

Chapter 2

The Current Status and Issues of Data Distribution and Utilization

With the advancement of telecommunications infrastructure, the volume of data distribution has exploded, and various businesses and services utilizing data have emerged. While such services offer improved convenience for users, various issues have become apparent in the distribution and utilization of data on the Internet.

This chapter summarizes the status and issues of accelerating data distribution and utilization, and analyzes the status of each country's initiatives.

Section 1 The Continuing Acceleration of Data Distribution and Data Utilization

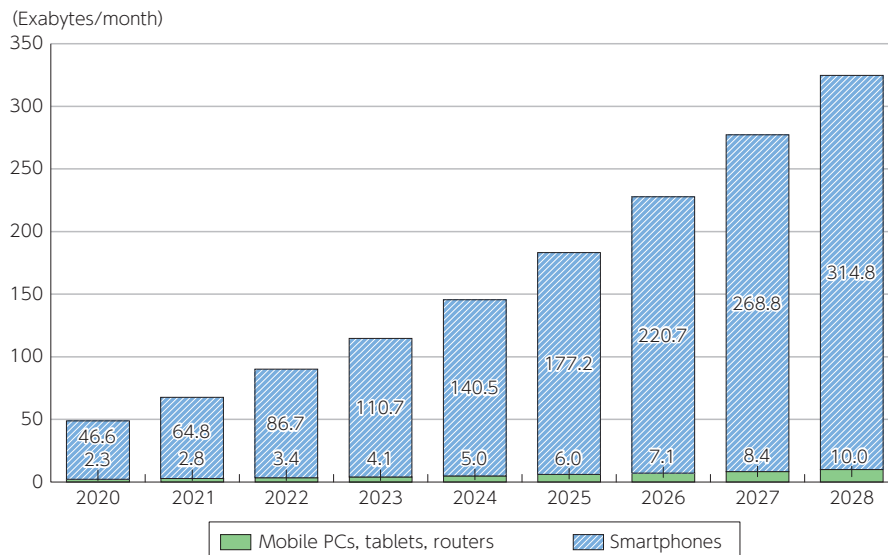
1. The explosive increase in data distribution

With the advancement of telecommunications infrastructure and the spread and diversification of digital services, the volume of data distribution on networks in Japan has increased exponentially. Since the COVID-19 pandemic, digitization has progressed, enabling people to live non-contact and work non-face-to-face. As of November 2022, the total download traffic of fixed-line broadband service subscribers increased by 23.7% year on year, and that of mobile communications subscribers as of September 2022 increased by 23.4% year on year.¹

tion, especially through mobile terminals, have increased significantly and are expected to increase further. For example, the Ericsson Mobility Report published by Ericsson (Sweden) in November 2022 shows that worldwide data traffic via mobile devices (excluding FWAs) has increased significantly, reaching approximately 90 exabytes per month by the end of 2022, and it is expected to reach approximately 325 exabytes per month by 2028 (**Figure 2-1-1-1**). Also, the percentage of 5G in mobile data traffic is expected to be about 17% by the end of 2022 and is expected to be 69% by 2028.

Globally, the volumes of data traffic and data distribu-

Figure 2-1-1-1 Predicted global mobile data traffic by device



(Source) Prepared based on "Ericsson Mobility Visualizer by Ericsson"²



Figure (related data) Global mobile data traffic forecast (5G and Non-5G)

Source: Prepared based on "Ericsson Mobility Visualizer by Ericsson"

URL: https://www.soumu.go.jp/johotsusintokei/whitepaper/eng/WP2023/data_collection.html#f00004

