Digital Technology

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1. Overview

Japan's digital transformation market shows solid growth, presenting increased growth opportunities for foreign-affiliated companies

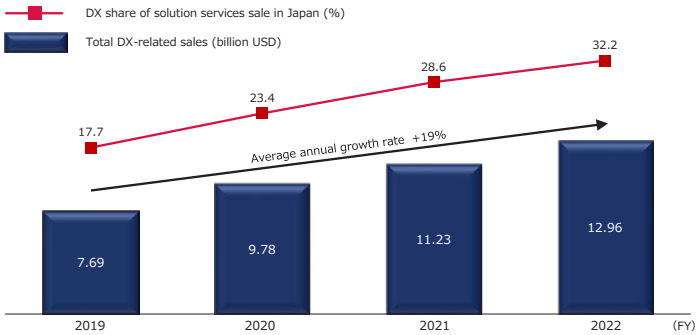
(1) Japan as a leading country in large-scale investments in digitalization

In the International Institute for Management Development's (IMD) Digital Competitiveness Ranking (2023) covering 64 countries, Japan ranks 8th overall in the Asia-Pacific region. Notably, Japan held top positions worldwide in the E-Participation (1st) and Wireless broadband (2nd) indices, demonstrating its global leadership in digital infrastructure.[1] Similarly, in the Portulans Institute's Network Readiness Index (2023), which covers 134 countries and regions, Japan ranks 13th globally and 3rd in Asia. Japan excels in areas such as Access to Technology (5th) and Online Information Sharing by Government Agencies, including local authorities (2nd). Additionally, Japan's high willingness to invest in the research and development (R&D) of new technologies is notable, with strong positions in R&D Investment (2nd), R&D Expenditure (4th), and Investment in Emerging Technologies (9th).[2] It is evident that Japan has made comparatively more large-scale investments in digitalization and R&D than other countries, led by large private companies with financial power and influence, as well as by the government.

(2) Continuous growth is expected in digital market

The market size for digital transformation-related solution services in Japan grew from 7.69 billion USD* (1,163.4 billion JPY) in 2019 to 12.96 billion USD* (1,961.9 billion JPY) in 2022, recording a steady annual growth rate of 19% (Figure 1).

Figure 1 Digital transformation-related solution services market size in Japan



Source: Created by JETRO based on data from the Information-technology Promotion Agency, Japan (IPA) [3]

In addition, the digital transformation market is expected to see steady long-term growth due to the government's support for digitalization initiatives, including the realization of Society 5.0 and the new taxation system for promoting digital transformation investment (as detailed in section 2. Government Initiatives).

(3) Company-wide digital transformation driven by large corporations

With the solid growth of the domestic digital transformation market, Japanese companies are advancing digitalization across different fields. In addition to streamlining existing operations, such as digitizing physical data, digital transformation is beginning to be recognized for its diverse benefits, including the creation of new products and services and the transformation of company-wide processes leading to fundamental management reforms.[4]

1 International Institute for Management Development (IMD). "PEER GROUPS RANKINGS: ASIA – PACIFIC," "TECHNOLOGY: Wireless broadband," "FUTURE READINESS: E-Participation," *Digital Trends-Overall-Japan.*

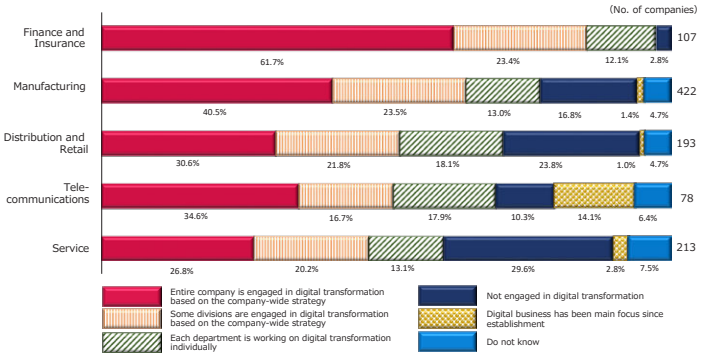
2 Portulans Institute. "Network Readiness Index 2023(PDF)," *Analysis Benchmarking the Future of the Network Economy.*

3 Japan Electronics and Information Technology Industries Association (JEITA). *Solution Services Market Size (2019-2020)* (JP), p. 2.
JEITA. *2021-2022 Solution and Services Market Size by Application, JEITA* (JP), p. 2.

4 Information-technology Promotion Agency, Japan (IPA). *Digital Transformation Trend 2024* (JP), p. 9.

On the other hand, there is variation in the level of digital transformation achieved among industries. According to survey results, the proportion of companies engaged in digital transformation is highest in the Finance and Insurance industry at 85.1%, followed by the Manufacturing, and Distribution and Retail industries. In contrast, the Service industry tended to have fewer companies involved in digital transformation (Figure 2).

