Outline of the 2021 White Paper on Information and Communications in Japan
[Unofficial Translation]

～Livelihood and Economy Supported by Digital Technologies～

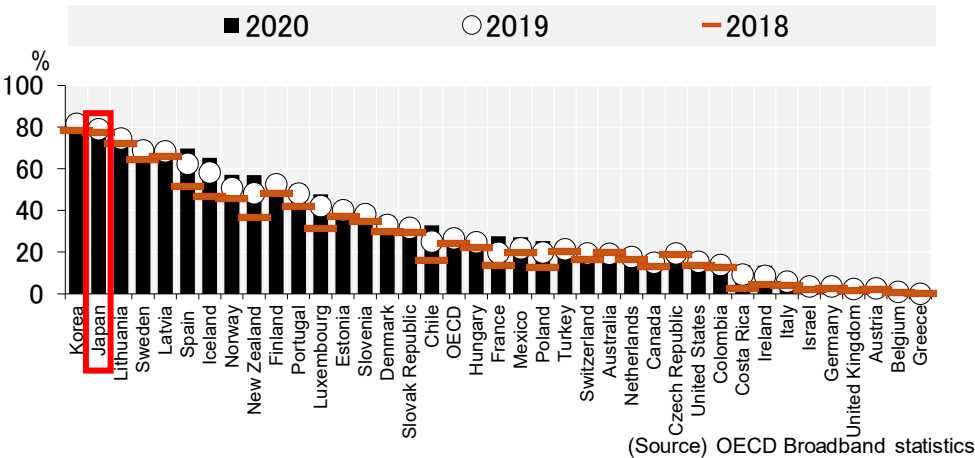## July 2021

Ministry of Internal Affairs and Communications

- Since the Basic Act on the Formation of an Advanced Information and Telecommunications Network Society was established in 2000, Japan has tackled digitalization under various national strategies, including the e-Japan Strategy, and has made great progress in developing fiber-optic and other broadband networks.
- However, information and communication technology (ICT) utilization has not necessarily made sufficient progress.
- International digital competitiveness and e-government indicators show low ratings for Japan's human resources and data analysis. Japan's rankings have stagnated.
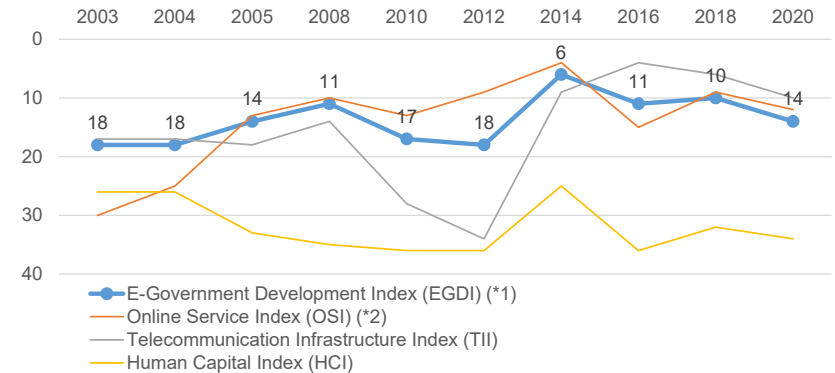
Broadband network development by country

Percentage of fiber connections in total fixed broadband

■2020　○2019　▬2018

(Source) OECD Broadband statistics

Mobile broadband diffusion rates

*As of June 2019

(Source) OECD Broadband statistics

Japan's ranking in international indicators

United Nations E-Government Ranking

E-Government Development Index (EGDI) (*1)
Online Service Index (OSI) (*2)
Telecommunication Infrastructure Index (TII)
Human Capital Index (HCI)

(*1) "E-Government Index" for 2001 and "E-government Readiness Index" for 2003-2008
(2*) "Web Measure Index" in and before 2008

(Source) Prepared by NTT Data Institute of Management Consulting from UN e-Government Surveys