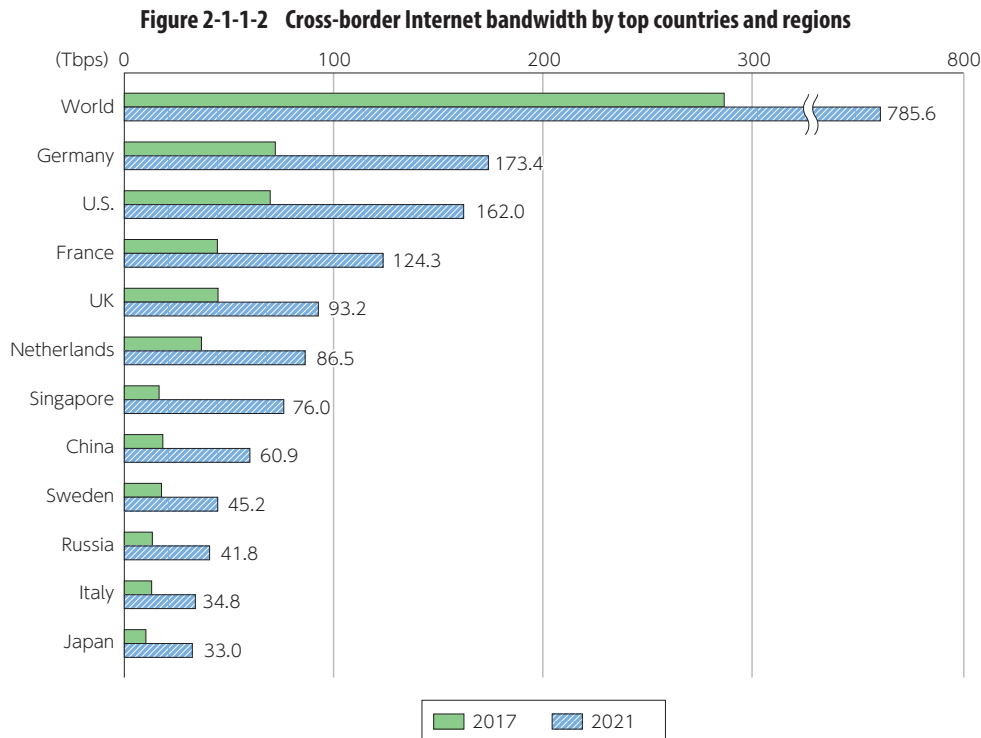
(Data collection)

¹ https://www.soumu.go.jp/main_content/000861552.pdf

² <https://www.ericsson.com/en/mobility-report/mobility-visualizer>

Furthermore, in recent years, globalization of corporate activities and the normalization of the provision of international services via the Internet have led to the active distribution of data beyond national borders. According to TeleGeography (U.S.), the volume of cross-border data distribution has grown rapidly since the COVID-19 pandemic, as the use of online shopping and video distribution services, etc. increased due to mea-

sures such as national lockdowns and emergency declarations. In 2021, for example, the volume of cross-border data distribution reached 785.6 terabits per second (Tbps), an increase of about 2.7 times from 2017. Looking at countries and regions, Germany came in first followed by the U.S. and France, with Japan ranking 11th at 33 Tbps (**Figure 2-1-1-2**).



* The classification of regions is based on TeleGeography's definition, and the regional totals are the sums of the countries for which data is available.
 (Source) Japan External Trade Organization (JETRO) (Aug. 2, 2022) "The data environment is now (worldwide) - A look at cross-border data flows, investment and trade rules"

2. The awareness of companies and consumers regarding the provision and utilization of data

As the volume of data distribution within countries and across borders increases, we surveyed companies and consumers regarding their awareness of the provi-

sion and use of data in four countries: Japan, the U.S., Germany, and China.

