# Sustainability in Society 5.0 Perspective

# 22

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## 22.1 Introduction

We live in a socially challenging, uncertain, and complex age. Increasing world population, industrialization and excessive consumption habits of people have increased the need for energy. In order to meet this energy need, people have recklessly used natural resources, leading to their depletion, environmental degradation, and global disasters. People are starting to understand that they need to take action to prevent all these problems that the world is facing. In order to be protected from the destructive effects of the digital transformation experienced with Industry 4.0 and to benefit from its constructive effects at the highest level, the Society 5.0 approach, which puts people and society at the center, has emerged. The Society 5.0 philosophy is to transform states, institutions, and society into a smart society. It paves the way for energy, cities, regions, disaster prevention and mitigation, agriculture and food, logistics, manufacturing service, finance, healthcare, and public services. While realizing these, it is also to ensure that the Sustainable Development Goals of the United Nations can be achieved. In this direction, in this study, we first tried to give information about the philosophy of Society 5.0 and the sustainable development approach. Then, we examined and summarized the results of different studies dealing with Society 5.0 practices that mediate the achievement of Sustainable Development Goals.

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## 22.2 Society 5.0 and Sustainable Development

Society 5.0 has emerged as a philosophy that focuses on society by providing solutions with new technologies in all sectors and social activities to ensure sustainable development (Higashihara, 2018; Keidanren Policy and Action, 2016; Nakanishi, 2019). The Society 5.0 model aims to create a human-centered society and uses technology and innovation to achieve this (Higashihara, 2018). In 2016, the Japanese government launched what it calls a "Super Intelligent Society" or "Society 5.0" to tackle the problems it faces such as the declining birthrate, aging population, and deteriorating infrastructure (Council of Science, Technology and Innovation, 2016). Society 5.0 follows Industry 4.0 to some extent. However, it aims to contribute to the quality of life, social welfare, sustainability, and economic growth by taking the transformation realized with Industry 4.0 beyond the industry. In order to achieve this, it tries to create "Super Smart Societies" where new knowledge and values are revealed by making more use of the results of Industry 4.0 and technology (Ferreira & Serpa, 2018; Fukuda, 2020).

One of the focal points of Society 5.0 is to combine cyberspace and physical space to provide appropriate infrastructures for a sustainable life (Higashihara, 2018; Keidanren, 2019). In other words, the Society 5.0 model predicts the creation of a sustainable society where various values are interconnected by cyber-physical systems and where people can live under safe and comfortable conditions (Shiroishi et al., 2018). In the report prepared by Keidanren, the Japanese Federation of Economic Organizations, the main objectives of Society 5.0 are: developing solutions against the aging world population, making the virtual world and the real-world work together, making use of the Internet of Things by considering the interests of the society, and producing solutions for environmental pollution and natural disasters. Again, in the same report, the obstacles to be faced in the creation of Society 5.0 are listed as follows (Keidanren, 2016):

- Barriers in the legal system
- Scientific gaps in the digitization of objects
- Lack of qualified personnel
- Sociopolitical prejudices
- Social resistance

In order to overcome all these obstacles, five steps have been determined. First of all, it was stated that national strategies should be created by *Ministries and Agencies* and the state incentive system should be integrated. It was emphasized that the next step was to develop laws suitable for new technologies by emphasizing the *Legal System*. In the third step, serious research and development studies on technologies such as cyber security, bio, nano, and robot were made and the importance of *Technology* development and use was explained. In the fourth step, it was stated that *Human Resources* should be developed by making educational reforms such as information technology literacy and equipping existing manpower with advanced numerical skills. In the last step, it was understood that Society 5.0 is also relevant to citizens, governments, academic circles, and all other stakeholders, and its *Scope* has been revealed.


**Fig. 22.1** Society 5.0 and the Sustainable Development Goals (Source: http://www.keidanren.or.jp/policy/2018/095.html)

Society 5.0 will bring about major changes in lifestyles and industry. In addition to the transformation of existing industries, close partnerships spanning borders and industries across many sectors will enable people to lead different lifestyles. The aim of Society 5.0 is to enable all people to pursue their own happiness and lifestyles and to achieve sustainable development in harmony with nature by solving social problems. In short, achieving Society 5.0 will contribute to solving all global problems facing not only Japan but also the world but also meeting the Sustainable Development Goals established by the United Nations (Cabinet Office, 2017) (Fig. 22.1).

