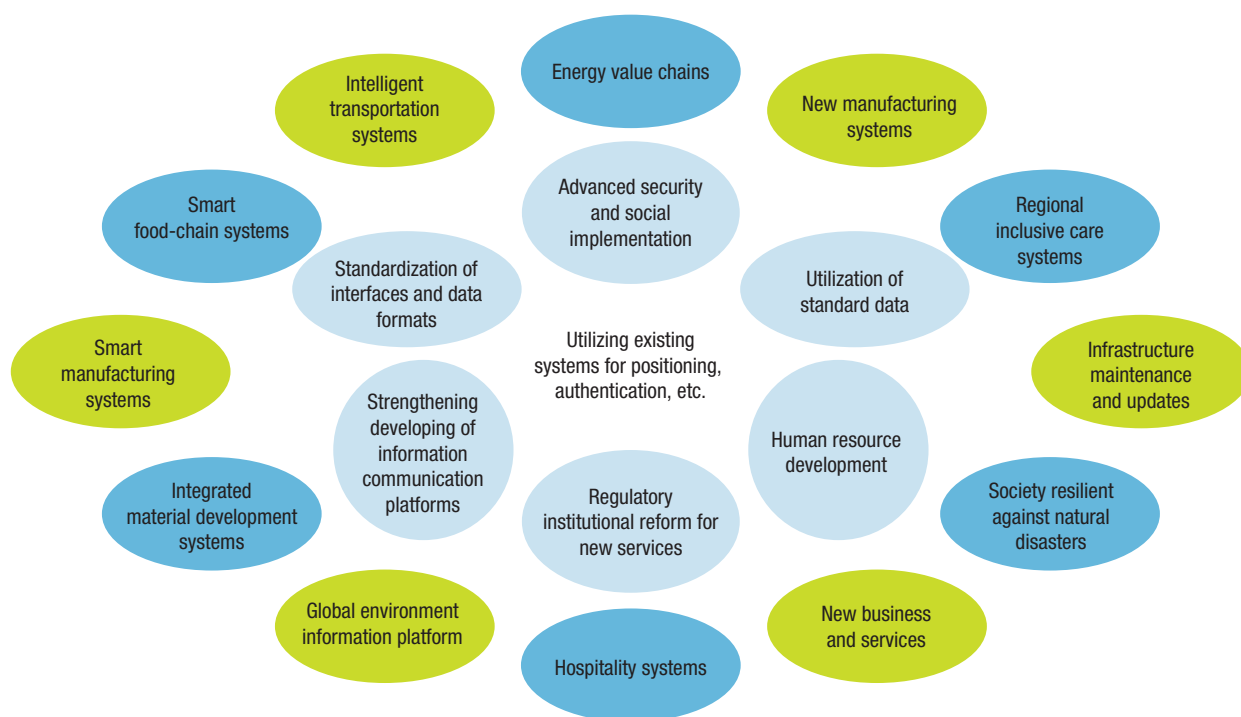
Figure 1. The 12 service platforms for creating a Super Smart Society.[2]

In 2016, an initiative called "Society 5.0" was proposed by the Japanese Cabinet in its 5th Science and Technology Basic Plan,[1] with a vision toward creating a "Super Smart Society." The Super Smart Society is positioned as the fifth developmental stage in human society, following hunter/gatherer, pastoral/agrarian, industrial, and information,[2] and represents a sustainable society connected by digital technologies that attend in detail to the various needs of that society by providing necessary items or services to the people who require them, when they are required, in the amount required, thus enabling its citizens to live an active and comfortable life through high-quality services regardless of age, sex, region, language, and so on. Note, however, that digitalization is only the means, and that it is essential that we humans remain the central actors so that a firm focus is kept on building a society that makes us happy and provides us with a sense of worth. The Japanese government presented

its vision of Society 5.0, together with exhibits by supporting companies from Japan, at CeBIT 2017,[3] Europe's business festival for innovation and digitalization that covers the digitalization of business, government, and society from every angle.