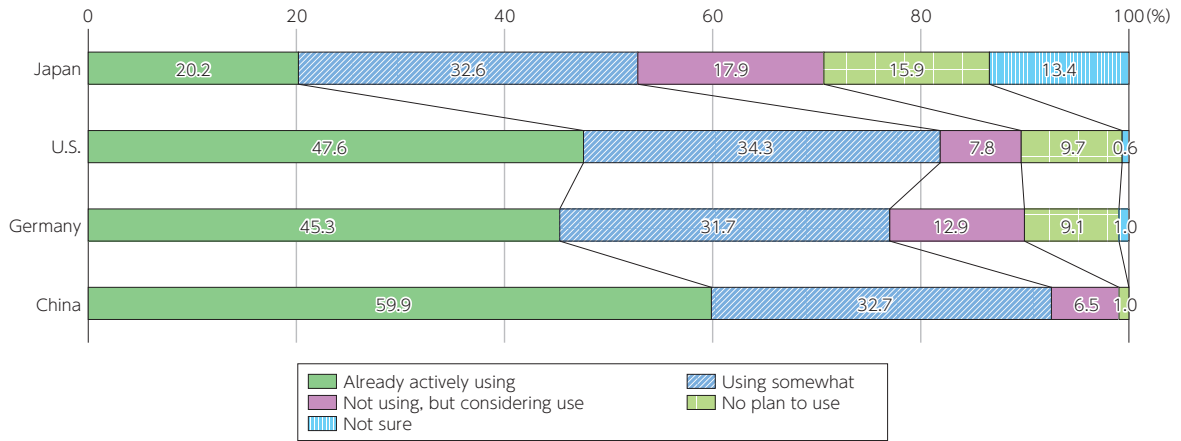
(1) Corporate awareness

First, we asked companies in each country how they use personal data, such as basic customer information. The percentage of Japanese companies that responded they were able to utilize personal data (the sum of "already actively utilizing personal data" and "somewhat utilizing personal data") was 52.8%, which was higher

than the results of the survey conducted in fiscal 2019³ but lower than that of foreign companies (**Figure 2-1-2-1**). The percentage of Japanese companies that can utilize data other than personal data (51.8%) was low compared to other countries.

³ MIC (2020) "Survey Research on Consumer Awareness of the Data Distribution Environment"

Figure 2-1-2-1 Utilization of personal data by companies in each country



(Source) MIC (2023) "Survey Research on R&D on the Latest Information and Communications Technologies and Trends of Use of Digital Technologies in Japan and Abroad"



Figure (related data) Utilization of data other than personal data

Source: MIC (2023) "Survey Research on R&D on the Latest Information and Communications Technologies and Trends of Use of Digital Technologies in Japan and Abroad"

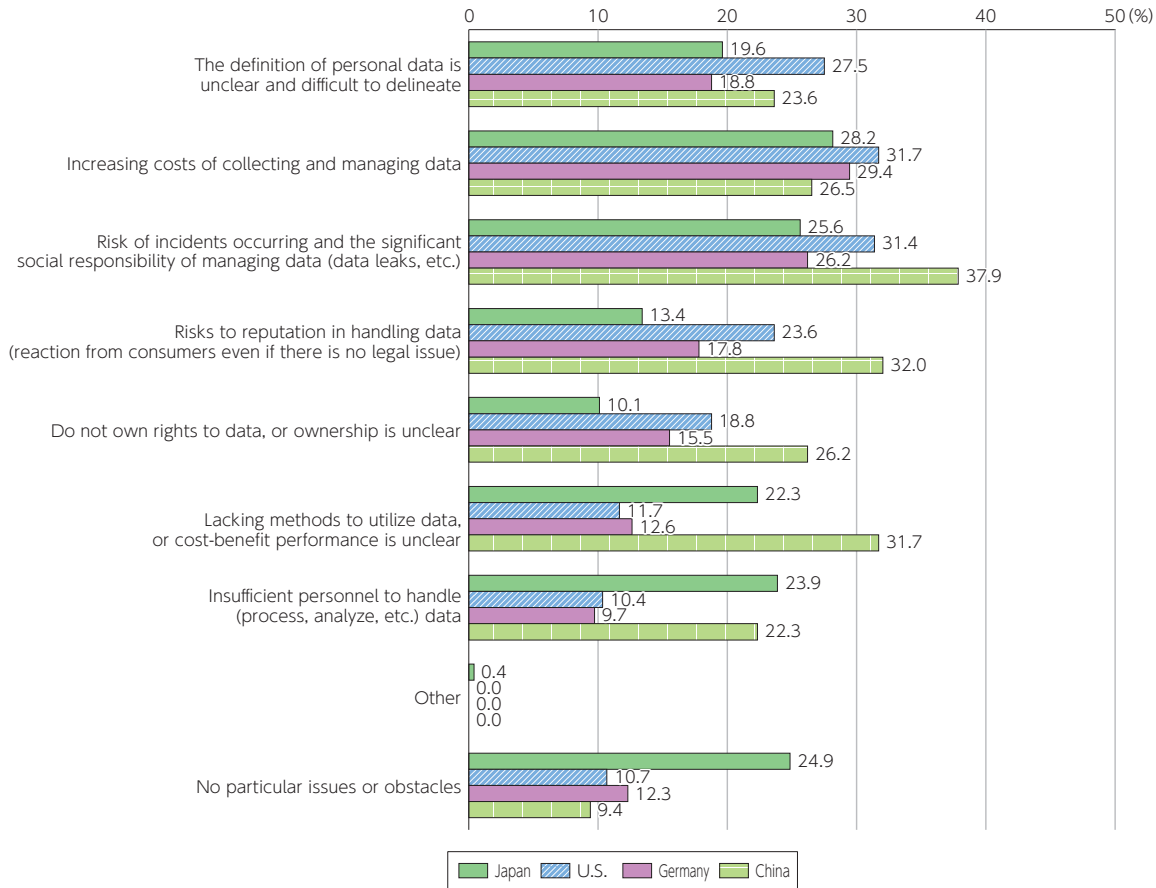
URL: https://www.soumu.go.jp/johotsusintokei/whitepaper/eng/WP2023/data_collection.html#f00007

