Chapter 3
Basic Data on the ICT Field

Section 1   Economic size of the ICT industry

1. ICT Industry Trends

(1) Domestic production value

• ICT industry’s production value was 97.5 trillion yen, making it the largest industry

The ICT industry’s nominal domestic production value in 2017 was 97.5 trillion yen, accounting for 9.7 percent of all industries and making it the largest industry in the country (Figure 3-1-1-1). It had reached 116.6 trillion yen in 2000, however, its production value cooled off for several years in response to the collapse of the IT bubble. The industry started growing again from 2005 and reached 113.8 trillion yen in 2007, but its production value plummeted to 98.9 trillion yen in 2009 due to the 2008-9 global financial crisis. Even after 2010 it continued to slide, dropping to 89.9 trillion yen in 2012. However, since 2013 signs of recovery finally started to appear. (Figure 3-1-1-2).

Figure 3-1-1-1 Domestic production values of major industries (based on nominal domestic production and real domestic production) (breakdown) (2017)


Figure 3-1-1-2 Changes in domestic production values of major industries (based on nominal domestic production and real domestic production)

In 2017 the ICT industry’s real domestic production value based on constant 2011 values was 99.8 trillion yen and accounted for 10.2% of all industries. In contrast to the nominal values, it has increased since 2000 and reached 102.7 trillion yen in 2007. It decreased to 91.3 trillion yen in 2012, but signs of recovery could be seen from 2013.

(2) Gross Domestic Product (GDP)

The nominal GDP of the ICT industry in 2017 was 43.9 trillion yen and accounted for 8.6 percent of all industries. The nominal GDP of the ICT industry rose in 2017 by 0.9 percent year-on-year to 43.9 trillion yen. Looking at the size of nominal GDP of the main industries shows that the ICT industry’s nominal GDP accounts for 8.6 percent of the combined nominal GDPs of all industries and is the third largest after the commerce and real estate industries. Real GDP according to constant 2011 values accounted for 9.5% of the real GDP of all industries (Figure 3-1-1-3).

Looking at the growth rate in 2016-2017, ICT industry accounted for 8.6 percent of all industries. In contrast to the ICT industry’s nominal GDP, the ICT industry’s real domestic production value based on constant 2011 values was 99.8 trillion yen and accounted for 10.2% of all industries. In contrast to the nominal GDP of the ICT-related manufacturing and ICT-related construction industries has been decreasing. On the other hand, the Internet-related services industry has grown rapidly.

(3) Employment

ICT industry employment totaled 3.99 million in 2017 and accounted for 5.8 percent of total employment in all industries, which is a 15.9% decrease from 2000. The ICT industry employed 3.99 million people in 2017 (up 0.1 percent from the previous year), and accounted for 5.8 percent of total employment in all industries. Compared with 2016, Internet-related services (up 3.4% from the previous year), communications (up 2.4%), and information services (up 1.6%) were steadily growing. However, video, audio and text information production (down 4.0%), broadcasting (down 1.8%), ICT-related services (down 1.5%), and ICT-related manufacturing (down 0.9%) decreased (Figure 3-1-1-5).

![Figure 3-1-1-3 Nominal GDP and real GDP of major industries](image)

![Figure 3-1-1-4 Changes in the nominal GDP and real GDP of major industries](image)
2. ICT industry contributions to the national economy

(1) ICT industry’s economic spillover effects

The scale of economic spillover effects caused by the ICT industry is one of the largest in all industries in terms of induced added value. When different industries make intermediate inputs to the production activities of the ICT industry, this generates added value (e.g. operating surplus and employee compensation) in those industries. The economic spillover effects\(^\text{54}\) of the ICT industry were estimated to be 84.8 trillion yen in induced added value, and 8.416 million in induced employment. ICT industry shows the largest economic spillover effect in terms of induced added value, and also shows higher inducement in jobs than the transportation equipment industry (2.859 million jobs), which is recognized as one of broad industries. Figure 3-1-2-1.

3. Trade in the ICT field

(1) Technology trading

The ICT industry posted a surplus in technology exports\(^\text{55}\) in FY 2017. The received value from Japan’s technology exports in FY 2017 totaled 3.8844 trillion yen, to which the ICT industry contributed 512.3 billion yen, or 13.2 percent. On the other hand, the cost of technology imports was 629.8 billion yen, of which 241.7 billion yen came out of the ICT industry, or 38.4 percent. While the total of technology trading, together with the ICT industry, posted export surpluses, on the other hand the Information and Communications sector had a deficit. Figure 3-1-2-5.

\(^\text{54}\) There are two methods of calculating economic spillover effects: (1) calculating the economic spillover effects for all Japan’s industries brought about by each industry sector’s final demand, focusing on the goods and services that constitute the industry sector’s final demand and (2) calculating the economic spillover effects for all Japan’s industries brought about by each industry sector’s production activities (total of final demand and intermediate demand), focusing on the industry sector itself. The latter method was used here.
communications posted import surpluses. ICT equipment and appliance manufacturing sector accounted for the largest share of the ICT industry’s technology expenditure (i.e., research spending) in FY 2017, which stood at 3.7117 trillion yen. Of this amount, 26.9 percent of all research spending, was 13.7989 trillion yen. Corporate research spending, which accounts for about 70 percent of all research spending, was 13.7989 trillion yen. Of this amount, 3.7117 trillion yen (26.9 percent) was spent on research by the ICT industry. The ICT equipment and appliance manufacturing sector was the largest research spender in the ICT industry (Figure 3-1-4-1).

### 4. Research and development in the ICT field

#### (1) Research and development spending

- The ICT industry spent 3.7117 trillion yen on research in FY 2017, accounting for 26.9 percent of all corporate research spending.