● As smartphones have rapidly become widely used, internet use through mobile terminals has expanded.
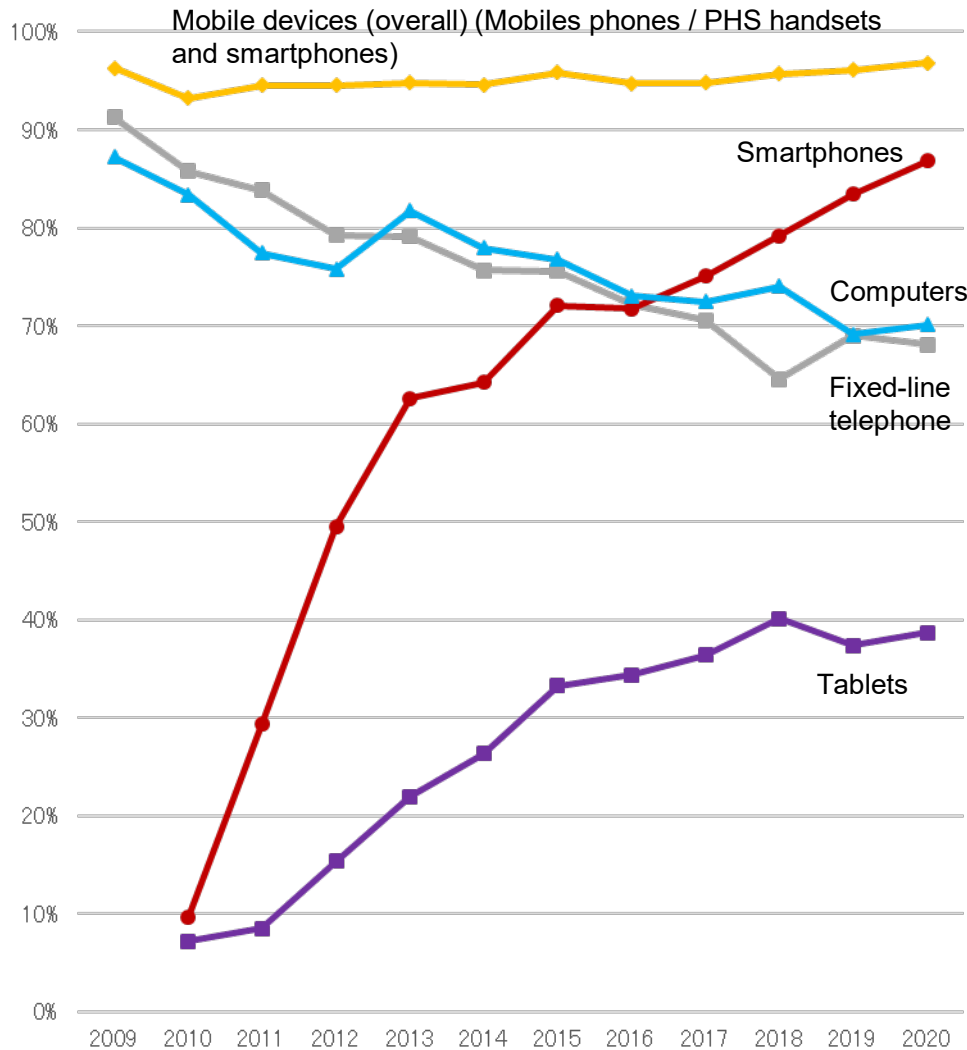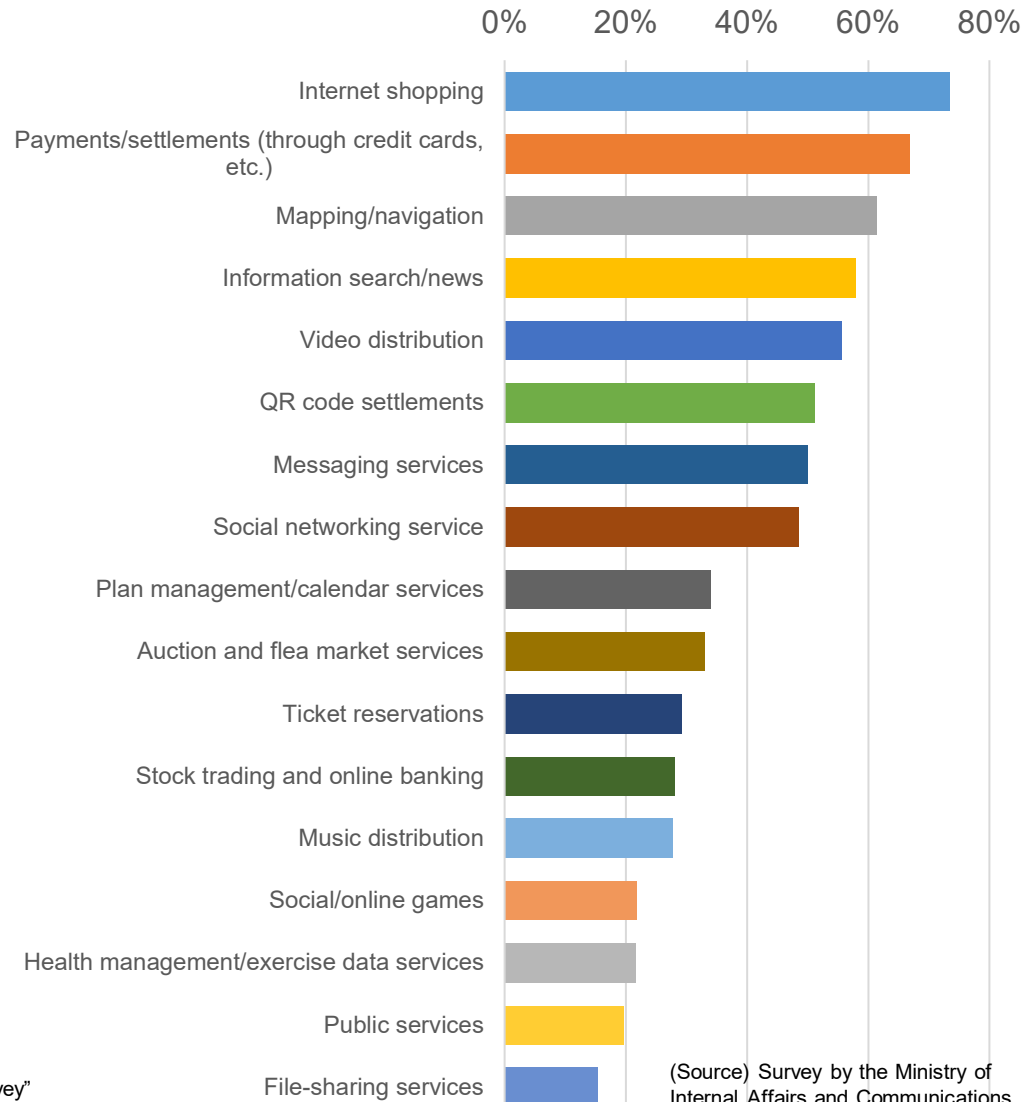● The internet is used mainly for shopping, payments, video distribution and other living or entertainment purposes. Public services through the internet are less used.

Household ownership rates for ICT devices

Mobile devices (overall) (Mobiles phones / PHS handsets and smartphones)

Smartphones

Computers

Fixed-line telephone

Tablets

2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

(Source) Ministry of Internal Affairs and Communications "Communications Usage Trend Survey"

Internet services for daily use

0%　20%　40%　60%　80%

- Internet shopping
- Payments/settlements (through credit cards, etc.)
- Mapping/navigation
- Information search/news
- Video distribution
- QR code settlements
- Messaging services
- Social networking service
- Plan management/calendar services
- Auction and flea market services
- Ticket reservations
- Stock trading and online banking
- Music distribution
- Social/online games
- Health management/exercise data services
- Public services
- File-sharing services

(Source) Survey by the Ministry of Internal Affairs and Communications

● There is a generation gap that can be seen in the use of ICT devices. Particularly, those aged 70 and above use such devices much less than others.