(Data collection)

When asked about issues and barriers to handling and utilizing data, many Japanese companies cited "Lack of methods for utilizing data," "Unclear cost-effectiveness and a lack of human resources for handling data (processing and analysis, etc.)." However, companies in the other surveyed countries frequently cited "Risk to

company's reputation associated with handling data (consumer backlash, etc. even when there are no legal issues)," and "Fact that the data does not belong to the company, or it is unclear who the owner is" as issues and barriers (**Figure 2-1-2-2**).

Figure 2-1-2-2 Issues and barriers envisaged in the handling and use of personal data



(Source) MIC (2023) "Survey Research on R&D on the Latest Information and Communications Technologies and Trends of Use of Digital Technologies in Japan and Abroad"

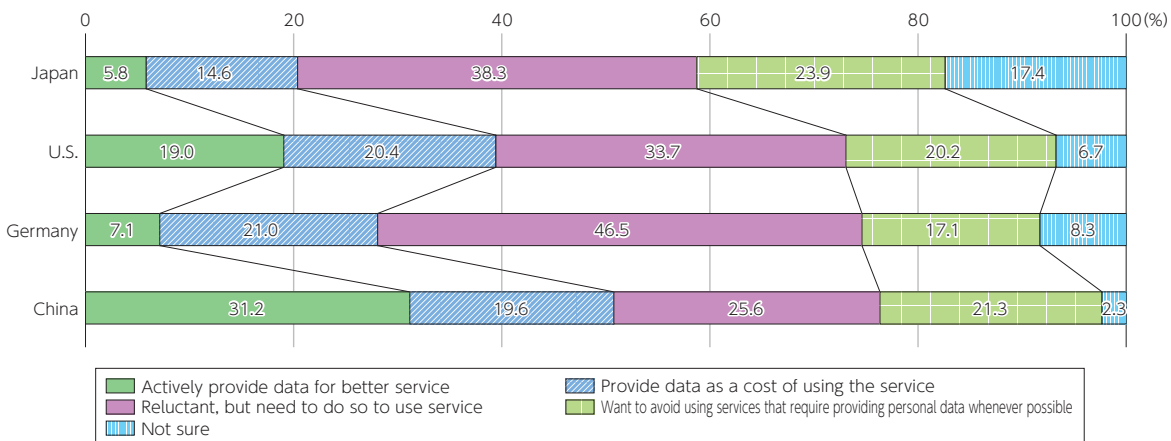
(2) Consumer awareness

When consumers in the four target countries were asked how they felt about providing personal data to companies in order to use services, 58.7% of respondents in Japan answered that they would provide personal data (the sum of respondents who answered "I will actively provide personal data in order to receive better service," or "It is only fair to provide personal information in order to use a service," or "I feel some reluctance

to providing personal data but I will to use a service"), which was about 15% lower than in other countries (Figure 2-1-2-3).