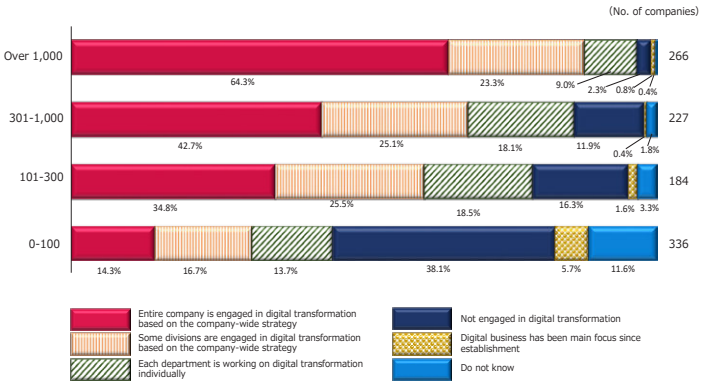
Figure 2 Companies engaged in digital transformation based on company-wide strategy (by industry)



Source: Created by JETRO based on data from IPA[5]

Furthermore, nearly 90% of large companies with over 1,000 employees are engaged in digital transformation, whereas only about 30% of companies with 100 employees or fewer are involved, indicating a significant gap (Figure 3). Many small and medium-sized enterprises (SMEs) cite the lack of strategic planning and oversight personnel, as well as insufficient personnel to facilitate on-site digital transformation, as reasons for the slow progress in digital transformation initiatives. Companies with 100 employees or fewer frequently report a lack of knowledge and information necessary for digital transformation, highlighting significant concerns regarding expertise and skills.

Figure 3 Companies engaged in digital transformation based on company-wide strategy (by number of employees)



Source: Created by JETRO based on data from IPA[6]

As compared to other countries, Japanese companies tend to cite a lack of personnel and lack of knowledge and literacy in digital technology as barriers to digital transformation.[7] Securing and developing talent, as well as reskilling existing employees, are key challenges.

In response to this situation, the government has begun implementing multifaceted support aimed at improving the nation's digital capabilities. This includes promoting further investment in companies that are advancing digitalization and digital transformation through innovation-driven policies, as well as supporting companies that are making efforts to attract and develop talent (as detailed in section 2. Government Initiatives).

(4) Japan's market size as a key point of attraction for foreign-affiliated companies

According to a survey of foreign-affiliated companies in Japan, the Japanese market is considered attractive due to its market size, social and economic stability, and robust infrastructure. In addition, foreign-affiliated ICT companies tended to value the size of the Japanese market at a higher rate (68.5%), than those in the finance and insurance industry (68.1%) and academic research, professional and technical services (51.4%). The same respondents also favorably rated the concentration of related clients and industries in Japan, the quality of infrastructure, and the medium- to long-term growth potential of the ICT industry in Japan, indicating that they value opportunities for collaboration and the well-developed business foundations in Japan.[8]

Furthermore, many foreign-affiliated companies highlighted the importance of advancing digital transformation as a key theme for both their operations and Japanese society in the aftermath of the COVID-19 pandemic. A similar trend is observed among Japan's domestic companies as well. According to a survey, 24% of Japanese companies reported that the COVID-19 pandemic led them to expanding the segments that they are digitalizing, increasing the budgets allocated towards digital transformation, and improving their digital transformation systems.[9] Despite the challenges, the digital transformation market is set to expand in the future due to an increase in the number of companies involved and government support measures (as detailed in section 2. Government Initiatives).

In addition to market size, social and economic stability, and well-developed infrastructure, the wave of digitalization following the COVID-19 pandemic could further incentivize foreign-affiliated companies specializing in digital transformation, to invest in the Japanese market. In fact, in recent years, various emerging digital markets in Japan have seen the entry of numerous foreign companies, ranging from startups to large enterprises (as detailed in section 3. Attractive Markets).

5 IPA. Digital *Transformation Trend 2024* (JP), pp. 2, 3.
6 See Note 5, pp. 2, 4.
7 Ministry of Internal Affairs and Communications (MIC). *Survey Research on R&D on the Latest Information and Communications Technologies and the Trends of Use of Digital* (JP), p. 243.
8 JETRO. *Summary of the Results of Survey on Business Operations of Foreign-affiliated Companies in Japan, 2023* (JP), p. 20.
9 Japan Electronics and Information Technology Industries Association (JEITA). *Results of Survey on DX in Japanese and US Companies, JEITA* (JP), p. 5.

2. Government Initiatives

Implementing wide-range support, from incentivizing the development of leading-edge technologies to promoting digital transformation

The Japanese government is advocating for further digitalization to tackle Japan's aging population, as well as to enhance the country's competitiveness and economic security. Aiming to realize a Society 5.0, the government is launching significant initiatives, such as the implementation of the Ouranos Ecosystem (described below) and is adopting various measures to attract foreign companies.