According to the “Survey of Research and Development,” Japan’s total scientific and technological research spending (i.e., research spending) in FY 2017 stood at 19.0504 trillion yen (the combined research spending by enterprises, nonprofit organizations, public agencies, universities, etc.).

Corporate research spending, which accounts for about 70 percent of all research spending, was 13.7989 trillion yen. Of this amount, 3.7117 trillion yen (26.9 percent) was spent on research by the ICT industry. The ICT equipment and appliance manufacturing sector was the largest research spender in the ICT industry (Figure 3-1-4-1).

*Source: Prepared from the “Survey of Research and Development,” MIC*
(2) Number of researchers

・ The ICT industry employed 171,235 researchers, or 34.3 percent of all corporate researchers in Japan.

There were 866,950 researchers in Japan as of March 31, 2018 (the total of all researchers at enterprises, nonprofit organizations, public agencies, universities, etc.).

171,235 people (34.3 percent of all corporate researchers) out of 498,732 corporate researchers (about 58 percent of all researchers) are in the ICT industry. The ICT equipment and appliance manufacturing sector had the most researchers of any ICT industry sector (Figure 3-1-4-2).

Figure 3-1-4-2  Corporate researchers by industry (as of March 31, 2018)

5. Current State of ICT enterprise operations

The Basic Survey on the Information and Communications Industry is a general statistical survey (started in 2010) that MIC and the Ministry of Economy, Trade and Industry jointly conduct under the Statistics Act (Law No. 53 of 2007) to clarify the operations of enterprises belonging to the ICT industry — a Large Category G in the Japan Standard Industry Classification — and to obtain basic data for ICT industry policies. The following sections provide an overview of the 2018 survey that pertains to enterprises operations.

(1) Summary of enterprises engaging in ICT business operations (activity-base results)

a. General summary of the survey results

・ 5,467 enterprises were engaged in ICT business operations with sales in excess of 49 trillion yen

Sales attributed to ICT business operations in FY 2017 totaled 49.7496 trillion yen (total sales by all enterprises were 66.5058 trillion yen). By sector, the telecommunications sector accounted for 35.2 percent of all sales (up 0.1 percentage points from the previous year), the software sector 31.1 percent (up 0.1 points), and the data processing and information sector 12.9 percent (up 0.8 points) (Figure 3-1-5-1).

The number of enterprises engaging in ICT business operations (irrespective of whether ICT business operations are the enterprise’s mainstay operations) stood at 5,467. Operating profits were 6.2755 trillion yen, ordinary income was 6.9263 trillion yen, and the enterprises held 10,304 subsidiaries and associated companies.

b. Breakdown of sales

・ Enterprises capitalized at less than 100 million yen accounted for more than 60 percent of all enterprises in 8 out of 12 ICT industry sectors

A breakdown of ICT industry enterprises by capital size reveals that enterprises capitalized at less than 100 million yen accounted for more than 60 percent of all enterprises in 8 out of 12 ICT industry sectors. Of particular note are the sectors in video information production and distribution, and sound information production, where enterprises capitalized at less than 50 million yen accounted for more than 40 percent of all enterprises in each respective sector (Figure 3-1-5-2).
Figure 3-1-5-1 ICT industry sales

(Unit: trillion yen)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total</th>
<th>Sales in ICT industries FY 2017</th>
<th>FY 2017 Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommunications</td>
<td>37.2</td>
<td>49.746 trillion yen</td>
<td>100.0%</td>
</tr>
<tr>
<td>Private broadcasting</td>
<td>3.72</td>
<td>35.2%</td>
<td></td>
</tr>
<tr>
<td>Cablecasting</td>
<td>0.5</td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>15.48</td>
<td>31.1%</td>
<td></td>
</tr>
<tr>
<td>Internet-related services</td>
<td>3.32</td>
<td>6.7%</td>
<td></td>
</tr>
<tr>
<td>Publishers, except newspapers</td>
<td>1.37</td>
<td>2.8%</td>
<td></td>
</tr>
<tr>
<td>Audio program producers</td>
<td>0.16</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>Video picture information production and distribution</td>
<td>0.19</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>Telegraphal operators</td>
<td>0.15</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>Services incidental to video information, sound information, character information production and distribution</td>
<td>0.13</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous ICT businesses</td>
<td>0.19</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5,467</td>
<td>49.746 trillion yen</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

(Note) *1 Figures in parentheses are the number of companies.

*2 "Miscellaneous ICT businesses" refers to enterprises that selected "other" as the primary business in the breakdown of sales attributable to ICT business operations.

(Source) "2018 Basic Survey on the Information and Communications Industry," MIC / METI

Figure 3-1-5-2 Breakdown of ICT industry enterprises by capital size

(Source) "2018 Basic Survey on the Information and Communications Industry," MIC / METI
6. Telecommunication market trends

(1) Market size

- Mobile communications accounted for more than 50 percent of sales in the telecommunications sector, while, by service category, the data transmission services’ share is increasing year by year.

Sales in the telecommunications sector in FY 2017 (Figure 3-1-6-1) were 14.0238 trillion yen (a decrease of 1.1 percent from the previous year). Fixed line communications accounted for 32.4 percent of all sales in FY 2017, and mobile communications for 52.2 percent (Figure 3-1-6-2). Looking at sales by service category shows that voice transmission services accounted for 27.6 percent and data transmission services for 56.9 percent (Figure 3-1-6-3). The average revenue per user (ARPU) among the main mobile communication service providers was 4,800 yen for NTT DOCOMO, 6,560 yen for KDDI, and 4,360 yen for SoftBank (Figure 3-1-6-4).