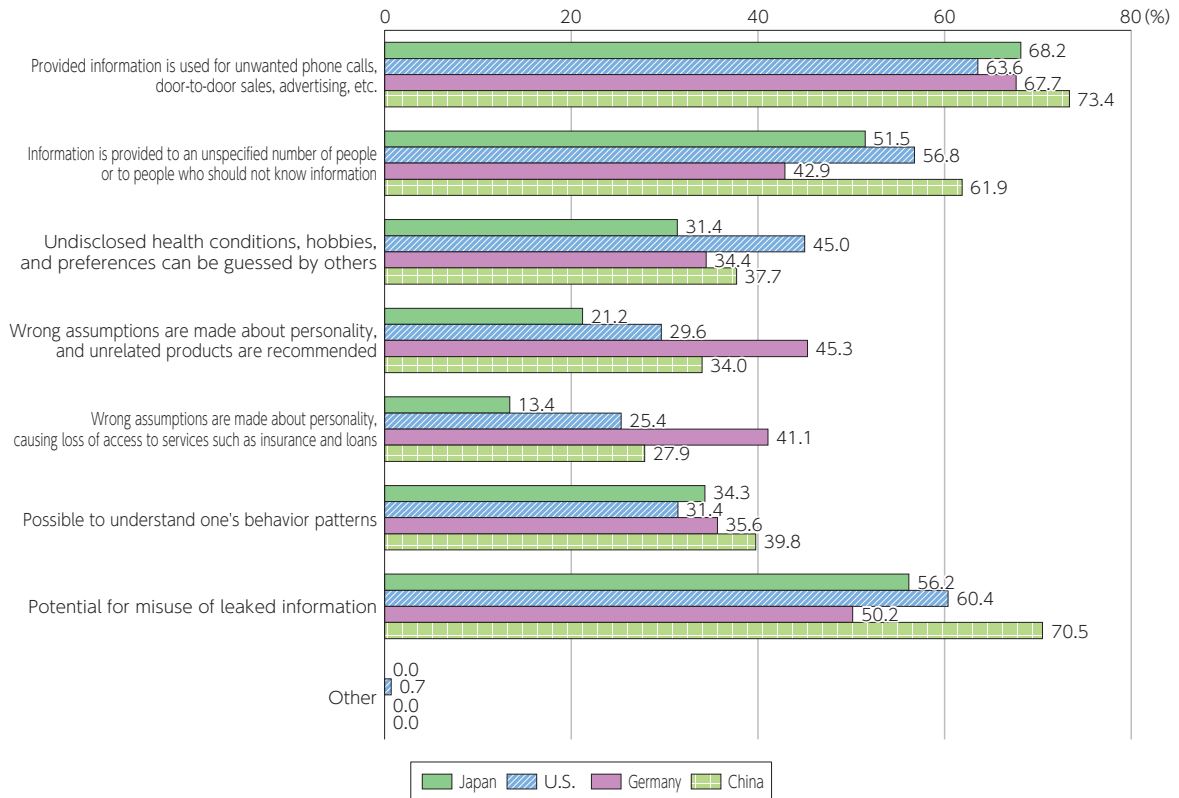
In all four countries, the most common reasons for concern and reluctance in providing personal data to companies were "Unintentional information leaks and that information may be used in undesired ways" (Figure 2-1-2-4).

Figure 2-1-2-3 Intent regarding using services that require the provision of personal data



(Source) MIC (2023) "Survey Research on R&D on the Latest Information and Communications Technologies and Trends of Use of Digital Technologies in Japan and Abroad"

Figure 2-1-2-4 Reasons for reluctance to provide personal data when using services



(Source) MIC (2023) "Survey Research on R&D on the Latest Information and Communications Technologies and Trends of Use of Digital Technologies in Japan and Abroad"

Furthermore, when asked about the conditions for providing personal data to companies, the most common answer in all four countries was "To receive an economic benefit" followed by "To improve the service for me,"

showing that the more obvious the advantage was to the personal data provider, the greater the intention was to provide personal data.



Figure (related data) Conditions for providing personal data to companies

Source: MIC (2023) "Survey Research on R&D on the Latest Information and Communications Technologies and Trends of Use of Digital Technologies in Japan and Abroad"

URL: https://www.soumu.go.jp/johotsusintokei/whitepaper/eng/WP2023/data_collection.html#f00011

(Data collection)

3. Initiatives by country for promoting data utilization (national strategies, etc.)

Against the backdrop of increasingly higher volumes of data distribution through the advancement of digitalization, the promotion of innovation, and the enhancement of the economic value of data, countries around the world, including Japan, have formulated comprehensive

and specific data strategies, and they are actively promoting measures in line with them with the recognition that data is the foundation for national wealth and international competitiveness in the digital society.

(1) Japan

In June 2019 the Cabinet approved the Declaration to be "The World's Most Advanced IT Nation — the Basic Plan on the Advancement of Public and Private Sector Data Utilization" with the aim of creating the world's most advanced IT nation. The plan calls for the use of data to realize benefits to people's lives as a priority item, and the thorough use of data in the public and private sectors is one of the initiatives for realizing the plan.