(1) Improving national productivity by focusing on data linkage and international cooperation

Japan has the world's highest rate of elderly population aged 65 and over[10], and the working population rate is declining in response to the increase in the elderly population rate. As the need for improving productivity through the adoption of new technologies increases, Japan's shortage of human resources needed to carry out fundamental reforms and the various barriers to achieving company-wide data utilization are becoming serious challenges. The government estimates that Japan as a country could incur economic losses of up to 79.27 billion* USD (12 trillion JPY) per year from 2025 onwards, if the various challenges with existing systems (company-wide data utilization and the necessary management reforms to achieve it) are not addressed, resulting in the government treating the digitalization and digital transformation of all industries as a priority issue.[11]

The effects of the COVID-19 pandemic have also contributed towards digitalization. As in other countries, online consumption and communication has become commonplace, and the associated services (online payment services, online conference platforms etc.) have been digitized and are being used widely.[12]

The Japanese government, seemingly anticipating this transition, announced Society 5.0 in 2016 as the ideal form of Japanese society. Society 5.0 follows the hunting society (1.0), the agricultural society (2.0), the industrial society (3.0), and the information society (4.0). It refers to a society that attempts to develop its economy and solve its social issues through a system that integrates cyberspace and physical space at the highest levels.[13] While the information society (Society 4.0) focuses on network formation and access to information through the Internet, Society 5.0 aims to create new value, including flexible production planning and inventory management through AI analysis, utilization of robots, production efficiency improvement through collaboration between factories, labor-saving, succession of skilled techniques, and high-mix low-volume manufacturing, through the connection of different systems, physical space and cyber space.[14]

The Japanese government considers digital infrastructure, digital technology and industry, and personnel with experience in digital processes as the three pillars of Society 5.0.[15] Accordingly, the government is working on initiatives such as strategic innovation that ensures smooth cooperation between ministries, development of smart cities and R&D that could contribute to the solution of social issues, and accumulation of knowledge in multiple fields along with education and personnel training.[16] The government is engaged in several focus areas and policies for realizing Society 5.0 (Figure 4).

As an example of a large-scale measure led by the government, consideration is under way for implementing the Ouranos Ecosystem, which aims to build a digital platform through public-private partnership. Under the guidance of the Information-technology Promotion Agency, Japan (IPA, Japan), which is under the Ministry of Economy, Trade and Industry (METI), the initiative attempts to implement a platform to achieve cross-ministry and international data linkage.[17]

10 Population Reference Bureau. *Countries With the Oldest Populations in the World.*
11 Ministry of Economy, Trade and Industry (METI). *Digital Transformation Report, Overcoming the IT System 2025 Year Cliff and Full-Scale Development of DX* (JP), p. 2.
12 Ministry of Internal Affairs and Communications (MIC). *2021 WHITE PAPER Information and Communications in Japan,* Chapter 1, Section 2.
13 Cabinet Office. Society 5.0 (JP).
14 Cabinet Office. Society 5.0 *Examples of New Value (Manufacturing)* (JP).
15 METI. *Toward the Realization of a Digital Society* (JP), p. 6.
16 Cabinet Office. *Science, Technology and Innovation Basic Plan (Outline)* (JP), p. 1.
17 See Note 15, pp. 26-28.

The government is also involved in the creation of international regulatory frameworks for advanced technologies. Following the G7 Hiroshima Summit in May 2023, the Hiroshima AI Process was established. Under the Process, the Hiroshima AI Process Comprehensive Policy Framework was formulated, with international guidelines and a code of conduct for all AI stakeholders, through which issues such as ensuring transparency and risk disclosure in the use of advanced AI systems were discussed. Following this, the Tokyo Expert Support Center of the Global Partnership on AI (GPAI) was established, which is expected to strengthen collaboration with international organizations with regards to AI safety assessment methods.[18,19]

Figure 4 **List of major science, technology, and innovation-related policies for realizing society 5.0**

Science, Technology, and Innovation-Related Policy/Field	Overview
Cross-ministerial Strategic Innovation Promotion Program (SIP)	• Solving social issues and defining important issues for Japan's economic and industrial competitiveness. • Promoting R&D which covers basic research to social implementation. • Providing support through R&D which requires collaboration between government offices and ministries, through industry-academia-government collaboration"
Programs for Bridging the gap between R&D and the IDeal society (society 5.0) and Generating Economic and social value (BRIDGE)	• Defining important issues for solving social issues and promoting new business creation through innovative technologies, and promoting innovation in the R&D and other measures for each governmental ministry and agency.
Moonshot Research and Development Program	• Promoting proactive R&D to create disruptive innovations in the social, environmental, and economic fields.
Smart City	• Governmental support for the realization of smart cities, the development of smart city services and coordination between them, the solution of regional issues through streamlining, and the promotion of the development and deployment of personnel with experience in digital processes.
Convergence Knowledge	• Formulating promotion measures, organizing symposiums and webinars, and holding discussions at expert Diet members' meetings with the aim of gathering and utilizing diverse knowledge covering a wide range of specialties.
Education and Personnel Development	• Creating learning opportunities for children by diversifying the learning process, encouraging STEAM education, eliminating gender-related biases in higher education and the gap between liberal arts and science in universities.