Figure 3-1-6-1  Changes in telecommunications sector sales

(Note) Comparisons must be made with caution, as sales represent a simple sum of figures from all responding carriers and the number of responding carriers differs from year to year.

(Source) Prepared from "Basic Survey on the Information and Communications Industry," MIC / METI

Figure 3-1-6-2  Changes in telecom carriers’ sales broken down by fixed-line communications and mobile communications

(Note) Calculating excluding sales breakdown "Unknown.

(Source) Prepared from "Basic Survey on the Information and Communications Industry," MIC / METI
Figure 3-1-6-3  Telecom carriers’ sales breakdown by voice transmission and data transmission

(Note) Calculating excluding sales breakdown "Unknown".
(Source) Prepared from "Basic Survey on the Information and Communications Industry," MIC / METI

Figure 3-1-6-4  Changes in mobile ARPU in the past five years for three domestic mobile operators

(Notes) *1 Each company’s ARPU is calculated and published based on each respective company’s data. The figures were not calculated using the same method.

*2 The ARPU for KDDI is taken from the ARPA (Average Revenue Per Account) of each year. The figure for FY 2014 has been revised from ARPU to ARPA.

*3 The figures for NTT DOCOMO and Softbank in FY2014 were revised to unify the conditions and values for FY 2015-2017.

*4 The figures in FY2018 for NTT docomo and Softbank have changed in terms of presentation, so comparisons must be made with caution.
(Source) Prepared from the financial statements of each company
7. Broadcasting market trends

(1) Size of the broadcasting market

a. Broadcaster sales

- Broadcaster sales totaled 3.9337 trillion yen in FY 2017

Japanese broadcasters are divided into two categories: Japan Broadcasting Corp., a public broadcaster known as NHK, which depends on license fee revenues, and private broadcasters that depend on advertisements or paid programming. Aside from these two categories, the Open University of Japan also provides broadcasting services for educational purposes.

Sales for the entire broadcasting sector, including revenues from broadcasting and non-broadcasting operations, increased from FY 2016 to 3.9337 trillion yen (by 0.1 percent up from the previous year) in FY 2017. By category, terrestrial-based private broadcasters’ sales were 2.3471 trillion yen (down 1.3 percent), satellite-based private broadcasters’ sales were 369.7 billion yen (up 6.8 percent), and cable TV broadcasters’ sales were 499.2 billion yen (down 0.8 percent). NHK’s ordinary operating income was 717.7 billion yen (up 1.9 percent).

In terms of market share, terrestrial-based private broadcasters accounted for 73.0 percent (down 0.7 percentage points) of private broadcasters’ sales. (Figure 3-1-7-1).

Figure 3-1-7-1 Changes in and breakdown of the broadcasting sector market size (total sales)

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>Terrestrial-based broadcasters</th>
<th>Satellite-based broadcasters※1</th>
<th>Cable TV broadcasters※2</th>
<th>NHK※3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>25,229</td>
<td>2,995</td>
<td>3,330</td>
<td>6,803</td>
</tr>
<tr>
<td>2004</td>
<td>26,153</td>
<td>3,158</td>
<td>3,533</td>
<td>6,855</td>
</tr>
<tr>
<td>2005</td>
<td>26,138</td>
<td>3,414</td>
<td>3,850</td>
<td>6,749</td>
</tr>
<tr>
<td>2006</td>
<td>26,091</td>
<td>3,525</td>
<td>4,050</td>
<td>6,756</td>
</tr>
<tr>
<td>2007</td>
<td>25,847</td>
<td>3,737</td>
<td>4,746</td>
<td>6,848</td>
</tr>
<tr>
<td>2008</td>
<td>22,574</td>
<td>3,905</td>
<td>4,667</td>
<td>6,624</td>
</tr>
<tr>
<td>2009</td>
<td>22,655</td>
<td>3,887</td>
<td>5,134</td>
<td>6,659</td>
</tr>
<tr>
<td>2010</td>
<td>22,502</td>
<td>4,185</td>
<td>5,437</td>
<td>6,812</td>
</tr>
<tr>
<td>2011</td>
<td>22,870</td>
<td>4,490</td>
<td>5,177</td>
<td>6,946</td>
</tr>
<tr>
<td>2012</td>
<td>23,216</td>
<td>4,510</td>
<td>4,931</td>
<td>6,604</td>
</tr>
<tr>
<td>2013</td>
<td>23,375</td>
<td>4,491</td>
<td>5,030</td>
<td>6,570</td>
</tr>
<tr>
<td>2014</td>
<td>23,461</td>
<td>3,661</td>
<td>4,975</td>
<td>6,748</td>
</tr>
<tr>
<td>2015</td>
<td>23,773</td>
<td>3,809</td>
<td>5,063</td>
<td>6,879</td>
</tr>
<tr>
<td>2016</td>
<td>23,471</td>
<td>3,463</td>
<td>5,031</td>
<td>7,045</td>
</tr>
<tr>
<td>2017(FY)</td>
<td>38,356</td>
<td>3,697</td>
<td>4,992</td>
<td>7,177</td>
</tr>
<tr>
<td>Total</td>
<td>38,356</td>
<td>39,698</td>
<td>40,152</td>
<td>40,422</td>
</tr>
<tr>
<td></td>
<td>41,178</td>
<td>39,089</td>
<td>39,115</td>
<td>38,915</td>
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<tr>
<td></td>
<td>39,689</td>
<td>39,152</td>
<td>39,307</td>
<td>39,312</td>
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<tr>
<td></td>
<td>39,337</td>
<td>39,312</td>
<td>39,375</td>
<td>39,337</td>
</tr>
</tbody>
</table>

(Notes) ※1 Calculated from operating revenues of satellite-based broadcasting services.
※2 Cable TV broadcasters until FY 2010 were business enterprises providing independent broadcasting services with facilities licensed under the former licensing scheme under the former Act on Cable Television Broadcasting. (Note that facilities registered under the former Act on Broadcast on Telecommunications Services included those that use the same broadcasting method as facilities licensed under the former licensing scheme). From FY 2011 onwards, cable TV broadcasters were registered general broadcasting enterprises with wired telecommunication facilities providing independent broadcasting services. (Both exclude business operators using IP multicasts.)
※3 Figures for NHK represent ordinary operating income.
※4 Community broadcasting operators that also provide cable TV broadcasting services are excluded.