We can examine it under seventeen headings: (1) eradication of poverty, (2) end of hunger, (3) health and care, (4) quality education, (5) gender equality, (6) clean water and hygiene, (7) renewable clean energy, (8) equitable and non-exploitative work and economic growth, (9) innovation economy, (10) waste reduction, (11) sustainable cities and communities, (12) responsible and resourceful production, (13) climate protection, (14) protecting seabed life, (15) protecting natural life, (16) peace, justice and strong institutionalization, and (17) unity and cooperation in goals (Fukuyama, 2018). These Sustainable Development Goals (SDGs) enumerated enable to reveal the creative perspective from various perspectives, and the necessary solutions to achieve these goals should be supported by digital transformation (Fukuyama, 2018).

In order to ensure sustainable development, the Japanese Businessmen's Federation Keidanren (2019) has gathered the above-mentioned goals under nine headings. In this report, where Society 5.0 is declared to the world, information about the areas where the creation of the new society, called "Super Smart Society", will benefit and what kind of innovations will come, cities and regions, energy, disaster prevention and reduction, health, agriculture and food, logistics, production, and service, finance and public services (Keidanren, 2019: 15–20) (Table 22.1).

Sustainable development is a process of economic transformation that optimizes existing economic and social benefits without compromising the possibility of obtaining the same benefits in the future (Goodland & Ledec, 1987). It requires a socioeconomic system that can support an increase in income, improved education, improved public health, and overall quality of life (Pearce et al., 1989). Society 5.0

**Table 22.1** Community 5.0 practices to achieve Sustainable Development Goals

| | |
|---|---|
| Cities and regions | In urban areas, energy, transportation, logistics, waste, etc. related data will be shared for smart solutions. It is aimed to create a comfortable life. |
| Energy | Microgrids integrating decentralized renewable energy, energy storage systems, and demand-side controls will be developed and be compatible with local conditions. Affordable, reliable energy will be available to all. |
| Disaster prevention | Digital technologies will be used to mitigate natural disasters by taking effective measures to prevent daily maintenance and infrastructure degradation. Maintenance and rapid restoration of water and sewer infrastructure will ensure the water supply will continue in the event of natural disasters and accidents. |
| Health | The concept of health will be transformed into lifelong health services and will cover the fields of health, nursing, and medicine. Treatment according to individual health will be provided at the preventive stage to stop the onset and exacerbation of the disease. Access to high-quality healthcare will use next-generation high-speed communication networks and artificial intelligence-based medical and telemedicine technologies. |
| Agriculture and foods | Cutting-edge technologies such as artificial intelligence, agricultural robots, and remote monitoring and control by autonomous drones for on-site agricultural work will be leveraged. |
| Logistics | New platforms will be created using various trading procedures to increase efficiency. Most jobs will be automated with autonomous driving, drones, and robots without the use of human power. |
| Production and services | Analyzing data and using it to produce useful goods and services requires a great deal of investment and professional knowledge. This situation will be facilitated by artificial intelligence modules, which will increase in efficiency thanks to digital transformation. |
| Finance | Digital transformation will provide a variety of ready-made financial services, including payment, finance, and insurance. Low-cost, convenient, fast, secure, and versatile payment methods will enable people to live anywhere without cash. |
| Government policy | Central and local governments will rebuild their systems based on digitization. By digitizing many of their tasks and quickly sharing data between various actors, they will deliver more effective public services. |

Source: http://www.keidanren.or.jp/policy/2018/095.html

is a more integrated environment that facilitates the merging of the digital and real worlds. The society of the future will continually develop new values and services that make people's lives more affordable while ensuring sustainable growth (Budziewicz-Guzlecka & Drab-Kurowska, 2021: 401). Creating Super Smart Societies with Society 5.0 will have an important role in the realization of the Sustainable Development Goals.

## 22.3 Sustainable Development with Community 5.0 Practices in the World

The aim of this chapter is to analyze and summarize the results of different studies dealing with Society 5.0 practices that mediate the achievement of Sustainable Development Goals. For this reason, we have tried to make a summary of the

previously published studies below. To this end, we reviewed studies that analyze world practices in the fields of *cities and regions, energy, disaster prevention and mitigation, health, agriculture and food, logistics, production and service, finance and public services* within the scope of Society 5.0, which will ensure the achievement of the United Nations' Sustainable Development Goals. Within the scope of Society 5.0, which aims to increase the welfare and peace of the society and to realize Sustainable Development Goals, there are application examples from various parts of the world, most of which are from Japan.