Source: Created by JETRO based on data from the Cabinet Office[20]

(2) Measures to improve the business environment for foreign companies

Various support measures have been implemented for the use and adoption of digital technologies. The main support measures are the following: Firstly, the government is deregulating new technologies to accelerate innovation. In cases where the current system is a barrier to the practical application of new technologies (such as blockchain) or the implementation of new business models (such as platformer-type businesses, which provide a platform that connects providers of products and services with consumers), demonstrations are conducted based on requests from business operators and based on the results of the demonstration, the need for a regulatory review will be considered (Regulatory Sandbox).[21] Secondly, the government provides support for the expansion of communication infrastructure, which includes providing tax credits and breaks for capital investment in national and local 5G networks and financially supporting the social implementation and R&D for Beyond 5G/6G (Tax Measure to Promote 5G Network Technology[22] and Beyond 5G (6G) Fund Project[23]).

18 Ministry of Internal Affairs and Communications (MIC). *Hiroshima AI Process Outcome Documents* (JP).
19 Cabinet Office. *The Hiroshima AI Process: Leading the Global Challenge to Shape Inclusive Governance for Generative AI.*
20 Cabinet Office. Cross-ministerial Strategic Innovation Promotion Program (SIP) outline (JP), p. 2.
Cabinet Office. *Programs for Bridging the gap between R&D and the Ideal society (society 5.0) and Generating Economic and social value* (JP), p. 2.
Cabinet Office. *About Moonshot Research and Development Program.*
Cabinet Office. *Smart city policy roadmap: toward further development and implementation of smart cities* (JP), p. 5.
Cabinet Office. *Convergence Knowledge portal site* (JP).
Council for Science, Technology and Innovation, Cabinet Office. *[Outline] Policy Package on Education and Human Resource Development to Realize Society5.0* (JP), p. 1.
21 Cabinet Secretariat. *Regulatory Sandbox.*
22 Ministry of Economy, Trade and Industry (METI). *Tax Measure to Promote 5G Network Technology Exclusive page* (JP).
23 Ministry of Internal Affairs and Communications (MIC). *Innovative Information and Communication Technology Beyond 5G (6G) Fund Project* (JP).

The government is also making efforts to promote digitalization throughout Japan. Under the Vision for a Digital Garden City Nation, which aims to revitalize local regions through digital technology, the government provides a total of 660 million USD* (100 billion JPY) in grants to local governments to promote digitalization throughout Japan (the grants for the Vision for a Digital Garden City Nation[24]). For financial assistance to small and medium-sized enterprises (SMEs), the government subsidizes the costs of using cloud services and building the necessary equipment and systems, along with supporting the introduction of IT tools for operational efficiency and digital transformation (Business restructuring subsidy[25] and IT introduction subsidy[26]). In addition to the above, a tax credit of up to 5% or a special depreciation of 30% is provided to companies that undergo digitalization to secure personnel with experience in digital processes and increase profits (the new taxation system for promoting digital transformation investment[27]).

Under the Action Plan for Attracting Human and Financial Resources from Overseas, support is also being provided specifically to foreign companies in important sectors, including digital transformation. In FY 2023, the government approved 8 projects involving 15 foreign companies [worth a combined 1.32 billion USD* (200 billion JPY)], to promote investment in important sectors (semiconductors, digital transformation, green transformation, bio-healthcare, etc.). Business matching opportunities with Japanese companies and universities are also being organized. In FY 2023, 141 foreign companies (including 81 companies related to the digital sector) and 131 Japanese companies/universities participated in these business matching events. Additionally, the government is making efforts to create an environment that facilitates foreign companies' entry by considering granting residency status to international remote workers for securing overseas human resources, developing fiber optics, 5G, data centers, and super cities to facilitate the business activities for digital companies.[28]

In addition to the national efforts towards digital transformation, cross-institution and international cooperation measures are also being implemented. The momentum towards a society that incorporates digital technology into various aspects of daily life (Society 5.0) is expected to continue growing.

To realize Society 5.0, there is a need for businesses that can develop and implement (convey the benefits of the technology in an easy-to-understand manner, customize it to make it easy to use, and popularize it to individuals and businesses with different backgrounds and challenges) such technologies. Several foreign companies have entered the market and are playing a vital role in moving Japan closer to its social vision by developing their own services and cooperating with Japanese companies (as detailed in 3. Attractive Markets).