(Source) Prepared from MIC materials and NHK financial statements for each fiscal year.
8. Content market trends

(1) Size of Japan’s content market

- The Japanese content market was valued at 11.8099 trillion yen in 2017. By content segment, video content accounted for nearly 60 percent of the market, text-based content, 36 percent, and audio-based content, 6 percent.\(^\text{57}\) (Figure 3-1-8-1).

The overall size of the content market has been increasing since 2013. The size of each content segment stayed flat until 2012, however, after 2013 the video content segment expanded while the text-based content segment contracted (Figure 3-1-8-2).

(2) Trends in the online content market

- The market for online content, which is consumed via the Internet on computers and mobile phones, reached 3.6784 trillion yen, accounting for 31.1 percent of the entire content market (Figure 3-1-8-3).

The online content market has been growing steadily since 2013. The market size by content segment shows that the video content segment has been driving the expansion of the online content market (Figure 3-1-8-4).

\(^{57}\) The market size was measured and analyzed not by media types, but by assessing the primary nature of the content works and recalculating the value at each distribution level, such as primary distribution or multi-use.
Trends in the broadcast content market

The export value of Japanese broadcast content was 44.45 billion yen in FY 2017 (Figure 3-1-8-5). Looking at the composition of the export value of Japanese broadcast content, the total of program broadcast rights, Internet distribution rights, and merchandising rights account for more than 90 percent. Especially, export value of Internet distribution rights and merchandising rights have shown significant growth since 2012. The export value of program broadcast rights includes cases in which program broadcast rights and Internet distribution rights are sold as a set, so Internet distribution has a high impact on the overall exports. Looking at the export value of Japanese broadcast content by entity, the combined total of “NHK”, “main commercial broadcast stations” and “production, etc.” covers over 90 percent. When the comparison is limited to just the export value of program selling rights, then the ratio of broadcasting entities become higher.

Anime accounts for over 80 percent of the export value for the program category, this is followed by drama programs and variety shows. Asia accounts for nearly 60 percent of exports, followed by North America and Europe.

Looking at the broadcast content export value by program category finds that anime accounts for 80 percent of the total, this is followed by drama programs and variety shows (Figure 3-1-8-6). The largest export market for broadcast content was Asia, with over 50 percent, followed by North America, Europe, and Central America. This shows that Japanese broadcast contents are exported across the world, particularly to Asia. When the comparison is limited to just the export value of program selling rights, the ratio to Asia is much higher.
Figure 3-1-8-5  Export value of Japanese broadcast content

(Notes) *1 Export value of broadcast content; program broadcast rights, Internet distribution rights, video and DVD rights, format and restaging rights, merchandising rights, and similar rights.

*2 Calculated based on questionnaire responses by NHK, main commercial broadcast stations, producers, sub-main commercial broadcast stations in Osaka, local stations and satellite broadcasting stations.

*3 Calculations for FY 2016 and later include digital gaming rights.

(Source) Prepared from “Survey on the State of Overseas Expansion of Broadcast Content” MIC

Figure 3-1-8-6  Export value of Japanese broadcast content by program category

(Notes) *1 Figures for FY 2015 and later have been calculated by excluding unidentified figures.

*2 Unidentified figures in FY2016 include all values for “digital gaming rights”, and shows the mass amount of approximately 10 billion yen.

*3 Figures for FY 2017 includes the values provided by the Japan Foundation project.

(Source) Prepared from “Survey on the State of Overseas Expansion of Broadcast Content” MIC
Section 2 ICT Service Usage Trends

1. Internet usage trends

(1) ICT device ownership

a. Major ICT device ownership (households)

- Ownership rate of smartphones for households was nearly 80 percent, in contrast the rate for fixed line telephones was just over 60 percent.

The ownership rate for ICT devices (households) in 2018 was 79.2 percent for “smartphones”, which is included in “mobile devices” (95.7 percent), and exceeds that of “computers” (74.0 percent). The rate for “fixed-line telephones” was 64.5 percent (Figure 3-2-1-1).

(2) Internet usage

a. Internet usage rate (individuals)

- Usage of the Internet via smartphones exceeds the usage via computers.

The Internet usage rate (individuals) in 2018 was 79.8 percent (Figure 3-2-1-2). Looking at the Internet usage rate by devices, “smartphones” (59.5 percent) exceeded “computers” (48.2 percent) by 11.3 points (Figure 3-2-1-3).

Figure 3-2-1-1 Changes in ownership rates for ICT devices (households)

(Source) “Communications Usage Trend Survey,” MIC
Figure 3-2-1-2 Changes in the Internet usage rate

Figure 3-2-1-3 Device used for Internet by category

(Note) Figures indicate the percentage of people who accessed the Internet using the corresponding device during the past twelve months.

(Source) "Communications Usage Trend Survey," MIC
b. Purpose for using the Internet
   • “Sending and receiving email” was the most common purpose for using the Internet

   While among all age groups, the most common purpose for using the Internet was “sending and receiving email”, the number of users varies by age groups for “using social networking services,” and “using video posting / sharing sites” (Figure 3-2-1-4).