In 2017, Artificial Intelligence Technology Strategies was published, aiming at the development and implementation of artificial intelligence, which plays a key role in the creation of Japan Society 5.0. With the growing awareness of the importance of data sharing rules, Japan has started to work to create a global rule and in March 2019 the Principles of the human-centered Artificial Intelligence Society have been announced (Fukuda, 2020: 1). Japan, with its competence in technology, constitutes the elements of smart faktory, Internet of Things (IoT), machine-to-machine communication (M2M), industrial robots, sensors and semiconductors, robotic logistics solutions (such as transporter robots, conveyors), software programs and systems for industrial manufacturers, cloud It produces and sells advanced technology solutions in areas such as edge computing and edge computing (BTK, 2018: 23). At the end of Japan's G-20 Presidency, the Society 5.0 vision, whose basic principles were accepted by the G-20 and B20 Leaders in their Summit Declarations, is launched as a roadmap that also serves the United Nations Sustainable Development Goals (Kara, 2020).

Faced with increasing medical and social security expenses and demands, as a solution to this situation within the scope of Japan Society 5.0; It aims to (1) support people's independence through the provision of connectivity and information sharing, including check-up, treatment, and care records, with medical data users; (2) the implementation of remote medical care services; and (3) the use of AI and robots in medical care facilities. Thus, by combining and sharing the scattered medical data in different hospitals, a more effective treatment based on data will be possible. Thanks to remote medical care, it can be possible to measure health data such as heart rate and decrease in the number of elderly people coming to hospitals (WHO, 2021).

In Japan, resulting in the elimination of the distortions on behalf of public infrastructure, information and communication technologies (ICT), robots, and systems that require expertise by using new technologies that contain sensors for inspection and maintenance, repair areas that require early detection and diagnosis can be made and thus minimizing unexpected accidents and reducing the time spent on repairs (BTK, 2018: 24). A total of 229 smart city projects have been put into operation in 157 regions in Japan in public–private–academia partnership (Deguchi, 2020).

In addition to Japan, other countries are trying to implement Society 5.0 practices in order to achieve Sustainable Development Goals. There are many countries in the world trying to build "Smart Cities" that encourage and facilitate the participation of their citizens in physical and digital spaces, online and offline processes. For example, Tallinn, Singapore, and Amsterdam are trying to establish smart cities

using digital programs (Puutio, 2018). Similarly, San Francisco, Silicon Valley, New York, and London, which are known as the most powerful technology centers, are some of the cities that are compatible with the future (Kelly, 2018).

Society 5.0 aims to use data to create efficient energy networks. For this purpose, we can give an example of the Pakistani government's plan that proposes the elimination of taxes on the production of solar and wind energy equipment in the country in 2019 in order to increase renewable energy production (Mukhtar, 2019). In the Rajasthan region of India, the use of solar energy is encouraged by the government (Banerji, 2018). Benban Solar Park in Egypt is one of the world's largest and most ambitious projects. This solar park is expected to meet 20% of Egypt's energy needs from renewable energy sources (Fleming, 2019). Mexico, on the other hand, has established 4000 Megawatts of new solar farms and more than 1000 new wind farms with the power generation reform (Ávila, 2019).

One of the fields in which advanced technologies are used with Community 5.0 applications is the health sector. The use of artificial intelligence, which is one of the most effective products of advanced technologies, in health services is quite common. For example, the UK has created a digital physician thanks to an artificial intelligence-based chatbot and has established an organization called Babylon Health, which enables patients to interact directly with this physician in a very short time through a mobile application. The biotechnology company Insilico Medicine, headquartered in Hong Kong, has started collaborative work with a team from Oxford University to design drugs with fewer side effects using artificial intelligence (Büyükgöze & Dereli, 2019).

## 22.4 Conclusions

In this study, we tried to deal with Society 5.0 practices, which are important in the realization of the Sustainable Development Goals. We have revealed the philosophy and practices of Society 5.0, which is thought to serve the world to overcome the ecological crisis it is in. The digital transformation that comes with Industry 4.0 has begun to change lives, cities, jobs, and behavior patterns, that is, society. The aim of Society 5.0 is to create societies that put society and people at the center by preventing the negative effects of technological advances. Thus, it will contribute to the adoption of practices that serve to bring about an economic transformation that optimizes current economic and social benefits without jeopardizing the possibility of obtaining the same benefits in the future. Many countries around the world, especially Japan, have started to implement these practices. These practices continue to increase in order to achieve the United Nations' Sustainable Development Goals in the fastest and most stable way. New applications will continue to appear every day. All these applications are still very new. For this reason, although it is difficult to determine how effective the practices are, it is possible to say that they are trying to remedy the ecological crisis that the world is in.