International discussion is proceeding on the implementation of the United Nations' Sustainable Development Goals (SDGs),[4] which were adopted in September 2015 as guideposts for the entire world. The driving principle is to realize peace and prosperity for all people and the planet by responding to the challenges with an inclusiveness that "leaves no one behind." The Japanese government has made the SDGs Implementation Guiding Principles—science, technology, and innovation (STI)—a key policy and priority area. The Advisory Board for the Promotion of Science and Technology Diplomacy deliberated on these concepts and prepared a recommendation[5] identifying four action areas to mobilize "STI for SDGs":

› creating a global future through Society 5.0,
› enabling solutions using global data,
› promoting cooperation at a global level, and
› fostering human resources to undertake STI efforts for SDGs.

The 12 service platforms shown in Figure 1 will be developed by fully utilizing the Internet of Things (IoT): big data, computation, artificial intelligence (AI), display, and robotics technologies. A series of government initiatives are now in progress in Japan, including "Robot Industry"[6] and "Connected Industries,"[7] which were introduced by the Ministry of Economy, Trade, and Industry (METI); and "Conference toward AI Network Society,"[8] introduced by the Ministry of Internal Affairs and Communications (MIC). These initiatives essentially target the development of advanced common platform technologies, services and systems, and system of
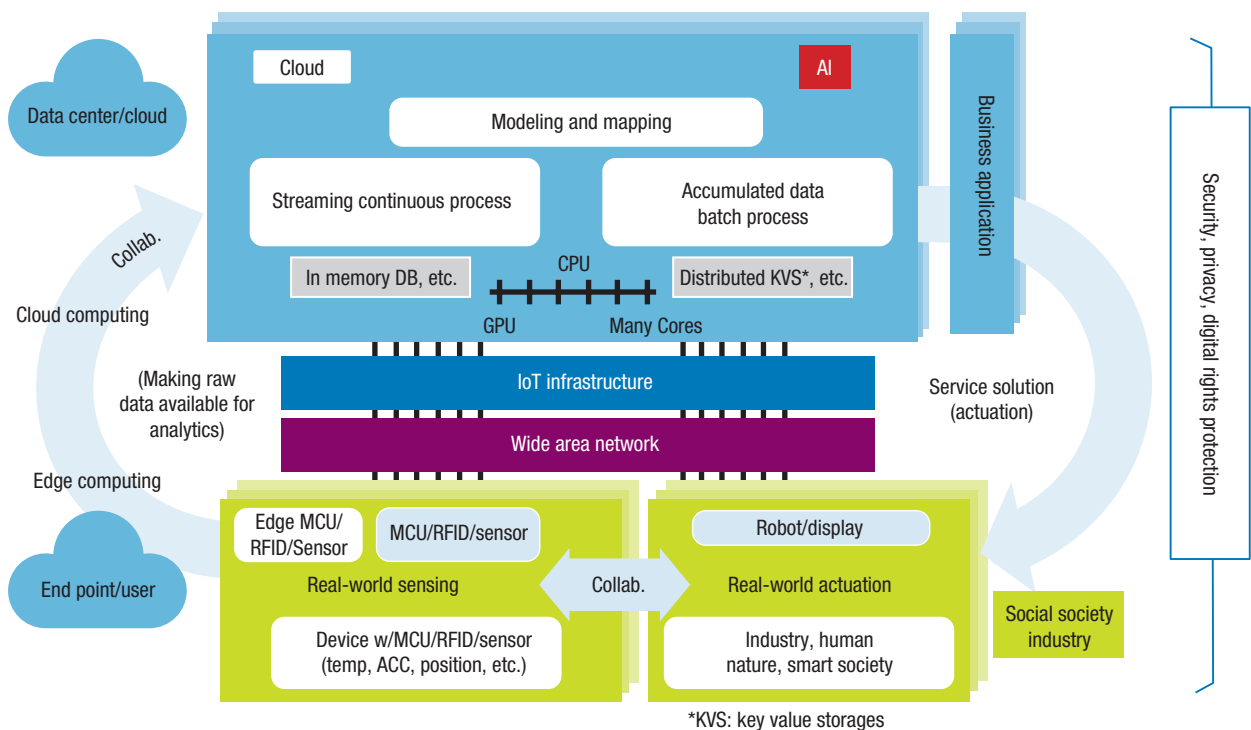
Figure 2. A cyber–physical system.