(3) Challenges for secure Internet usage
a. Concerns about Internet usage and issues with usage of ICT networks
   • Individuals are concerned about leaks of personal information, and enterprises are concerned about computer virus infections

   The percentage of individuals (aged 12 and older) who feel concerned about their Internet usage is 70.7 percent including both respondents who said they “feel concerned” and respondents who said that they “feel rather concerned” (Figure 3-2-1-5). Among more specific concerns that they had about using the Internet, 84.6 percent cited “leak of personal information and Internet use history”. This was followed, in descending order, by “computer virus infections” (65.7 percent) and “concern about fraudulent email or fraud using the Internet” (48.3 percent). “Concern about the reliability of electronic payment methods” (37.8 percent) increased by 4.6 percentage points over the previous year (Figure 3-2-1-6).

   Among enterprises, the most common response at 47.2 percent cited “concern about virus infections” as a problem when using ICT networks (the Internet and internal LANs) (Figure 3-2-1-7).

Figure 3-2-1-4  Applications / purpose for using the Internet by age group (multiple answers)

(Source) “Communications Usage Trend Survey”, MIC
Figure 3-2-1-5  Responses of individuals regarding concerns about using the Internet

- Feel not concerned: 13.9%
- Feel concerned: 28.6%
- Feel rather unconcerned: 13.9%
- Feel rather concerned: 42.1%

2018 (n=4,435)

(Source) "Communications Usage Trend Survey," MIC

Figure 3-2-1-6  Types of concerns about using the Internet (multiple responses accepted)

- Leak of personal information and Internet use history: 49.2%
- Computer virus infections: 33.2%
- Concern about fraudulent email or fraud using the Internet: 23.5%
- Spam: 14.2%
- Security measures: 11.8%
- Concern about the reliability of electronic payment means: 14.2%
- Viewing of illegal and harmful information: 11.6%
- Concern about trouble with communication on social media, etc.: 11.6%
- Internet addiction: 2.3%
- Other: 2.3%

2018 (n=3,091)
2017 (n=2,477)

(Source) "Communications Usage Trend Survey," MIC

Figure 3-2-1-7  Issues associated with use of information-communication networks in enterprises (multiple answers permitted)

- Concern about virus infections: 47.9%
- Difficulties in establishing security measures: 47.2%
- Lack of operational and administrative personnel: 47.0%
- Rising operational and management costs: 45.0%
- Low security awareness among employees: 44.4%
- Difficulties in restoring operations after a fault: 41.7%
- Difficulties in quantifying benefits of network adoption: 40.6%
- High communication charges: 37.2%
- Difficulties in achieving benefits from network adoption: 32.4%
- Low communication speeds: 12.9%
- Concern about the reliability of electronic payments: 11.6%
- Concern about protection of copyrights and intellectual property: 11.4%
- Concern about the reliability of authentication technology: 11.4%
- Other: 4.6%
- No particular issues: 1.0%

2018 (n=2,081)
2017 (n=2,527)

(Source) "Communications Usage Trend Survey," MIC
b. Information security measures

Almost 70 percent of households and almost all enterprises have implemented some form of information security protective measures.

Looking at the state of information security protective measures taken by households that use the Internet shows that 68.5 percent of households have taken some form of security. The leading security measures were "installed or updated a security program" (53.4 percent) and "signed up or updated a security service" (24.2 percent) (Figure 3-2-1-8).

Looking at the state of information security measures implemented by enterprises that use an ICT network, it shows that 97.8 percent of enterprises have implemented some form of security. The leading security measure was to "install anti-virus programs on PCs and other devices (operating system, software, etc.)," which 82.9 percent of enterprises have implemented. This was followed by the measure of "install anti-virus programs on servers" (61.0 percent) (Figure 3-2-1-9).

Figure 3-2-1-8 Implementation of information security measures by households (multiple answers permitted)

(Source) "Communications Usage Trend Survey," MIC

Figure 3-2-1-9 Implementation of information security measures by enterprises (multiple answers permitted)

(Source) "Communications Usage Trend Survey," MIC
(4) Trends of enterprises using cloud services

a. Use of cloud services

- The percentage of enterprises using cloud services was nearly 60 percent in 2018.

   Looking at the state of cloud service usage in 2018, 58.7 percent of enterprises answered they had used cloud services either partially or extensively, which is a significant rise of 1.8 percent from the previous year when it stood at 56.9 percent. (Figure 3-2-1-10)

b. Effectiveness of cloud services

- Many enterprises recognize cloud services as being effective.

   Among the enterprises that do use cloud services, 83.2 percent responded that they found it to be “very beneficial” or “somewhat beneficial” (Figure 3-2-1-11).

![Figure 3-2-1-10 Use of cloud services](Source: "Communications Usage Trend Survey," MIC)

![Figure 3-2-1-11 Impact of cloud computing services](Source: "Communications Usage Trend Survey," MIC)
c. Breakdown of cloud service usage
   - The most frequently used cloud service is “file storage and data sharing”

The most frequently used cloud service is “file storage and data sharing”, as cited by 53.1 percent of respondents, this is followed, by “email” with 52.2 percent and “server applications” with 51.0 percent. Very advanced use of cloud services, such as utilizing it for “sales support” or “production management”, is still rather limited (Figure 3-2-1-12).

(5) Introduction and usage of IoT/AI systems and services by enterprises

a. Introduction of IoT/AI systems and services
   - Approximately 20 percent of enterprises have introduced, or are planning to introduce, IoT/AI systems and services.

