

How AI Will Transform Science, Technology, and Innovation

The 21st century is referred to as an era of a “knowledge-intensive society,” and Japan is shifting from a capital-intensive society, which is highly dependent on capital equipment with products being the main source of value to what is called a knowledge-intensive society, where all products and services have higher value-added through smartization.¹ It is also referred to as an era of data where data resources serve as a driving force for economic growth under such a situation. One of the reasons for this is the rapid advancement of the technology known as artificial intelligence (AI). In particular, the remarkable progress of generative AI technology in recent years has attracted considerable attention around the world. AI is having substantial impact on all kinds of technologies and industries, including data analysis, robot technology, as well as medical care and the manufacturing industry. In addition, as services with interfaces that allow use by non-experts, such as conversational generative AI, became widely available, AI has become a familiar technology accessible by a large number of people, and has also been changing our daily lives and values at the same time. It is expected that our future society will be even more strongly affected by AI.

In the 5th Science and Technology Basic Plan, the government proposes “Society 5.0” as a future society that Japan should aim for. Society 5.0 is defined as “a human-centered society in which economic development and the resolution of social issues are compatible with each other through a highly integrated system of cyberspace and physical space.” The society to be realized by

Society 5.0 is one where all people and things are connected by the Internet of Things (IoT), various knowledge and information are shared among them, and new, unprecedented values are created. Japan also aims to realize a society where, with the use of AI, required information is provided in a timely manner, problems such as an aging society with a declining birthrate, depopulation of rural areas, and economic disparities will be overcome by robots, automated driving, and other technologies, and every individual can live in comfort and play an active role through innovation. The 6th Science, Technology and Innovation Basic Plan succeeds in this concept and sets forth that it is necessary to embody the vision of society indicated in the 5th Basic Plan in response to both domestic and international changes. In fact, the domestic AI system market is growing rapidly, with survey results and forecasts² indicating that the market size (based on end-user spending) in 2023 grew by 34.5% over the previous year, and that the compound annual growth rate for the period of 2023 to 2028 is expected to be 30.0%.

Amid the rapid advancement of new technologies that affect the state of society, such as IoT, robots, AI, and big data, we face the challenge of not merely adopting technologies, but how we link them to innovation of society as a whole, and how we build a state of coexistence with these technologies.

Precisely at such timing, in 2023, the G7 under Japan’s presidency launched the “Hiroshima AI Process” for discussing the topic of generative AI whose rapid development and spread had been an important issue for the international community as

¹ White Paper on Science and Technology 2019.

² International Data Corporation Japan “The 2024 Domestic AI System Market Forecast released” <https://www.idc.com/getdoc.jsp?containerId=prJPI52070224>.

a whole, and Japan has been demonstrating its leadership. Recognizing the importance of maximizing the innovative opportunities of AI while mitigating risks and challenges from advanced AI systems, including foundational models and generative AI, the "Hiroshima AI Process Comprehensive Policy Framework" was developed with an aim to promote safe, secure, and trustworthy AI globally and was endorsed by the G7 Leaders. It is important for international partners to continue to collaborate with each other and build up global governance in a flexible

manner in the future, while swiftly responding to technology trends and environmental changes, so that more people will be able to enjoy the benefits of cutting-edge science and technology.

This white paper features the AI-related situation surrounding Japan and R&D trends, as well as the possibilities and impact of the use of AI in various fields, including R&D and the manufacturing industry, the public sector, etc., and explores the direction of science, technology, and innovation toward the coexistence with AI which Japan should aim for in the future.

What is the 6th Science, Technology and Innovation Basic Plan?

In Japan, the Science, Technology, and Innovation Basic Plan (previously known as the Science and Technology Basic Plan from the 1st iteration to the 5th iteration; hereinafter referred to as "the Basic Plan") is formulated every five years based on the Basic Act on Science, Technology, and Innovation, and the current 6th Basic Plan was started in April 2021. The plan puts forth an objective to continue to create knowledge with diversity and excellence, and restore the world's highest level of research capabilities for the realization of Society 5.0.

What is Society 5.0?

Society 5.0 is a concept proposed in the Basic Plan as a future society that Japan should aim for. It is defined as "a human-centered society in which economic development and the resolution of social issues are compatible with each other through a highly integrated system of cyberspace and physical space" and as "a society that is sustainable and resilient against threats and unpredictable and uncertain situations, that ensures the safety and security of the people, and that enables each and every individual to realize diverse forms of well-being."



The staff at MEXT explain three important points of the future society Japan should aim for—"Society 5.0."

Video Guide to Society 5.0 for the White Paper on Science, Technology, and Innovation 2021 (Staff Explanation Ver.)
URL: <https://www.youtube.com/watch?v=ggS9VQLsMrQ>