24 Cabinet Secretariat. *Comprehensive Strategy for the Vision for a Digital Garden City Nation (DIGIDEN)*, p. 1.
25 METI. *Outline of the 12th Public Offering of the business restructuring subsidy* (JP), p. 16.
26 TOPPAN Inc. (The organization for Small & Medium Enterprises and Regional Innovation, JAPAN and The Small and Medium Enterprise Agency). *IT introduction subsidy 2024* (JP).
27 METI. *The new taxation system for promoting digital transformation investment* (JP).
28 Cabinet Office. *List of Follow-up Actions to The Action Plan for Attracting Human and Financial Resources from Overseas* (JP) (serial number 1, 9, 33, 71, 84).

3. Attractive Markets

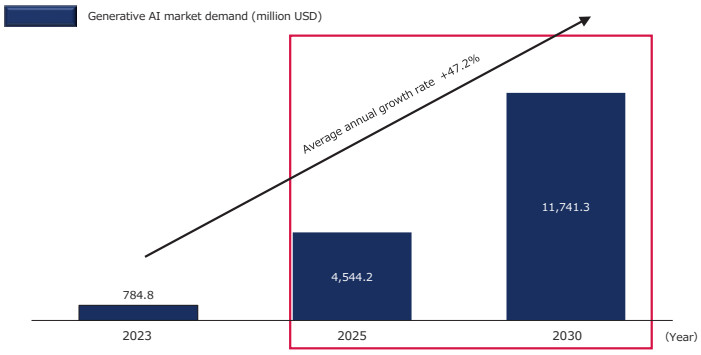
In this report, we focus on the following five attractive markets in the Digital industry.

(1) AI: Increasing public and private investment
(2) Cybersecurity: Increasing presence of foreign companies in the Japanese market
(3) Virtual Space (metaverse): Business opportunities in social implementation
(4) Web 3.0: An improving business environment
(5) FinTech: The significant roles of foreign companies

(1) AI: Increasing public and private investment

The Japanese AI market is expanding as AI services grow rapidly and the government increases AI related expenditure. Generative AI is gaining more attention. Domestic demand is expected to grow rapidly from 780 million USD* (118.8 billion JPY) in 2023 to 11.74 billion USD* (1,777.4 billion JPY) in 2030, with an average annual growth rate of 47.2% (Figure 5).

Figure 5 Demand forecast in Japan's generative AI market (FY 2023-30)



Source: Created by JETRO based on data from Japan Electronics and Information Technology Industries Association (JEITA) [29]

The Japanese government is also enacting policies in the AI sector. The government's budget for AI in 2023 was 750 million USD* (113.8 billion JPY), with the budget increasing year by year, and efforts are being made to promote AI usage, research and development of foundation models, and risk management.[30] In addition to enhancing competitiveness in the AI sector, the government is working vigorously to establish a stable supply of foundational cloud services in Japan in light of recent uncertainties.[31]

The versatility of generative AI has resulted in a rise in both domestic investment and the number of foreign companies entering the market. Examples of foreign companies entering the market include OpenAI (U.S.), a developer of large-scale language models (LLM), which established its first Asian base[32] and NVIDIA (U.S.), which specializes in GPUs (semiconductor chips needed for image and video rendering) and established a development base.[33]

Major Japanese companies are partnering with overseas companies to promote and develop AI services – Japanese companies with financial resources and expertise on Japan's unique landscape are partnering with foreign companies with technological capabilities, to develop various services. For example, Fujitsu and Cohere (Canada) have teamed up to develop a Japanese-language LLM.[34] Another example is the collaboration between SG Holdings, Sagawa Express, Sumitomo Corporation and the robot AI developer Dexterity (U.S) for the demonstration of AI-equipped loading robots.[35]

As seen above, foreign companies are starting to enter the Japanese market for AI-related development and demonstrations. Additionally, with widespread adoption of AI in various fields, including support for business operations, product development, and creative activities, the demand for related software and hardware products is expected to grow. In the service and manufacturing industries, there are still several operations that rely on human labor, and foreign companies with advanced digital technologies will have abundant opportunities for collaboration.

29 Japan Electronics and Information Technology Industries Association (JEITA). *JEITA Announces Global Demand Forecast for Generated AI* (JP).
30 Cabinet Office. *AI-Related Budget in FY 2024 Budget Request* (JP), p. 2.
31 Ministry of Economy, Trade and Industry (METI). *Approval of Plans for Ensuring a Stable Supply of Cloud Programs under the Economic Security Promotion Act.*
32 OpenAI Japan. *Introducing OpenAI Japan.*
33 NVIDIA. *NVIDIA to Help Elevate Japan's Sovereign AI Efforts Through Generative AI Infrastructure Build-Out.*
34 JETRO. *Canadian generative AI startup Cohere signs strategic partnership with Fujitsu (JP).*
35 Sagawa Express. *Becoming the first industry to solve Labor Shortages through AI-equipped loading robots* (JP).