Enterprises that have already introduced IoT/AI systems and services, for example, in order to collect and analyze digital data, accounted for 12.1 percent of enterprises. We can see that if enterprises that are planning to introduce these kinds of systems and services in the future are included, then this accounts for 20 percent of the total, (Figure 3-2-1-13).

b. Purpose behind collecting and analyzing digital data
   - About 70 percent of enterprises collect and analyze digital data to raise job performance and improve business processes

Looking at the purpose for collecting and analyzing digital data, the most frequent answer was “to raise job performance and improve business processes” with 73.8 percent, this was followed by “to improve customer services” (43.2 percent) and, “for the optimization of projects” (23.9 percent) (Figure 3-2-1-14).
c. Impact of introducing IoT/AI systems and services

- About 70 percent of enterprises recognized that there had been positive impacts from IoT/AI systems and services.

Looking at the impact of IoT/AI systems and services, enterprises that responded it had been “very beneficial” or “somewhat beneficial” totaled 73.3 percent of all enterprises (Figure 3-2-1-15).

2. State of provision and usage of telecommunication services

(1) State of provision of telecommunication services

a. Overview

(i) Subscriptions to voice communication services

- Subscriptions to fixed communications are on a downward trend while subscriptions to mobile communications and OABJ-IP phone services have steadily increased.

Subscriptions to fixed communications (including NTT East and West subscription telephone services, including ISDN, non-NTT telephone services, and CATV telephone services but excluding OABJ-IP phone services) have been declining, while those for mobile communications (mobile phones and PHS handset services) and OABJ-IP phone services have been growing steadily. Subscriptions to 050-IP phone services have been flat in recent years.

There were about 9.0 times more mobile communications subscriptions than fixed communications subscriptions (Figure 3-2-2-1).

b. Mobile communications

- Subscriptions to mobile communication services have risen each year.
  The proportion of subscriptions to MVNO services across all mobile communication subscriptions also surged.
  Subscriptions to mobile communications at the end of FY 2018 stood at 40.25 million (up 1.5 percent from the previous year). Subscriptions to mobile ultra-high-speed broadband services was 136.64 million for 3.9G and 4G (LTE) services (up 13.2 percent), and 66.24 million for BWA services (up 13.8 percent) (Figure 3-2-2-2).
  Trends for the net increase in the number of subscriptions to FTTH and DSL show that DSL continues to decrease while FTTH continues to increase.

(2) Broadband usage

- Subscriptions to mobile ultra-high-speed broadband services have leaped dramatically year on year.

The number of subscriptions to fixed line broadband services at the end of FY 2018 stood at 40.25 million (up 1.5 percent from the previous year). Subscriptions to mobile ultra-high-speed broadband services was 136.64 million for 3.9G and 4G (LTE) services (up 13.2 percent), and 66.24 million for BWA services (up 13.8 percent) (Figure 3-2-2-2). Trends for the net increase in the number of subscriptions to FTTH and DSL show that DSL continues to decrease while FTTH continues to increase.

(i) Subscriptions to mobile ultra-high-speed broadband services have leaped dramatically year on year.

Subscriptions to mobile ultra-high-speed broadband services was 136.64 million for 3.9G and 4G (LTE) services (up 13.2 percent), and 66.24 million for BWA services (up 13.8 percent) (Figure 3-2-2-2). Trends for the net increase in the number of subscriptions to FTTH and DSL show that DSL continues to decrease while FTTH continues to increase.

(ii) Subscriptions to mobile communication services have risen each year.

The proportion of subscriptions to MVNO services across all mobile communication subscriptions also surged.

Subscriptions to mobile communications (mobile

\[58\) Non-NTT services are subscriber phone services provided by telecom carriers other than NTT East and West and cover direct subscriber telephone, ISDN services, new-type non-NTT telephone, and ISDN services.

\[59\) Figures for subscriptions to fixed-line broadband services cover FTTH, DSL, cable TV, and FWA services.
phones, PHS handsets, and BWA) at the end of FY 2018 totaled 180.45 million (an increase of 4.0 percent from the previous year). Net growth in comparison to the end of FY 2017 was 6.88 million subscriptions, which demonstrates a continuing upward trend (Figure 3-2-2-3).

By carrier (Group), the market share for mobile communication subscriptions was 37.9 percent for NTT DOCOMO (down 0.8 percentage points), 27.4 percent for the KDDI Group (up 0.2 percentage points), and 23.1 percent for the SoftBank Group (±0) (Figure 3-2-2-4). By carrier (Group), market share for MVNO services was 5.6 percent for NTT DOCOMO MVNO (up 0.2 percentage points from the previous year), 3.4 percent for the KDDI Group MVNO (up 0.6 percentage points), and 2.6 percent for the SoftBank Group MVNO (up 0.2 percentage points).

Subscriptions for MVNO services, out of subscriptions for mobile communications (mobile phones, PHS handsets, and BWA), continue to increase, and reached 20.94 million in FY 2018 (an increase of 14.0 percent). (Figure 3-2-2-5)

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**Notes**

*1 Subscriptions for mobile communications cover mobile phones, PHS services and BWA.

*2 Figures for mobile communications from FY 2013 onward are ‘after adjusting for internal group transactions.’ ‘After adjusting for internal group transactions’ refers to adjustments made to count 1 mobile phone device as 1 contract and not 2 contracts, so as not to diverge from the actual state, when an MNO receives mobile phone or BWA services as an MVNO from another MNO in the same group and provides these services together with its own services to a mobile phone device.

*3 Figures of the past years are different from those in last year’s publication due to amendments by the target enterprises.

(Source) Prepared from ‘Official Announcement of Quarterly Data on the Number of Telecommunications Service Subscriptions and Market Share (FY2018 Q4 (End of March))’ MIC

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**Figures after adjusting for internal group transactions.**

**Figures after subtracting subscriptions to MVNOs that are MNOs.**
(Notes) *1 ‘After adjusting for internal group transactions’ refers to adjustments made to count 1 mobile phone device as 1 contract and not 2 contracts so as not to diverge from reality, such as when an MNO receives mobile phone or BWA services as an MVNO from another MNO in the same group and provides these services together with its services in 1 mobile phone device.

