

# ▶▶▶ Part I ▶▶▶

## Possibilities and Options for a Future Society Expanded by Science and Technology



## Introduction

The first outbreak of the novel coronavirus disease (COVID-19) was reported in Wuhan City, Hubei Province, People's Republic of China in December 2019. The disease spread in China and then to other parts of the world, leading to the WHO's declaration of a Public Health Emergency of International Concern (PHEIC) on January 30, 2020. COVID-19 became a pandemic in just a few months.<sup>1</sup> In Japan, since the first case of infection was confirmed on January 15, 2020, approximately 14,000 people have been confirmed to be infected and approximately 400 people died by the end of April. On April 7, the government declared a state of emergency pursuant to Article 32, paragraph (1) of the Act on Special Measures for Pandemic Influenza and New Infectious Diseases Preparedness and Response (Act No. 31 of 2012; hereinafter referred to as the "Special Measures Act"). Meanwhile, looking at the situation overseas, COVID-19 infected countries exist on every continent except Antarctica. The explosive surge of patients has forced some countries to take draconian measures called "lockdowns," which involve mandatory curfews and the closure of non-essential stores.

The rapid spread of COVID-19 across the world has revealed the reality that people's activities are linked across borders and globally. At the same time, the current situation, which calls for urgent steps to be taken to develop diagnostic and therapeutic methods and vaccines to overcome the pandemic, has demonstrated once again that the collective wisdom of science and technology is essential to solving the global problems we are facing.

In Japan, based on the Basic Act on Science and Technology (Act No. 130 of 1995), the government has formulated a Science and Technology Basic Plan every five years to promote science and technology policies in a comprehensive and systematic manner. With the current rapid development of networks and cyberspace in mind, the Fifth Science and Technology Basic Plan (approved by the Cabinet in January 2016; for the term from FY2016 to FY2020) envisages a super smart society dubbed "Society 5.0"<sup>2</sup> as a future that Japan aspires to achieve. Japan aims to be one of the first countries to bring into reality a society where economic and social challenges are solved by the integration of cyberspace and physical space (real space) while people's quality of life is enhanced at the same time. Today, with the rapid development of AI,<sup>3</sup> quantum technology, genome editing, and other cutting-edge emerging technologies, science and technology can have a significant impact on society on an unprecedented scale, while the world is becoming ever more unpredictable. In addition, there are high expectations for science and technology to help resolve increasingly diverse and complex domestic and international challenges, such as the need for accommodating various social needs in a more meticulous manner, which includes respecting diversity and valuing social inclusion, while responding to COVID-19 and other emerging and re-emerging infectious diseases, global warming, and other global-scale issues. At present, the government is discussing the next Basic Plan for Science and Technology. There is an urgent need for Japan, as

<sup>1</sup> This White Paper describes the status of and response to COVID-19 ascertained by the end of April 2020.

<sup>2</sup> The Fifth Science and Technology Basic Plan defines a super smart society as "a society that is capable of providing the necessary goods and services to the people who need them at the required time and in just the right amount; a society that is able to respond precisely to a wide variety of social needs; a society in which all kinds of people can readily obtain high-quality services, overcome differences of age, gender, region, and language, and live vigorous and comfortable lives." Also, the Comprehensive Strategy on Science, Technology and Innovation 2017 describes Society 5.0 as "a human-centered society that, through the high degree of merging between cyberspace and physical space, will be able to balance economic advancement with the resolution of social problems by providing goods and services that granularly address manifold latent needs regardless of locale, age, sex, or language to ensure that all citizens can lead high-quality, lives full of comfort and vitality."

<sup>3</sup> Artificial Intelligence

the proponent of Society 5.0, to realize an inclusive society (a society where no one is left behind) by realizing a harmonious relationship with cutting-edge science and technology, while also contributing to the sustainable development of the world by solving social challenges with such science and technology. In order to achieve this, it is necessary to further encourage research projects that tap into researchers' ingenuity and ensure the diversity of knowledge as a source of value. In addition, it is also necessary to promote R&D that will contribute significantly to the strengthening of Japan's industrial competitiveness, the enrichment of people's lives, the resolution of social issues, and the security and safety of the people, while envisioning a desirable future society.

Part I of this White Paper introduces you to Japan's current R&D projects and measures to counter the spread of COVID-19. After that, it covers the prediction of the future as a means of foreseeing the uncertain future, presenting some examples from Japan and overseas. Based on one of the prediction initiatives from Japan, the 11th Science and Technology (S&T) Foresight Survey by the National Institute of Science and Technology Policy (NISTEP) of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), this White Paper describes what the future society may look like in 2040.<sup>1</sup> Part I also introduces the government's efforts to realize the desired future society and solve global issues, as well as specific R&D initiatives.

The global spread of COVID-19 is likely to change the shape of society into the future. In the Opinion Poll on Science and Technology (Opinions on COVID-19 and Other Infectious Diseases) (Preliminary Report)<sup>2</sup> conducted by the NISTEP in March 2020, a new question was added asking what science and technology measures the respondents think the government should take in order to predict and counter COVID-19 and other infectious diseases. As a result, the percentage of respondents who chose "promotion of R&D" exceeded 60% for the first time in the history of the poll, showing a high level of public interest in R&D in this field. However, the R&D of therapeutic agents and vaccines for COVID-19 is an ongoing process and needs an evaluation in the future.

The spread of the disease is having a profound impact on the way people live their daily lives, on public services such as education, health care and transportation, and on the supply chain in the industrial sector worldwide. The great stagnation in human society has been a turning point for people to change their values that they used to take for granted. In Japan, there has been a rapid change in society, such as remotization and digitization using ICT,<sup>3</sup> including telework, distance education, and telemedicine. It is hoped that the government also promotes such efforts and accelerate the realization of Society 5.0, a human-centered society where people can lead a high quality life by solving economic and social challenges through the integration of cyberspace and physical space (real space), which has been Japan's goal up to now. This may have an impact on the timing of the realization of the future society described in the 11th S&T Foresight Survey. In addition, the behavioral changes that Japan is promoting as a nation need to be scientifically evaluated in the future.

The spread of COVID-19 has once again demonstrated to us the important role that the knowledge of the humanities and social sciences can play along with cutting-edge science and technology in solving

<sup>1</sup> Although the Science and Technology Basic Plan is a five-year plan looking ahead to the next ten years, this White Paper aims to contribute to the examination of the plan from a long-term perspective by showing possibilities for the next two decades.

<sup>2</sup> National Institute of Science and Technology Policy (NISTEP), Opinion Poll on Science and Technology (Opinions on COVID-19 and Other Infectious Diseases) (Preliminary Report), [https://www.nistep.go.jp/wp/wp-content/uploads/public-attitudes\\_flash.pdf](https://www.nistep.go.jp/wp/wp-content/uploads/public-attitudes_flash.pdf)

<sup>3</sup> Information and Communication Technology

economic and social challenges. This is a good example to show that it is necessary to comprehensively promote science, technology and innovation creation based on deep insights into the nature of human beings and society as a whole (and in line with the amended Basic Act on Science and Technology) to confront the increasingly complex challenges of our time. In other words, rapid advances in science, technology and innovation, such as the globalization and digitalization of society, are having a significant impact on the nature of human beings and society, while the state of human beings and society is inseparable from advances in science, technology and innovation. For this reason, it is important that researchers in the natural sciences and the humanities and social sciences work together to solve problems. From these perspectives, it is necessary to make further predictions of the future keeping in mind future structural changes and developments in society.