(2) Cybersecurity: Increasing presence of foreign companies in the Japanese market

Cyberspace is becoming increasingly public, interconnected and interrelated, with personal and corporate information and human interactions starting to shift to the cloud.[36] However, the ever-increasing competition between companies and countries with regards to the economy, military, and technology is forcing the Japanese government to take measures against cyber-attacks that can have a significant impact on companies' production activities and national security.

Japan has always prioritized cybersecurity and is relatively advanced when it comes to initiatives related to cybersecurity. The International Telecommunication Union's (ITU) 2020 Global Cybersecurity Index, which evaluates countries' cybersecurity related efforts, ranked Japan 7th overall and 3rd in Asia among 193 countries worldwide.[37] The domestic cybersecurity market is also expanding year by year. It reached 9.66 billion USD* (1,462.8 billion JPY) in 2022 and is expected to grow at an annual rate of 8-9% over the next few years. In addition, companies expanding into Japan are responding to the various developments in cybersecurity in recent years, such as the spread of the concept of Zero Trust (performing security checks for anyone trying to access information assets, whether from inside or outside the network), the spread of multi-device services such as IoT, the expansion of cloud services due to remote work, the emergence of generative AI, and daily updates to security guidelines and legal revisions.[38]

Foreign-affiliated companies with diverse cybersecurity solutions and technologies are developing their own products and services in partnership with Japanese companies in a variety of industries (Figure 6).

As mentioned earlier, the expanding security needs, the need to respond to possible new threats, and regulatory reforms in line with these needs, are expected to fuel the demand in the cybersecurity market. In addition, the government has allocated 1.406 billion USD* (212.8 billion JPY) in its FY 2024 budget for cybersecurity, aiming to strengthen security at each ministry and agency. Initiatives are being taken to improve security nationwide, and business opportunities in this field are expected to increase in the future.[40]

Figure 6 **Successful cases of security-related foreign companies entering Japan and collaborating with local companies**

Foreign Companies	Overview
Stealien (Korea)	• The company expanded into Japan through the Tokyo Metropolitan Government's program for attracting foreign companies in collaboration with financial institutions. It engages in R&D, sales, and consulting related to cybersecurity mobile applications.
Robust Intelligence (U.S.)	• The AI security services company partnered with Japan's Tokio Marine dR Co., Ltd. to jointly develop and market consulting services and risk verification platforms as solutions for achieving AI security.
Axonius (U.S.)	• Macnica, a company dealing in semiconductors and IT products, partnered with Axonius, which offers CAASM (a cybersecurity solution that assists in identifying and visualizing cyber assets), to sell CAASM products and services in Japan.
Cato Networks (Israel)	• The security company that provides SASE technology and services that integrate security and network services, established a Japanese subsidiary and announced its full-scale entry into the security market for the manufacturing industry and critical infrastructure.
Allot (Israel)	• The company which provides network intelligence and Security as a Service (SECaaS) solutions has partnered with the Japanese broadband provider Asahi Net to provide users with network traffic analysis and real-time traffic management services.

Source: Created by JETRO based on data from the respective companies' websites[39]

36 National center of Incident readiness and Strategy for Cybersecurity (NISC). *Japan's Cybersecurity Strategy 2021 (Overview),* p. 1.
37 International Telecommunication Union (ITU). Global Cybersecurity Index 2020, pp. 25, 29.
38 Japan Network Security Association (JNSA). *Japanese Information Security Market: 2023 Survey Report* (JP), pp. 8, 11.
39 Press releases from the respective companies
Stealien. *[Korean Cybersecurity Firm Challenging the World] (12) Stealien (KR).*
Robust Intelligence. *Robust Intelligence Teams Up with Tokio Marine to Help Japanese Companies Use AI.*
Macnica. *Visualizes and analyzes information from multiple tools to support appropriate security measures.*
Cato Networks. *Cato Networks, a leading vendor of the SASE platform, established a Japanese subsidiary to accelerate its penetration into the domestic market, establishing two PoP connection bases in Tokyo and Osaka to respond to the growing demand for cloud services, strengthen marketing and channel development* (JP).
Allot. *Japanese Broadband Provider Asahi Net Launches Allot Traffic Management Solution.*
40 NISC. *Government cybersecurity budget* (JP), p. 1.

(3) Virtual space (metaverse) : Business opportunities in social implementation

The domestic market for virtual space (metaverse) is expected to exceed 19.82 billion USD* (3 trillion JPY) by FY 2028,[41] and the number of users is expected to reach approximately 17.5 million by 2030.[42] It is a promising market with the potential to leverage Japan's strength in abundant IP content and the formation of a creator economy. In Japan, leading companies in the gaming industry, including Sony and Nintendo, drive the gaming hardware market, and several startups that develop platforms and content, are entering the market. In addition, platforms operated by foreign companies such as The Sandbox and Fortnite are being used by several domestic companies and local governments for public relations purposes. An increasing number of companies and organizations are focusing on platforms operated by foreign companies with a large global userbase, using it for self-promotion and attracting tourism.