Smartphone or tablet use

Categories: Total, 20s (including those aged 18 and19), 30s, 40s, 50s, 60s, 70 and above

Legend:
- 1. Use frequently
- 2. Use sometimes
- 3. Use little
- 4. Do not use
- No response
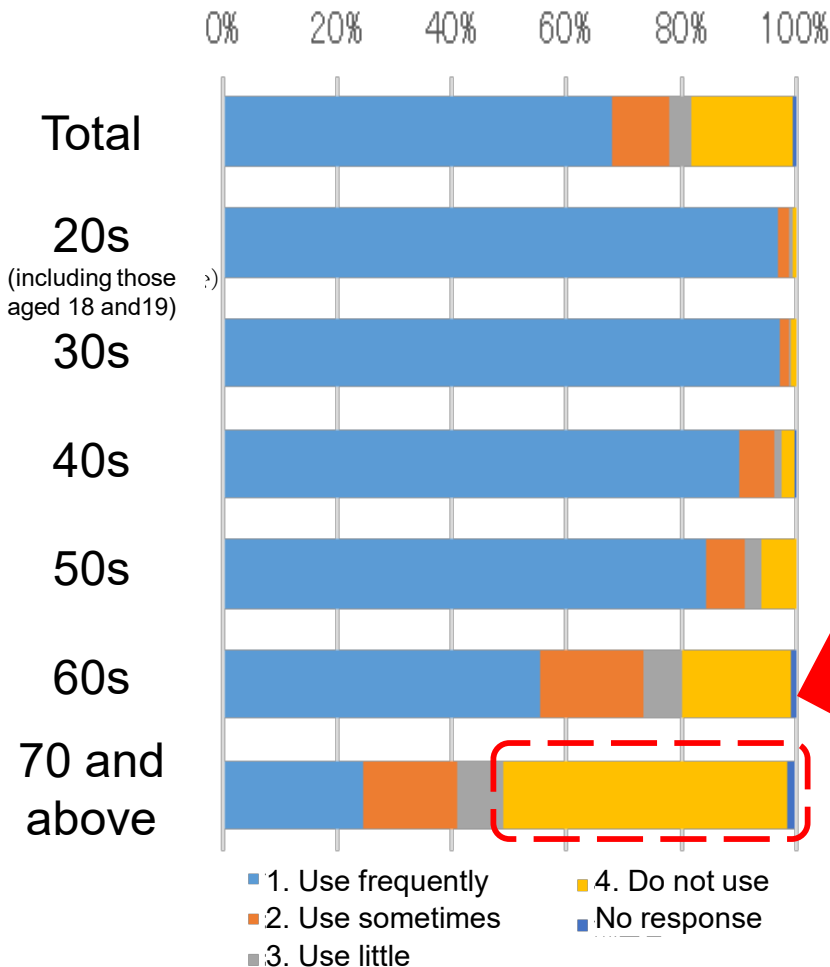
Reasons for not using smartphones or tablets

- I think they are not necessary for my life.
- I don't know how to use them.
- I think I could ask my family members to use them if necessary.
- I am afraid of dealing with problems such as information leakage or fraud.
- I think their purchase and use are expensive.
- I don't know what or where I should buy such a device.
- I am not able to use them very well.
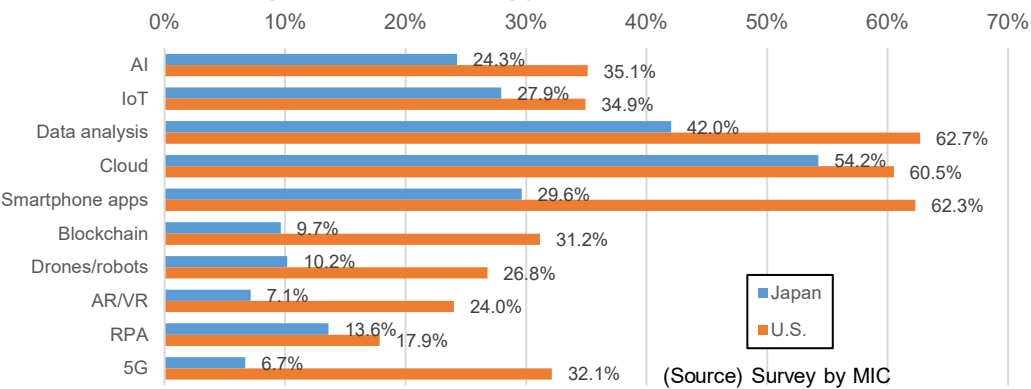- Others

● ICT investment by Japanese companies is mainly designed to improve business efficiencies over that of promoting digital transformation accompanied by business model reforms such as business expansion and new business exploration.

● As Japanese ICT human resources become concentrated in ICT companies, other companies lack human resources for digital transformation, which becomes a major issue.

Purposes for using cutting-edge technologies

- Improving business efficiency (reducing workload on employees): **69.5%**
- Cutting costs (including personnel and maintenance costs): 39.3%
- Developing new products or services: 6.3%
- Expanding into new businesses (diversification): 1.8%

(n=763)
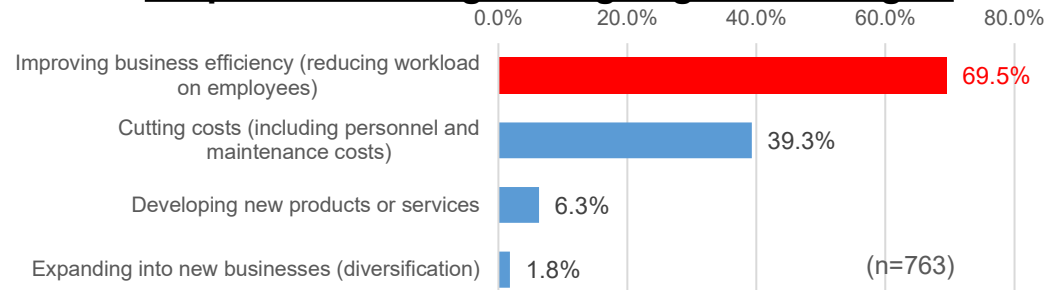
(Source) Ministry of Finance (2018) "Use of Cutting-edge Technologies (e.g., IoT, AI) Indicated by Survey by Regional Financial Bureaus"