systems for new market creation and transformation into a prosperous society by creating new values through cyber-physical systems (CPS).[9] As the CPS in Figure 2 shows, various big data items—collected from intelligent sensing devices with low power and networks and kept in information storage devices—can be analyzed and visualized using analytic tools such as AI with high computing power in cyberspace. This valuable data, often hard for humans alone to notice, will inform actions taken by decision-makers to provide solutions to societal issues and economic growth in the physical world.

In Japan, a series of government projects, such as ImPACT (Impulsing Paradigm Change through Disruptive Technologies Program) and SIP (cross-ministerial Strategic Innovation Promotion program),[10] are geared toward realizing such technologies and service platforms. ImPACT is designed to develop industry- and society-changing disruptive STIs through high-risk,

high-impact research and development, while SIP covers the entire path from basic research to effective exit strategies (practical application/commercialization) as well as taking on initiatives to reform regulations and systems. In SIP, for example, projects such as an automated driving system; energy carriers; cybersecurity for critical infrastructure; and technologies for creating next-generation agriculture, forestry, and fisheries are now in progress with allocated budgets from the Council for Science, Technology, and Innovation (CSTI), which is responsible for planning and coordinating STI policies under the Japanese Cabinet. In addition, several academic studies on authentic third proposals and policy proposals for Society 5.0, including the "SDGs Project," "Next-Generation Computing Project," and "Telexistence Project," are being carried out by The Engineering Academy of Japan (EAJ),[11] a unique non-governmental engineering academy in Japan.

TOWARD HUMAN SECURITY AND WELL-BEING

We have also entered an era in which the human lifespan— because of STI— is reaching 100 years; therefore, it's increasingly vital to empower humans by including a wider range of stakeholders and digitalization technologies. We are just beginning to strive for true human security and well-being. We must foster a pioneering spirit and the ability to be disruptive if necessary by increasing the number of people working under their own initiative and acting as game changers. To achieve a sustainable society on a global scale as soon as possible, it will be necessary to pursue transformation through a collaborative ecosystem that brings together ideas from industry, academia, and citizens.