*2 Figures of the past years are different from those in last year’s publication due to amendments by target enterprises.

(Source) Prepared from “Official Announcement of Quarterly Data on the Number of Telecommunications Service Subscriptions and Market Share (FY2018 Q4 (End of March)),” MIC

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**Chapter 3**

(2) Telecommunication usage

a. State of traffic

(i) Internet traffic

- The total download traffic of broadband service subscribers in Japan reached an average of 11.0 Tbps as of November 2018, a 23.3 percent increase from the same month in the year before.

(a) Changes in traffic by broadband subscribers

Traffic by the broadband service subscribers of ISP962 continues to grow, with download traffic (A1 OUT) reaching a monthly average of 7281.8 Gbps in November 2018 (a 21.8 percent increase from the same month the year before). Download traffic (A1 OUT) is 7.8 times larger than upload traffic (A1 IN: 929.1 Gbps), thus, most traffic is download traffic (Figure 3-2-2-6).

(b) Changes in traffic exchanged between ISPs

Data inflow has exceeded outflow in all three types of traffic between ISPs: the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged between ISPs: the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major domestic internet exchanges (IXs)62 (B1), the traffic exchanged with major...
major domestic IX (B2), and the traffic exchanged with overseas ISPs (B3). In all three types, data inflow has exceeded outflow (Figure 3-2-2-6).

### Figure 3-2-2-6 Estimates for Internet traffic in Japan

#### [Traffic estimates]

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Total traffic by broadband service subscribers in Japan (estimated) [Gbps]*1</th>
<th>Traffic per broadband service subscriber (estimated) [Mbps]</th>
<th>Traffic by subscriber type</th>
<th>Traffic exchanged between major domestic IXs and ISP9 [Gbps]</th>
<th>Traffic exchanged between domestic ISPs and ISP9 without passing through major domestic IXs [Gbps]</th>
<th>Traffic exchanged between overseas ISPs and ISP9 (outgoing) [Gbps]</th>
<th>Traffic exchanged between overseas ISPs and ISP9 (incoming) [Gbps]</th>
<th>Share of nine cooperating ISPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>5</td>
<td>1,406</td>
<td>8,027</td>
<td>266.4</td>
<td>954.8</td>
<td>5,452.9</td>
<td>1,390.0</td>
<td>597.1</td>
<td>590.5</td>
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<tr>
<td>11</td>
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<td>8,903</td>
<td>296.4</td>
<td>227.1</td>
<td>799.1</td>
<td>5,980.2</td>
<td>1,428.9</td>
<td>688.1</td>
<td>690.4</td>
</tr>
<tr>
<td>2018</td>
<td>5</td>
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<td>10,289</td>
<td>33.2</td>
<td>261.1</td>
<td>870.1</td>
<td>1,441.9</td>
<td>726.4</td>
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</tr>
<tr>
<td>11</td>
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<td>10,976</td>
<td>35.3</td>
<td>277.0</td>
<td>929.1</td>
<td>7,281.8</td>
<td>1,921.4</td>
<td>867.5</td>
<td>964.9</td>
</tr>
</tbody>
</table>

(Notes) *1 The total for nine cooperating ISPs, namely the Internet Initiative Japan (IIJ), NTT Communications, NTT Plala Inc., K-Opticom (changed its name to OPTAGE Inc. in April, 2019), KDDI, Jupiter Telecommunications Co., Ltd., SoftBank Corp., NIFTY Corporation, and BIGLOBE Inc.

*2 The total traffic by broadband service subscribers in Japan (estimated), the traffic per broadband service subscriber (estimated). For A1 and A2 columns, **In** stands for uploads and **Out** stands for downloads.

*3 Total traffic by broadband service subscribers in Japan was estimated from the traffic of broadband service subscribers of the nine cooperating ISPs (A1) and the share of all subscriptions of the nine cooperating ISPs (X).

*4 Estimation by linear interpolation using the data of “Official Announcement of Quarterly Data on the Number of Telecommunications Service Subscriptions and Market Share”

### Types of traffic

**B. Traffic exchanged between ISPs**

- **B1** Traffic exchanged with major domestic IXs
- **B2** Traffic exchanged between domestic ISPs without passing through major domestic IXs
- **B3** Traffic exchanged with overseas ISPs

**A. Traffic by subscriber type**

- **A1** Traffic by broadband service subscribers
- **A2** Traffic by other subscribers

**C. Traffic at major domestic IXs**


*1 A1 includes the following types of traffic:
- Some traffic on public wireless LAN services from some ISP carriers
- Some traffic on femtocell services from some mobile communications carriers

*2 It was defined from November 2016 that traffic by CDN cache and traffic by customer ISPs connecting with cooperating ISPs which provide transit are handled as A2.

*3 B2 includes traffic exchanged via the following:
- Private peering with domestic ISPs
- Transit provided by domestic ISPs
- Public peering at other domestic IXs other than major domestic IXs

*4 B3 includes traffic exchanged via the following; however, it was defined from November 2016 that among the traffic, the traffic at domestic connection points are handled as B2.
- Private peering with overseas ISPs
- Transit provided by overseas ISPs
- Public peering at overseas IXs

(Source) Prepared from “Aggregation and Provisional Calculation of Internet Traffic in Japan (Announcement of aggregate results as of November 2018)” MIC

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* The total for IXs run by Internet Multifeed, Equinix Japan, Japan Internet Exchange, BBIX, and WIDE Project.
Estimations for Internet traffic in Japan

MIC have estimated the total download traffic by broadband service subscribers in Japan from A1 — the traffic of ISP9 broadband service subscribers (DSL, FTTH, CATV, FWA) — and the percentage of the nine ISP’s subscriptions among all broadband subscriptions in Japan. This estimate found that traffic internet, on average, was approximately 11.0 Tbps during November 2018. This is a 23.3 percent increase from the same month a year ago, and demonstrates a continuing rise in internet traffic (Figure 3-2-2-6).