Digital twins, which recreate the real world in a virtual space based on data collected from the real world, are being considered for a wide range of applications, including design, simulation, and monitoring. The government collects and measures data such as topography and buildings in each city, mainly for urban development and disaster prevention, and converts it into 3D models and open data.[43] Meanwhile, the private sector has begun to utilize the system mainly for process optimization in the manufacturing industry. There are also examples of applications in fields such as building 3D models of products to identify unpredictable defects in the manufacturing process, and modeling human movement and posture to help set indicators that consider the work environment and mental load. In addition to the increasing utilization in the manufacturing industry, the potential of virtual spaces in other industries is being recognized, such as banking and financial services, driven by expectations for technology transfer and operational efficiency improvements. However, while companies are collecting data through multiple devices when using digital twins, many are facing challenges in developing and implementing integrated platforms for data aggregation and execution planning software that optimize data linkage. Therefore, there is a growing need for collaboration with foreign companies that have strengths in these areas, as well as securing talent capable of system development.[44]

The introduction and application of metaverse is also attracting attention in terms of public relations for products and services, as well as risk prevention, including disaster prevention and defect detection. To create an attractive business and investment environment, the government is considering forming a common understanding with other countries, ensuring interoperability, and developing guidelines for businesses.[45] Aligning system design and environmental improvements with global standards is likely to support the entry of foreign companies into the Japanese market.

(4) Web 3.0: An improving business environment

Following Web 1.0, which made the transmission and reception of information possible, and Web 2.0, which made progress in the aggregation of information, including big data, Web 3.0 now uses blockchain technology to process information in an autonomous and decentralized manner. This has improved information security and has helped create new services which use crypto assets and non-fungible tokens (NFTs), and bring about changes in consumer activities and asset formation (token economy).[46]

Government initiatives for Web 3.0 include undertaking cross-border projects and creating flexible regulations that facilitate innovation.[47] While Japan was one of the first countries to introduce regulations on crypto assets, it is also taking steps to ensure that those regulations do not become a hindrance to innovation. These steps include providing tax benefits, such as a system that exempts long-term ownership of crypto assets by corporations from taxation based on certain requirements[48], and promoting Web 3.0-related startup investment by allowing crypto assets to be acquired and held by Investment Limited Partnerships (LPS) .[49]

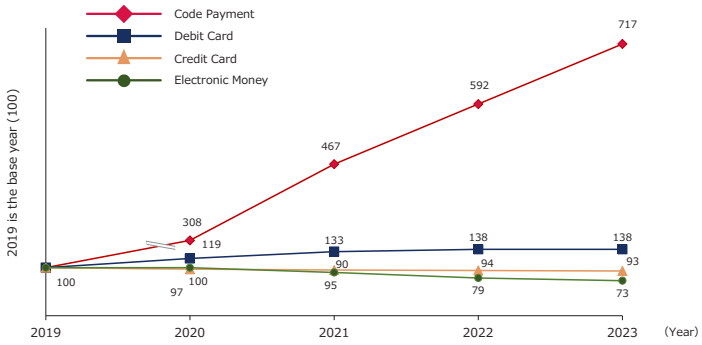
The government's positive attitude towards Web 3.0 is contributing to an increase in the number of foreign blockchain startups entering the Japanese market in recent years. Japanese companies and institutions are developing services in collaboration with foreign-affiliated companies that possess highly specialized technologies and can flexibly respond to changes in Japan's regulatory environment and market conditions. Examples include dApp Technology (Canada) establishing its Japanese subsidiary,[50] and the strategic alliance between Fujitsu and SettleMint (Belgium).[51] Such opportunities for business collaboration are predicted to increase in the future.

41 Nomura Research Institute (NRI). *Transformation of ICT and media markets through digitalization* (JP), p. 20.
42 Ministry of Internal Affairs and Communications (MIC). *Study Group on Realizing a Safe and Secure Metaverse (1st meeting) "Secretariat Material"* (JP), pp. 4, 66.
43 MIC. "Digital Twin," *2023 WHITE PAPER Information and Communications in Japan* (JP), Chapter 1, Section 2.
44 JETRO. *Impact of changes in GVC [Metaverse Digital Twin (industrial applications)]* (JP), p. 16.
45 MIC. *Study Group on Utilization of Metaverse in the Web 3 Era: Report Outline (draft)* (JP), pp. 22-24.
46 METI. *Approach to Improving Web3.0 Business Environment* (JP), p. 11.
47 See Note 46, p. 40.
48 METI. *(3-5) Revision of Taxation on Year-End Fair Value Valuation of Crypto-Assets Held by Third Parties* (JP).
49 Ministry of Economy, Trade and Industry (METI). *Cabinet Decision on the Bill for Partially Amending the Act on Strengthening Industrial Competitiveness and Other Acts to Create New Business and Encourage Investment in Industries.*
50 JETRO. *dApp, a Blockchain System Developer from Canada, Establishes Japanese Subsidiary.*
51 Fujitsu. *Fujitsu and SettleMint embark on global strategic agreement to accelerate enterprise blockchain technology.*