Furthermore, in June 2021, the Cabinet approved the

National Data Strategy. This strategy presents the following principles of data utilization: (1) data is connected and can be used anytime anywhere; (2) the use of data is controlled so it can be used safely; and (3) everyone cooperates to create new value. These are action guidelines common for both the public and private sectors in order to realize a citizen-centric society that combines economic development and solving social issues (creation of new value) based on a system (a digital

twin) that highly integrates physical space (real space) and cyberspace (virtual space). The strategy summarizes issues and measures on seven levels. The issues that each level should focus on in particular are “Trust⁴” in level 5 (Rules), “Platform” in level 3 (Tools) and level 4 (Service Platform), “Development of base data” in level

(2) The European Union (EU)

In February 2020, the European Commission published its European Data Strategy with the aim of creating a single market for data to enhance Europe's international competitiveness and data sovereignty. The strategy describes the aim of creating the European Data Space, which is a single market for data in order to ensure Europe's competitiveness and data sovereignty around the world and to make more data available for socioeconomic activities while maintaining an environment where companies and individuals can manage the data they generate.

In November 2020, the European Commission introduced the European Data Governance Act to promote the sharing of trustworthy data within Europe. The act stipulates the promotion of the reuse of certain data held by the public sector, improved trustworthiness and neutrality in data sharing, and a mechanism for managing the use of data generated by companies and individuals, etc. In May 2022, the act became law, and it will begin to apply 15 months after coming into force.

In addition, the Gaia-X European Association for Data and Cloud AISBL (hereinafter referred to as Gaia-X) was

(3) The U.K.

In September 2020, the Department for Digital, Culture, Media and Sport formulated the UK National Data Strategy. The strategy positions data as a driving force in the economy and trade, and it sets forth various measures to build the world's most advanced data economy while gaining public trust in the utilization of data. Priority issues include: (1) unlocking the value of data across the economy, (2) promoting growth and ensuring trust-

(4) The U.S.

In the U.S., home to many of the world's largest IT companies, the government has not intervened strongly to promote the use of data in the private sector, but in the public sector, both federal and state level governments are actively undertaking initiatives.

At the federal level, the Federal Data Strategy (FDS), a 10-year vision for the use of federal government data, was formulated and published in February 2019. It is a vision for the integrated use of data security, privacy, and confidentiality by all federal government agencies to serve the public and manage resources. It consists of a mission, 10 principles, 40 best practices, and 20 annual

2 (Data), and “Development and expansion of digital infrastructure” in level 1 (Infrastructure). The National Data Strategy will be carried over to the revised Priority Policy Program in 2023, and the Government will continue to promote measures that should be prioritized.

established in 2021 as an international non-profit organization for information infrastructure that links industrial data in nine fields: industry (manufacturing), the green deal, mobility, healthcare, finance, energy, agriculture, the government, and skills. Gaia-X aims to build an ecosystem in which data can be shared and used in a trusted environment and to incorporate key European values, such as interoperability, reversibility, transparency, and cybersecurity into the cloud infrastructure. As of the end of January 2023, 357 companies from within and outside the EU⁵ are participants. At Gaia-X, a consortium called IDS, which is differentiated and organized by industry, is examining use cases, such as areas of application and business processes. For example, in the automotive industry, Catena-X, an alliance centered in Germany for sharing data across the automotive value chain, has been established with the aim of enhancing the competitiveness of the automotive industry and reducing CO2 emissions, etc., and it is studying use cases, such as business partner data management, traceability, and quality control.

worthy data systems, (3) transforming government data use to increase efficiency and improve public services, (4) ensuring the security and resilience of the infrastructure on which data depends, and (5) promoting international data flows. The four pillars of efficient data utilization are (1) data foundations, (2) data skills, (3) data availability, and (4) data responsibility.

action plans. The principles and best practices guide the management and use of data from the federal government to individual agencies. In addition, the best practices are divided into three categories: “building a culture that values data and promotes public use,” “data management and protection,” and “promoting the efficient and appropriate use of data.” To promote the strategy under strong leadership, a Chief Data Officer (CDO) has been established at each agency, and a Federal Chief Data Officers Council has been established to focus on data sharing between agencies.

⁴ “Trust” refers to the trustworthiness of data itself in cyberspace and the trustworthiness of the attributes and sources of data, and it has been pointed out that there is a need for a mechanism that ensures trust when exchanging physical space information.