## References


Ávila, J. M. (2019). *Can free trade deliver cheaper renewable energy?* Ask Mexico, https://www.weforum.org/agenda/authors/juan-manuel-avila

Banerji, A. (2018, November). Women in India are tackling the rural energy crisis with solar power. In *World Economic Forum* (Vol. 22). https://www.weforum.org/agenda/2018/11/girl-power-indias-solar-gal-pals-light-up-rural-homes/

BTK. (2018). *Toplum 5.0 Araştırma Rapor*. https://www.btk.gov.tr/uploads/pages/arastirma-raporlari/toplum-5-0-arastirma-raporu.pdf

Budziewicz-Guzlecka, A., & Drab-Kurowska, A. (2021). Good regulation in the telecommunications and postal services markets as a necessary tool in the aspect of sustainable development and society 5.0. *European Research Studies Journal, 24*(3B), 399–411. https://doi.org/10.3390/su13052682

Büyükgöze, S., & Dereli, E. (2019). Toplum 5.0 ve Dijital Sağlık. In *Uluslararası Bilimsel ve Mesleki Çalışmalar Kongresi-Fen ve Sağlık* (Vol. 7). Akademisyen Kitabev.

Cabinet Office. (2017). Society 5.0. http://www8.cao.go.jp/cstp/english/society5_0/index.html

Council of Science, Technology and Innovation. (2016). *Fifth science and technology basic plan*. Government of Japan.

Deguchi, A. (2020). *Society 5.0 and its application to American smart cities*. https://www.americancityandcounty.com/2020/06/10/society-5-0-and-its-application-to-american-smart-cities

Ferreira, C. M., & Serpa, S. (2018). Society 5.0 and social development. *Management and Organizational Studies, 5*(4), 26–31. https://doi.org/10.5430/mos.v5n4p26

Fleming, S. (2019). *Egypt is building one of the world's largest solar parks*. https://www.weforum.org/agenda/2019/01/egypt-is-building-one-of-the-worlds-largest-solar-parks/

Fukuda, K. (2020). Science, technology and innovation ecosystem transformation toward society 5.0. *International Journal of Production Economics, 220*, 107460. https://doi.org/10.1016/j.ijpe.2019.07.033

Fukuyama, M. (2018). Society 5.0: Aiming for a new human-centered society. *Japan Spotlight, 27*(5), 47–50.

Goodland, R., & Ledec, G. (1987). Neoclassical economics and principles of sustainable development. *Ecological Modelling, 38*(1–2), 19–46. https://doi.org/10.1016/0304-3800(87)90043-3

Higashihara, T. (2018). *A search for unicorns and the building of society 5.0*. World Economic Forum.

Kara, T. (2020). *Toplum 5.0, Akıllı Fabrikalar ve Japonya Örneği*. https://www.ekonomidokto-runuz.com/is-dunyasi/toplum-5-0-akilli-fabrikalar-ve-japonya-ornegi-20200417

Keidanren. (2016). *Toward realization of the new economy and society*. http://www.keidanren.or.jp/en/policy/2016/029_outline.pdf

Kelly, J. (2018). *These are the world's most future-proof cities*. https://www.weforum.org/agenda/2018/06/worlds-most-future-proof-cities-jll

Mukhtar, I. (2019). *Energy-short Pakistan moves to power up solar manufacturing*. https://www.weforum.org/agenda/2019/02/energy-short-pakistan-moves-to-power-up-solar-manufacturing/

Nakanishi, H. (2019). *Modern society has reached its limits – "Society 5.0" will liberate us*. World Economic Forum.

Pearce, D., Markandya, A., & Barbier, E. B. (1989). *Blueprint for a green economy Earthscan*. Publications Limited.

Puutio, T. A. (2018). Here are 5 predictions for the future of our cities. In *World Economic Forum.* https://www.weforum.org/agenda/2018/02/here-are-5-predictions-for-the-cities-of-the-future/

Shiroishi, Y., Uchiyama, K., & Suzuki, N. (2018). Society 5.0: For human security and well-being. *Computer, 51*(7), 91–95. https://doi.org/10.1109/MC.2018.3011041

WHO. (2021). *Ageing and health*. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health