Digital technology introduction status

Technology	Japan	U.S.
AI	24.3%	35.1%
IoT	27.9%	34.9%
Data analysis	42.0%	62.7%
Cloud	54.2%	60.5%
Smartphone apps	29.6%	62.3%
Blockchain	9.7%	31.2%
Drones/robots	10.2%	26.8%
AR/VR	7.1%	24.0%
RPA	13.6%	17.9%
5G	6.7%	32.1%

(Source) Survey by MIC

Sales growth through digital transformation

Estimated changes for a case in which Japanese companies tackle digital transformation as proactively as U.S. companies

Manufacturers: +5.7% (about 23 trillion yen)

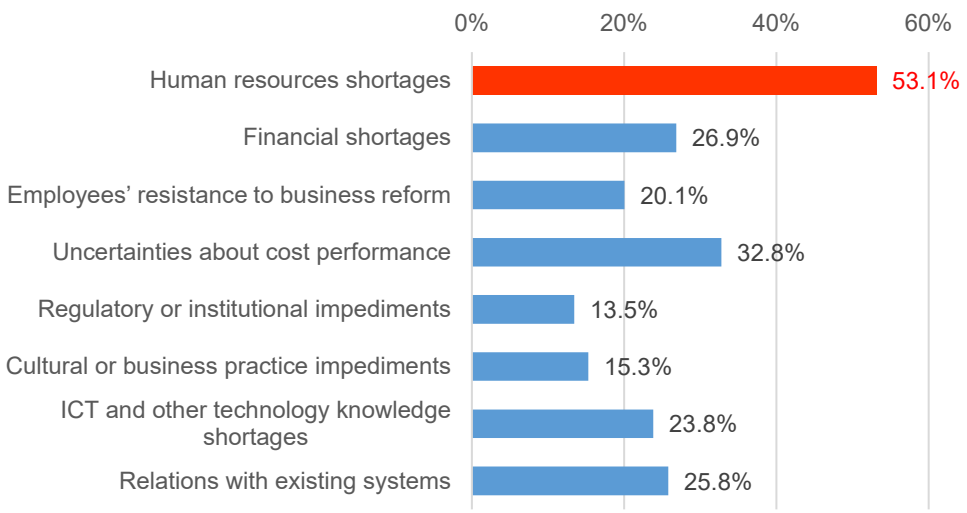**Nonmanufacturers: +4.2%** (about 45 trillion yen)

*Estimates based on questionnaire surveys of companies. Percentage shares for companies tackling digital transformation found in the surveys:
[Manufacturers] Japan: 13.3%   U.S.: 63.6%
[Nonmanufacturers] Japan: 13.4%   U.S.: 55.9%

(Source) Survey by MIC

ICT human resources shortages

ICT human resources totaled **about 220,000 persons** in 2018 and are expected to increase to **about 450,000 persons in 2030** (median scenario).

(Source) Ministry of Economy, Trade and Industry (2019) "Survey on ICT Human Resources Supply and Demand"

Problems with promoting digital transformation (Japanese companies)

- Human resources shortages: **53.1%**
- Financial shortages: 26.9%
- Employees' resistance to business reform: 20.1%
- Uncertainties about cost performance: 32.8%
- Regulatory or institutional impediments: 13.5%
- Cultural or business practice impediments: 15.3%
- ICT and other technology knowledge shortages: 23.8%
- Relations with existing systems: 25.8%

(Source) Survey by MIC

● Along with the spread of the COVID-19 pandemic, the need from citizens for online administrative procedures has grown.

● On the other hand, online services have failed to spread for such reasons as the limited range of electronic applications for administrative procedures for electronic application, the absence of knowledge about electronic applications and the complexity of electronic applications.
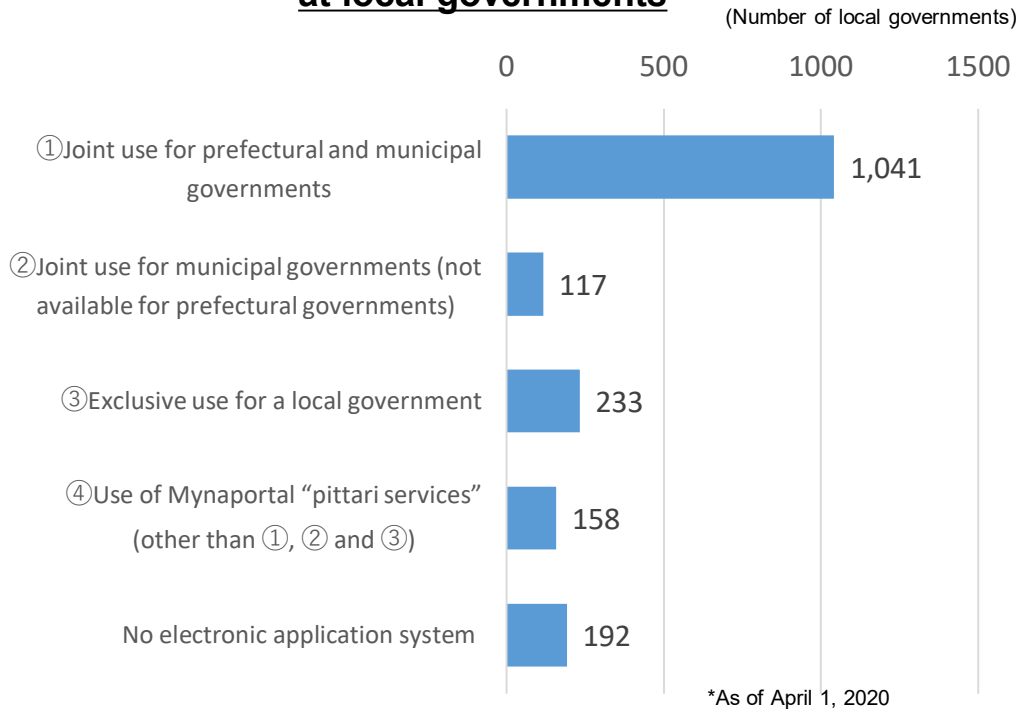
Online service use rate trend for national government procedures