⁵ Four Japanese companies and organizations, EY Consulting & Strategy, NTT Communications, NEC, and the Robot Revolution and Industrial IoT Initiative, are participants as of the end of January 2023.

4. Advanced Initiatives for Data Utilization

Initiatives to promote the use of data in various fields are being carried out in numerous countries, and in Japan progress is being made on examination of the ap-

(1) Education

The GIGA School Program was launched in December 2019 with the aim of creating an educational environment that is fairly and individually optimized to enable the further development of the qualities and abilities of diverse children without leaving anyone behind by integrating one terminal per person with a high-speed, large-capacity communications network. Due to the COVID-19 pandemic starting in 2020, the development of one terminal per person has been accelerated, and the introduction of the system is expected to be completed in 1,769 municipalities (97.6% of all municipalities) by the end of fiscal 2020.⁶ In addition, from the viewpoint of improving individual learning and teacher guidance and support by utilizing educational data, studies on the use of educational data were promoted, and the Roadmap on the Utilization of Data in Education was published in January 2022.

Under such circumstances, various services that strive to utilize data efficiently in educational settings are also being provided by business operators. For example, Google Workspace for Education from Google Inc. is used by more than 170 million students and educators worldwide.⁷ In November 2022, Google launched the Google for Education DX Package, which supports DX (digital transformation) in school settings, including elementary schools and junior and senior high schools. Learning logs and other information are centrally managed in the cloud to support analyzing the trajectory of learning and provide learning guidance, etc.

Microsoft also offers Microsoft 365 Education, which

(2) Medication

In the medical field, the concept of a national medical information platform is being examined for the realization of medical DX. It is expected that the realization of such a platform will lead to the provision of better quality medical care as medical information currently stored and managed individually will be consolidated onto a single platform.

The MDV Data Platform Service is an example of the utilization of medical data as a service for supporting hospital management. It integrates data scattered throughout a hospital, including electronic medical records, medical systems, and other systems, and it enables data analysis from the perspectives of “increased

appropriate and efficient use of personal data in education, medicine, etc. and the provision of advanced services by private companies.

is a learning platform that promotes visualization of the education field using data. In addition to the data from Microsoft 365 Education, data from other learning and school affairs systems can be stored, analyzed, and visualized in combination according to the purpose of utilization of the educational data.⁸

An example of the utilization of educational data by local governments is the Shibuya City Board of Education, which has been building an “educational dashboard” that aims to improve school satisfaction through guidance, based on each teacher’s understanding of their students, with the aim of realizing the happiness (well-being) for each child. Units such as “whole school,” “class,” and “individual students” are used to ascertain information from multiple sources.

In addition, initiatives by private cram schools and preparatory schools are progressing to utilize AI to analyze the data they have accumulated and then provide each student with the customized shortest route for learning. For example, the AI tool atama+ was provided to more than 3,100 cram schools and preparatory schools nationwide as of the end of May 2022, and the cumulative number of answers has exceeded 300 million.⁹ To realize individualized optimal learning, educational materials are being improved, and the accuracy of recommendations is becoming more precise on a daily basis through the analysis of large amounts of accumulated learning data. By accumulating data on the platform in this way, education is being realized according to the needs of each student.

revenue,” “work style reform,” “quality of medical care,” and “improved patient satisfaction.”¹⁰ The service is powered by Amazon’s AWS cloud service.¹¹

Many applications for promoting the health of users are also being provided. Smartwatches, such as Apple’s Apple Watch and those offered by Fitbit, which was acquired by Google, can capture the wearer’s heart rate, hours slept, physical activity, and other data and store it in the cloud. By linking apps, such as Pep Up, it is possible to integrate and analyze not only the data obtained by a smartwatch but also medical data to promote a person’s health.

⁶ MEXT https://www.mext.go.jp/a_menu/other/index_00001.htm

⁷ https://edu.google.com/intl/ALL_jp/workspace-for-education/editions/overview/

⁸ <https://news.microsoft.com/ja-jp/2022/12/21/221231-introducing-case-studies-and-technologies-for-utilizing-educational-data-to-advance-the-giga-school-initiative/>

⁹ <https://corp.atama.plus/news/2416/>

¹⁰ https://www.mdv.co.jp/solution/medical/hospital/mdv_dps/

¹¹ <https://d1.awsstatic.com/local/health/20220324%20MDV%20session%203.pdf>