Mobile communication traffic

Mobile communication traffic increased at a rate of about 1.3 times over the last year.

The rapid increase in traffic, particularly data communications, in recent years is a significant factor in radio spectrum congestion in the frequencies assigned to mobile communication systems. In view of this, five mobile communications carriers (NTT DOCOMO, KDDI, SoftBank, UQ Communications, and Wireless City Planning) worked together to tabulate and analyze data on the volume of mobile communication traffic (non-voice traffic). They found that, as of December 2018, mobile communication traffic increased about 1.3 times over the last year, and has reached an average of 2911.2 Gbps (Figure 3-2-2-7).

3. Provision and use of broadcasting services

Subscriptions to NHK terrestrial, NHK-BS, WOWOW and cable TV services in FY 2017 increased from the previous year.

Subscriptions to all broadcasting services increased in FY 2017, except for 110° East CS, 124/128° East CS broadcasts (Figure 3-2-3-1).
4. Promoting online government services

(1) Promoting e-government

Promotion of e-government based on the inventory of administrative procedures

In order to improve the convenience of overall administrative services, the Cabinet Secretariat conducted a detailed survey on government administrative procedures (inventory survey). The results show that about 1.5% (867 types) of all types of procedures (57,668 types), which had more than 0.1 million filings in a year, accounted for 98% (approximately 2.1 billion) of the sum of procedure filings. In particular, the online usage rate for 57 types of procedures under improvement promotions, which are frequently used by citizens and enterprises, has steadily been rising (about 208.27 million procedures out of all 431.33 million procedure filings were filed online, an online usage rate is 48.3%, and an increase of 2.6 percentage points from the previous fiscal year) (Figure 3-2-4-1).

(2) Promoting online governance by local governments

a. Use of online procedures

The usage rate for local government procedures which were selected for online-usage promotion increased over the previous fiscal year. The online usage rate of local government administrative procedures was 52.4 percent in FY 2017 (Figure 3-2-4-2).

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Section 3 Radio Spectrum Usage Trends

1. Usage and number of radio stations

(1) Radio stations

The number of radio stations in Japan has increased steadily since 2006. The number of radio stations (excluding PHS and wireless LAN handsets and other radio stations for which no license is required) at the end of FY 2018 increased by 7.1 percent from a year earlier to 251.01 million, including 247.48 million mobile phones and other land mobile stations. Mobile phones and other mobile land stations accounted for 98.6 percent of all radio stations. The number of convenience stations climbed by 5.6 percent to 1.25 million (Figure 3-3-1-1).

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64 Improvement promotion procedures are frequently used procedures that are filed 1 million or more times a year by citizens or enterprises or that are mainly used iteratively or continuously by enterprises even if annual filings are less than 1 million.

65 The targeted procedures are those selected for online-usage promotion under the E-Local Government Online Usage Advancement Policy.
2. Radio surveillance to eliminate interference with key radio communications

- There were 412 reports of interference with key radio communications in FY 2018, and 1,344 actions were taken against illegal radio stations.

In the interests of eliminating radio interference and obstructions and maintaining a favorable radio spectrum usage environment, officials at the 11 Regional Bureaus of Telecommunications and elsewhere use illegal radio station search vehicles and sensor stations installed in towers and on building rooftops in major urban areas nationwide. These investigate the sources of radio signals that interfere with fire and emergency services radio, aeronautical and maritime radio, mobile phones, and other key radio communications. Officials also crack down on illegal radio stations and undertake public awareness activities to ensure more people use the radio spectrum properly.

Since FY 2010, radio authorities have been working to promptly eliminate interference with key radio communications with a system that can receive interference reports around the clock. Radio authorities also monitor shortwave radio and cosmic radio waves from international radio surveillance facilities registered with the International Telecommunication Union (ITU).

In FY 2018, there were 1,813 reports of radio interference or obstructions of all kinds, 436 fewer (down 19.4 percent) than the previous year. Among these, there were 412 reports of interference with key radio communications, 110 fewer (down 21.1 percent) than the previous year. In response to these reports, 1,946 actions were taken in FY 2018 (Figure 3-3-2-1).

In FY 2018, 4,694 illegal radio stations were detected, 76 less (down 1.6 percent) than the previous year. In response, 1,334 actions were taken in FY 2018, a decrease of 124 actions (down 8.4 percent) from the previous year. These actions included 208 indictments (15.5 percent of all actions) and 1,126 directives (84.5 percent of all actions).

66 The number of actions includes incomplete actions remaining from the previous fiscal year.
Figure 3-3-2-1  Changes in the number of radio station interference / obstruction reports and the number of actions taken in response

<table>
<thead>
<tr>
<th>Year (FY)</th>
<th>Reports of interference with key radio communications</th>
<th>Other interference report</th>
<th>Actions taken in response to reports</th>
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<tbody>
<tr>
<td>2004</td>
<td>592</td>
<td>1,711</td>
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<td>2005</td>
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<td>2,665</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>2018</td>
<td>412</td>
<td>1,401</td>
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</table>

Number of actions in response to interference / obstruction reports:

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<thead>
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<th>Year (FY)</th>
<th>Number of actions in response to reports</th>
</tr>
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<tbody>
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