Japan's most important business federation, Keidanren, is well aligned with this game-changing initiative. Keidanren issued the fifth revision of its Charter of Corporate Behavior[12] with the primary aim of proactively
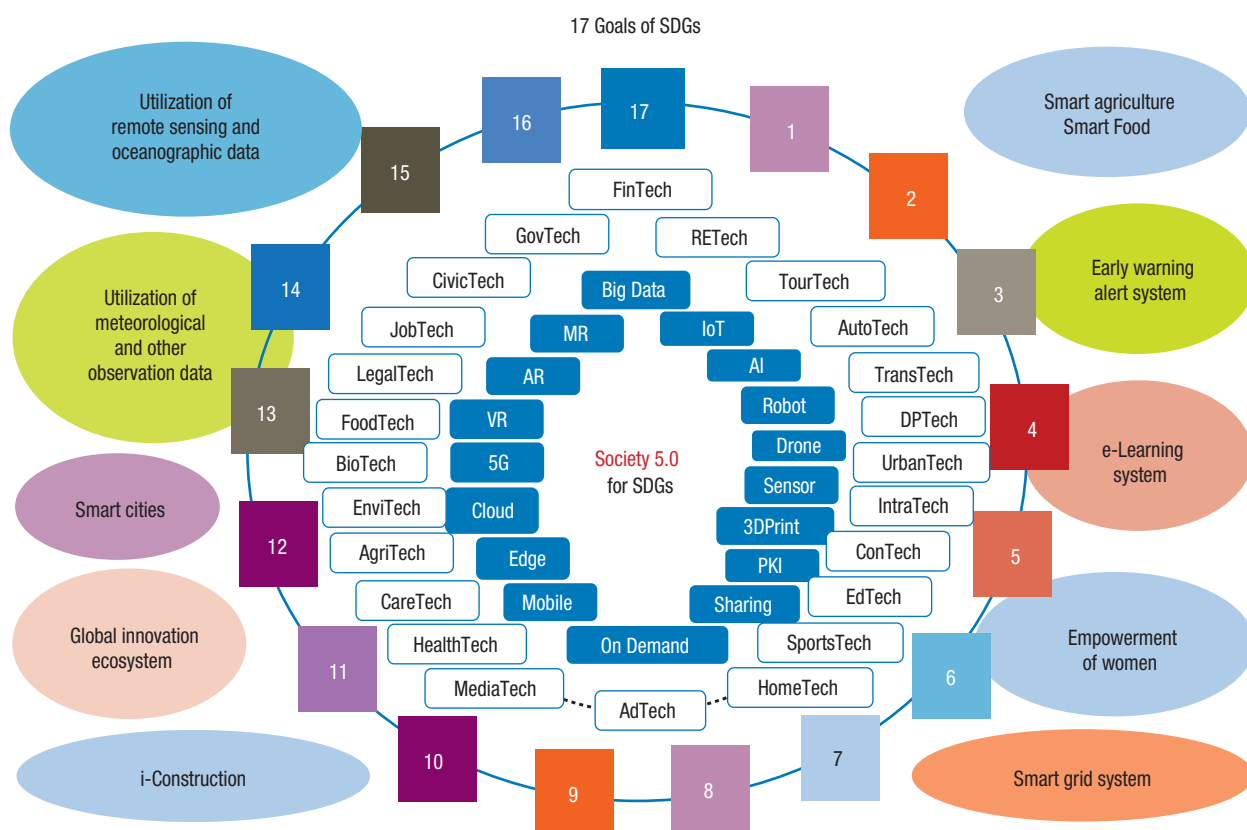
Figure 3. Society 5.0 for SDGs (Sustainable Development Goals).[13]

delivering on SDGs through the creation of Society 5.0. Figure 3 summarizes the concept of Society 5.0 for SDGs, as well as the challenges, key technologies, and systems of Society 5.0 and the 17 goals of SDGs.[13] Although STI has in many ways greatly enhanced the convenience of our lifestyle, it has also increased social complexity, revealing some negative aspects of a digital society. Society 5.0 can provide approaches to reducing or eliminating these negative aspects. However, doing so will require breaking down what the position paper calls the "five walls": ministries and agencies, the legal system, technologies, human resources, and social acceptance.[14] This will be our global challenge, and professional societies such as the IEEE Computer Society are expected to play a leading role in fully fledged cooperation with industrial society on STI, trans-science, and multidisciplinary issues.

We are living in a challenging age of societal complexity and uncertainty. The Japanese Cabinet's Society 5.0 initiative envisions the creation of a Super Smart Society—a sustainable society where various types of values are connected through CPS and where people can live in safety, security, and comfort. CPS can bridge different sectors, countries, regions, and societies that otherwise tend to be divided. The key to implementing Society 5.0/SDGs is that stakeholders share and address the challenges together by fully utilizing the potential of CPS.

To move toward greater human security and well-being, we will need to pursue transformation through a collaborative ecosystem with a shared vision for the future created with the participation of all stakeholders. Specifically, we should take the following actions:

› present a future vision of changes in society through STI;
› grasp and overcome challenges by creating new values through CPS; and
› establish collaborations among industry, multidisciplinary academia, and public and private sectors. ◼

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