Online Use Expansion Action Plan (2008)

New Plan for Online Use (2011)

Effectuation of the Basic Act on the Advancement of Public and Private Sector Data Utilization (2016)

26.8 31.5 31.8 38.5 41.2 44.1 45.4 47.3 53.0 55.0 60.0

2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 (FY)
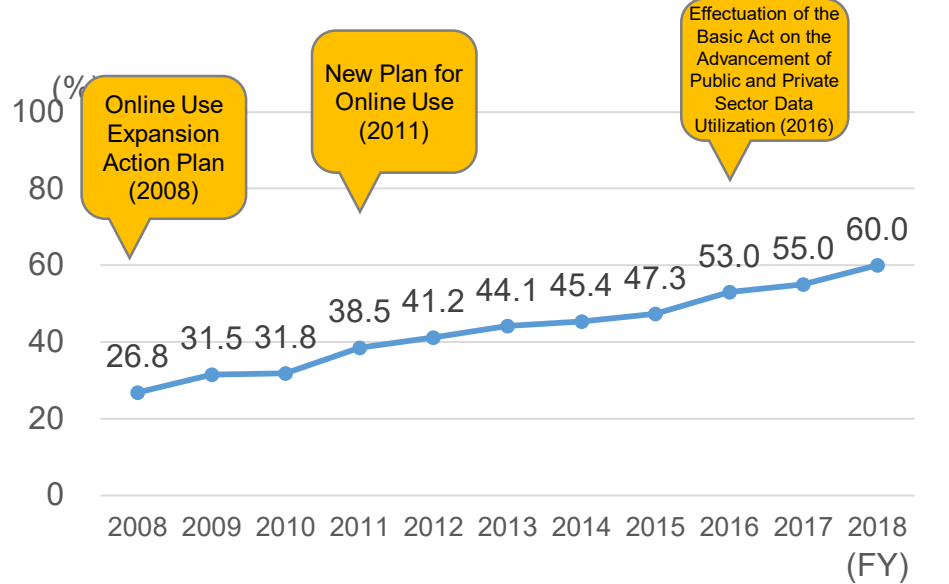
*Online service use rate: Online procedures' share of procedures available for online application

(Source) Ministry of Internal Affairs and Communications (2021) "Research on Digital Government Promotion"

Status of electronic application system development at local governments

(Number of local governments)

0   500   1000   1500

①Joint use for prefectural and municipal governments — 1,041

②Joint use for municipal governments (not available for prefectural governments) — 117

③Exclusive use for a local government — 233

④Use of Mynaportal "pittari services" (other than ①, ② and ③) — 158

No electronic application system — 192

*As of April 1, 2020

(Source) Ministry of Internal Affairs and Communication (2021) "Research on Digital Government Promotion"

● As the COVID-19 pandemic has spread, internet shopping and video distribution services have grown.

● An increase in time spent at home has led internet traffic to grow by more than 150% year on year.

● Consume behavior changes will lead to economic trend changes. Earnings will remain stagnant in face-to-face service industries.
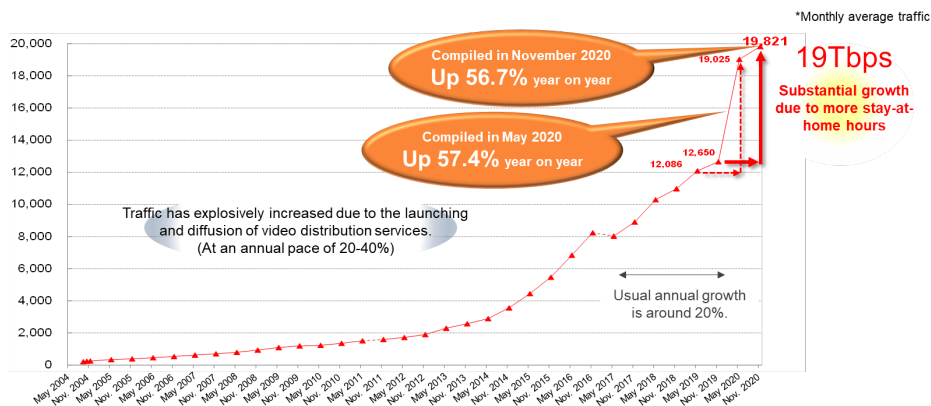
Household share for internet shopping
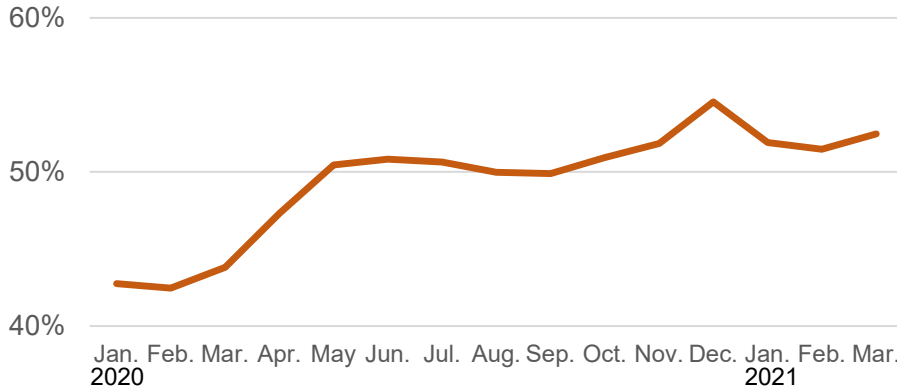
(Source) Prepared from Ministry of Internal Affairs and Communications "Survey for Household Economy"
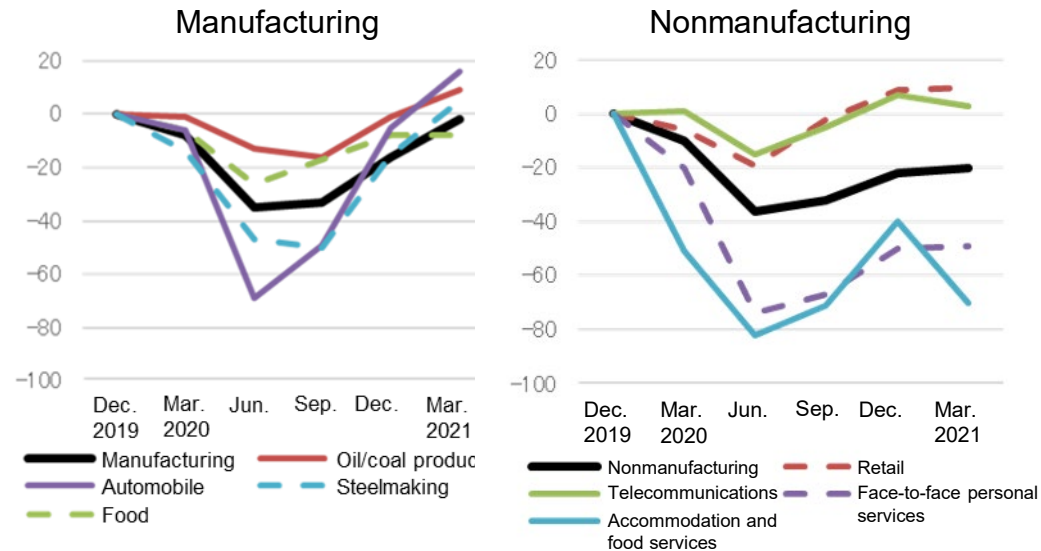
Internet traffic growth