(5) FinTech: The significant roles of foreign companies

Digitalization in Japan's financial sector has significant growth potential, and the market is forecast to continue growing. Japan has a strong preference for using physical cash for payments due to the country's public safety, well-developed cash infrastructure system, and high credit card transaction fees.[52] Therefore, the cashless payment ratio in 2023 was merely 39.3%. However, the rate of cashless payments is on the rise, and payment methods are becoming more diversified. Especially after the COVID-19 pandemic, the use of code payments has increased significantly (Figure 7).

Figure 7 Changes in the proportion of different payment methods within total cashless payment amounts in Japan (%, with 2019 as the base year)



Source: Created by JETRO based on data from the METI[53]

At present, the use of cloud services by financial institutions is mainly for operations that are not related to customer information or transaction operations. Future focus will likely shift towards implementing cloud solutions for core systems, such as accounting systems. In the process of adoption, challenges such as expanding availability and cost have been raised.[54] There is a demand for products and services that can broadly address the specific needs of financial institutions and improve the efficiency of system implementation, maintenance, and operation.

FinTech adoption is also spreading among small and medium-sized enterprises (SMEs). With the introduction of the Invoice System (a system which allows the buyer to deduct purchase tax if the seller accurately records the applicable tax rates and consumption tax amounts on the receipt) in 2023, the government has established subsidies for the introduction of accounting and transaction software and hardware for SMEs and small businesses.[55] Given that integration with the national electronic tax filing and payment system (e-Tax) is possible[56], the use of cloud-based accounting software is projected to increase.[57]

The government is encouraging the use of FinTech as described above and actively supporting the entry of FinTech businesses into the Japanese market. The Financial Services Agency (FSA) established an innovation promotion office in 2022 to set up a support desk for FinTech-related regulations and to support the creation of innovative business opportunities. For foreign companies, it also set up a contact point for opening offices and organized business matching events.[58]

With the expansion of the FinTech market, recent years have seen the entry of foreign companies into this market, especially those related to remittances and payments. PayPal (U.S.), a major payment service provider, acquired the Japanese startup Paidy, which provides a payment platform allowing online shopping to be completed via convenience store payments and bank transfers. Japan's e-commerce (B2C) market size, which is approximately 92.48 billion USD* (14 trillion JPY)[59], along with Paidy's unique payment services and its large number of accounts and affiliated merchants, are considered the key factors behind the acquisition.[60] Additionally, the FinTech startup Wise (U.K.) offers a service that enables international money transfers at exceptionally low fees. In Japan, there is no upper limit on the transaction amount for international money transfers, but it generally incurs fees of over 7%. Wise, which charges only one-tenth of that fee, entered the market likely due to the significant demand potential.[61]

As mentioned above, there are examples of market entry through partnerships with businesses already operating in Japan or by offering services with advantages that are difficult for domestic companies to provide. With government support, an open environment for FinTech companies is being fostered.

* Calculated based on the Bank of Japan exchange rate of 1 USD for 151.38 JPY (as of April 1, 2024)

52 METI. *Discussion by Study Group on the Future Direction of Cashless Payment Summarized,* p. 24.
53 METI. *2023 Ratio of Cashless Payment Among the Total Amount Paid by Consumers Calculated.*
54 Bank of Japan. *Current Utilization and Challenges of Cloud Services in Financial Institutions* (JP), pp. 2-7.
55 TOPPAN Inc. (The organization for Small & Medium Enterprises and Regional Innovation, JAPAN and The Small and Medium Enterprise Agency). "Invoice quota (invoice-enabled type)," *IT Introduction Subsidy 2024.*
56 National Tax Agency. "Frequently asked questions about e-Tax software (Web version)", *National Tax Electronic Filing and Payment System(e-Tax)* (JP).
57 Ministry of Internal Affairs and Communications (MIC). *Results of the Communications Usage Trends Survey of 2023* (JP), p. 6.
58 Financial Services Agency (FSA). *FSA's Efforts to Promote Innovation* (JP).
59 Ministry of Economy, Trade and Industry (METI). *Results of FY2022 E-Commerce Market Survey Compiled*, p. 5.
60 PayPal. *PayPal to Acquire Paidy.*
61 Wise. *WISE GRANTED TYPE 1 FUNDS TRANSFER SERVICE PROVIDER LICENCE IN JAPAN, READIES FOR NEXT PHASE OF GROWTH.*

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