Fixed broadband service

*Monthly average traffic

Compiled in November 2020
Up 56.7% year on year

Compiled in May 2020
Up 57.4% year on year

19Tbps

Substantial growth due to more stay-at-home hours

Traffic has explosively increased due to the launching and diffusion of video distribution services. (At an annual pace of 20-40%)

Usual annual growth is around 20%.

(Source) Ministry of Internal Affairs and Communications (February 5, 2021) "Japan's Internet Traffic Compilation/Estimation"

K-shaped economic recovery

Manufacturing

— Manufacturing   — Oil/coal produc
— Automobile   — Steelmaking
— Food

Nonmanufacturing

— Nonmanufacturing   — Retail
— Telecommunications   — Face-to-face personal services
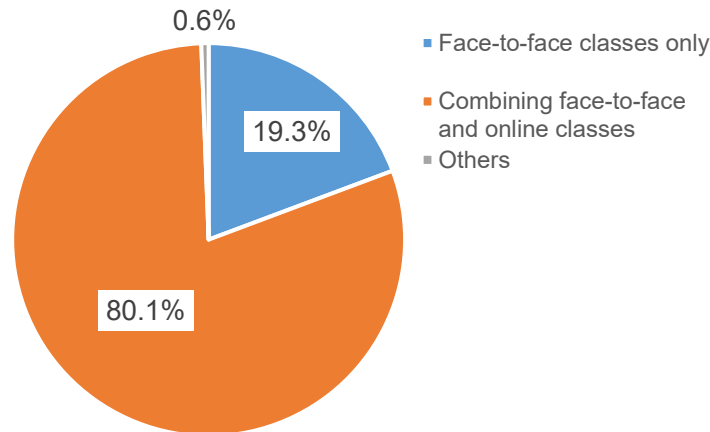— Accommodation and food services

(Changes in percentage points from the December 2019 survey)

(Source) Prepared by Ministry of Internal Affairs and Communications from Bank of Japan Tankan Survey (Business condition diffusion index by industry)
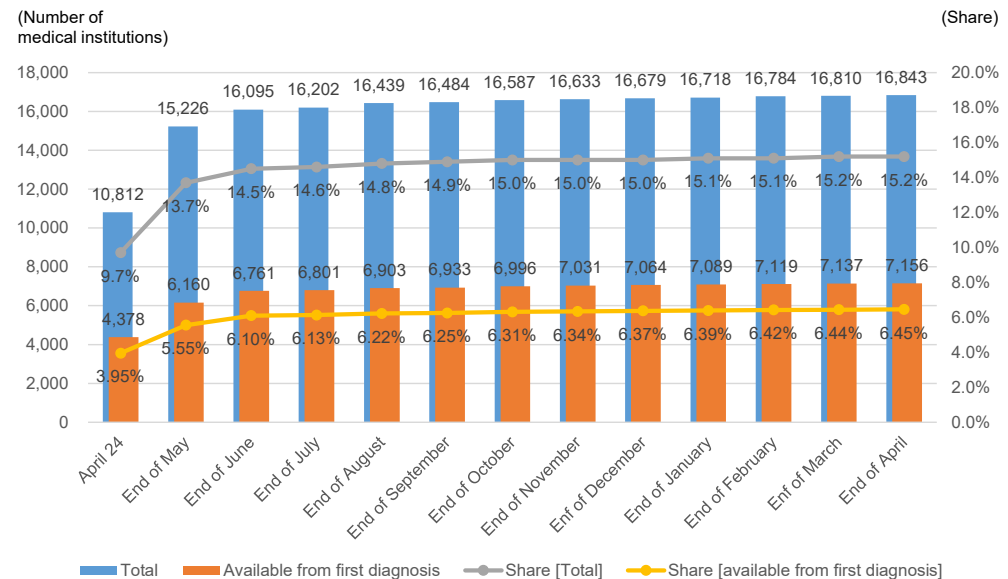
● Under the COVID-19 pandemic, Japan has used digital technologies to promptly provide economic assistance to citizens and detect regional COVID-19 infections and risks and to discover various relevant problems.

● In the education and healthcare sectors, remote education and online diagnosis have been implemented to help prevent COVID-19 infections.

Class implementation policies at universities

0.6%

19.3%

80.1%

- Face-to-face classes only
- Combining face-to-face and online classes
- Others

Number of institutions registered for telephone/online diagnosis

(Number of medical institutions)

(Share)

	April 24	End of May	End of June	End of July	End of August	End of September	End of October	End of November	Enf of December	End of January	End of February	Enf of March	End of April
Total	10,812	15,226	16,095	16,202	16,439	16,484	16,587	16,633	16,679	16,718	16,784	16,810	16,843
Available from first diagnosis	4,378	6,160	6,761	6,801	6,903	6,933	6,996	7,031	7,064	7,089	7,119	7,137	7,156
Share [Total]	9.7%	13.7%	14.5%	14.6%	14.8%	14.9%	15.0%	15.0%	15.0%	15.1%	15.1%	15.2%	15.2%
Share [available from first diagnosis]	3.95%	5.55%	6.10%	6.13%	6.22%	6.25%	6.31%	6.34%	6.37%	6.39%	6.42%	6.44%	6.45%

■ Total ■ Available from first diagnosis ━●━ Share [Total] ━●━ Share [available from first diagnosis]

(Source) Prepared by the Ministry of Internal Affairs and Communications from the Ministry of Education, Culture, Sports, Science and Technology (2020) "Survey on Second-half Class Implementation Policies at Universities, etc."
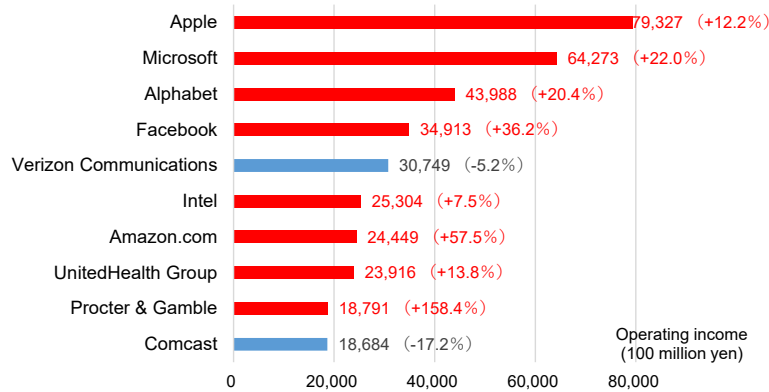
(Source) Ministry of Health, Labor and Welfare (2021) document for "the 15th meeting of the council on revisions to guidelines regarding adequate online diagnosis implementation"
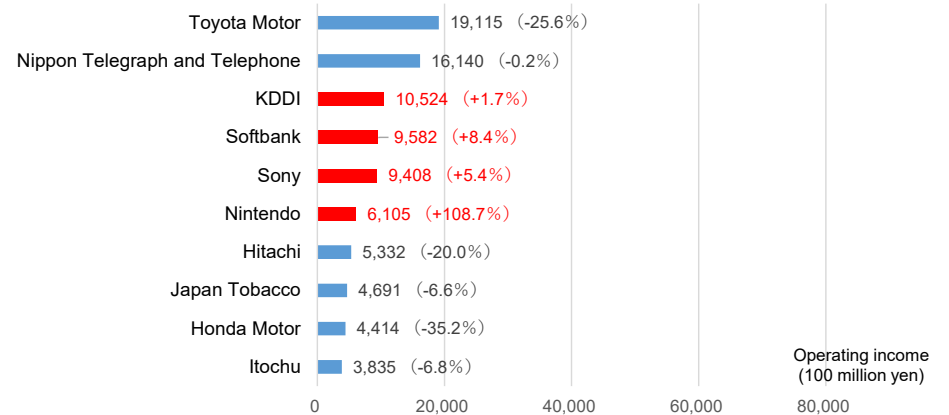
- In the United States, where corporate earnings are recovering from COVID-19 losses, technology companies are driving economic growth on the strength of digital transformation.
- The telework implementation rate rises under a state of emergency declaration and declines after its lifting. Telework and other digital technology initiatives should be established to secure resilience to infectious diseases and natural disasters.

Top 10 U.S. and Japanese operating income earners among listed companies in 2020

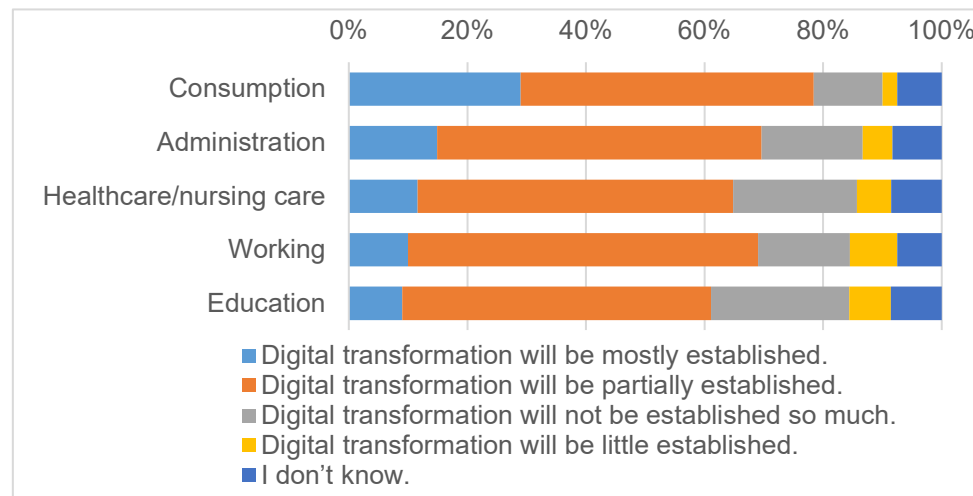U.S. (listed on the New York Stock Exchange or NASDAQ)

Company	Operating income	Change
Apple	79,327	(+12.2%)
Microsoft	64,273	(+22.0%)
Alphabet	43,988	(+20.4%)
Facebook	34,913	(+36.2%)
Verizon Communications	30,749	(-5.2%)
Intel	25,304	(+7.5%)
Amazon.com	24,449	(+57.5%)
UnitedHealth Group	23,916	(+13.8%)
Procter & Gamble	18,791	(+158.4%)
Comcast	18,684	(-17.2%)

Operating income (100 million yen)

Japan (Listed on the First section of the Tokyo Stock Exchange)

Company	Operating income	Change
Toyota Motor	19,115	(-25.6%)
Nippon Telegraph and Telephone	16,140	(-0.2%)
KDDI	10,524	(+1.7%)
Softbank	9,582	(+8.4%)
Sony	9,408	(+5.4%)
Nintendo	6,105	(+108.7%)
Hitachi	5,332	(-20.0%)
Japan Tobacco	4,691	(-6.6%)
Honda Motor	4,414	(-35.2%)
Itochu	3,835	(-6.8%)

Operating income (100 million yen)

* Prepared from data available on February 10, 2021. U.S. companies' operating income is converted into yen at the rate of 106.8 yen to the dollar. In parentheses are percentage changes from the previous year.
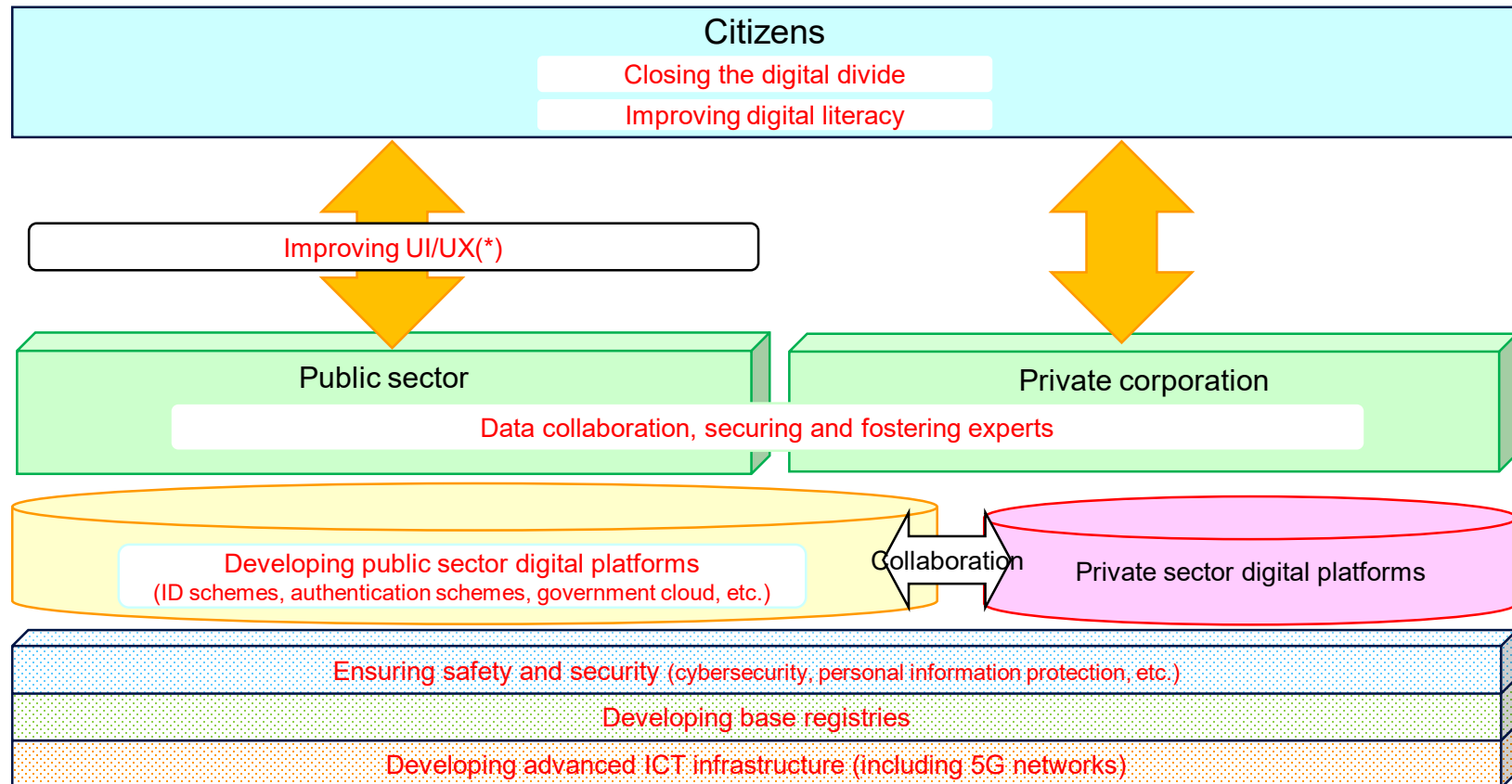
(Source) Document for the Growth Strategy Council

Will digital transformation be established? (by sector)

- Digital transformation will be mostly established.
- Digital transformation will be partially established.
- Digital transformation will not be established so much.
- Digital transformation will be little established.
- I don't know.

(Source) Survey by MIC

● In response to the COVID-19 pandemic, digital transformation should be promoted not only to improve productivity and create new added value, but also to secure resilience to infectious diseases and natural disasters and realize a sustainable society.

● In the future, Japan should strategically and integrally promote digital utilization among citizens and digital transformation in private corporations and the public sector. In this respect, it is important to build digital society common infrastructure by developing 5G and other ICT infrastructure, base registries and public digital platforms (ID, authentication, cloud and other platforms), and ensuring safety and security including cybersecurity and personal information protection.

Citizens

Closing the digital divide

Improving digital literacy

Improving UI/UX(*)

Public sector

Private corporation

Data collaboration, securing and fostering experts

Developing public sector digital platforms
(ID schemes, authentication schemes, government cloud, etc.)

Collaboration

Private sector digital platforms

Ensuring safety and security (cybersecurity, personal information protection, etc.)

Developing base registries

Developing advanced ICT infrastructure (including 5G networks)

*UI stands for user interface and UX for user experience

*Words written in red are future policy challenges.