Section 1 ICT Industry Trends

1. Economic size of the ICT industry

(1) Market size (domestic production)
- The ICT industry market accounted for about 9.9 percent of all industries, making it the largest industry.

The ICT industry’s market size in 2015 was 95.7 trillion yen (based on nominal domestic production), accounting for 9.9 percent of all industries and making it the largest industry in the country (Figure 6-1-1-1). Looking at the industry’s performance over time finds that its production value cooled off for several years after 2000 in response to the collapse of the IT bubble. The industry entered positive growth territory again starting in 2005, but its production value plummeted between 2008 and 2009 due to the global financial crisis. ICT’s production value continued to slide even after 2010 until signs of recovery finally started to appear in the years after 2012 (Figure 6-1-1-2).

Looking at the transitions in market size (based on real domestic production) of the main industries in constant 2011 values reveals that the ICT industry fell down by the 2008 – 2009 global financial crisis to 91.3 trillion yen in 2012 but trended gradual upward after 2013 (Figure 6-1-1-2). The ICT industry’s market size (based on real domestic production) in 2015 was 95.7 trillion yen. The industry’s average annual growth rate from 2000 to 2015 was 0.6 percent.

(2) Gross domestic product (GDP)
- The real GDP of the ICT industry in 2015 accounted for 9.3 percent of all industries.

The nominal GDP of the ICT industry rose in 2015 by 4.9 percent year-on-year to 44.2 trillion yen. Conversely, the real GDP of the ICT industry in constant 2011 values increased 1.8 percent year-on-year in 2015 to 44.4 trillion yen. (Figure 6-1-1-3).

Looking at the size of nominal GDP of the main industries finds that the ICT industry’s nominal GDP accounts for 8.9 percent of the combined nominal GDPs of all industries and is the third largest after the commerce and real estate industries. The growth rate of the ICT industry in terms of nominal GDP rebounded to plus 4.9 percent over 2014 and 2015. Examining the real GDPs of the main industries finds that the ICT industry’s real GDP accounts for 9.3 percent of all industries, making it the third largest industries following commerce and real estate industries (Figure 6-1-1-4).
**Employment**

The ICT industry employed 4.01 million people in 2015 (up 0.8 percent from the previous year), accounting for 6.0 percent of total employment in all industries. Employment declined by 6.1 percent from 2014 in the Broadcasting sector, by 3.5 percent in the video, audio and text information production sector, and by 1.4 percent in the communications sector. But employment in the research sector and the ICT-related services sector increased, by 3.3 percent and 2.6 percent respectively (Figure 6-1-5).

2. ICT industry contributions to the national economy

(1) ICT industry’s economic spillover effects

The ICT industry contributes the largest class economic spillover effects of all industries in terms of added value and job inducements.

The ICT industry’s real domestic production in 2015 was 95.7 trillion yen. The industry’s economic spillover effects, estimated to be 80.8 trillion yen in added value and 8.263 million jobs. By comparison, in 2000 the ICT industry’s real domestic production value was 87 trillion yen, which contributed 73.8 trillion yen in added value and 9.925 million jobs. Because technological innovation has a large impact on the ICT industry, the industry is believed to be a stronger driver of added value than employment (Figure 6-1-2-1).

3. Research and development in the ICT field

(1) Research and development spending

The ICT industry spent 3.9591 trillion yen on research in FY 2015, accounting for 28.9 percent of all corporate research spending.

According to the “2016 Research Investigation Report on Science and Technology”, Japan’s total scientific and technological research spending (i.e., research spending) in FY 2015 stood at 18.9391 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 13.6857 trillion yen. Of this amount, 3.9591 trillion yen (28.9 percent) was spent on research by the ICT industry. The ICT equipment and appliance manufacturing segment was largest research spender in the ICT industry (Figure 6-1-3-1).

(2) Technology trading
- The ICT industry posted a surplus in technology exports in FY 2015
The value received from Japan’s technology exports in FY 2015 totaled 3.9498 trillion yen, to which the ICT industry contributed 570.8 billion yen, or 14.5 percent. On the other side of technology trades, the costs of technology imports was 602.6 billion yen, of which the ICT industry paid out 274.1 billion yen, or 45.5 percent. Both Japan and the ICT industry posted export surpluses in technology trading.

The ICT equipment and appliance manufacturing segment accounted for the largest share of the ICT industry’s technology imports and exports (Figure 6-1-3-3).

(3) Number of researchers
- The ICT industry employed 169,717 researchers, or 34.9 percent of all corporate researchers in Japan
There were 847,093 researchers in Japan on March 31, 2016 (the total of all researchers at enterprises, nonprofit organizations, public agencies, universities, etc.). Enterprises employed 486,198 researchers, or about 60 percent of the total. The ICT industry employed 169,717 researchers, or 34.9 percent of all enterprise researchers in Japan. The ICT equipment and appliance manufacturing segment had the most researchers of any ICT industry sector (Figure 6-1-3-3).

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37 The value of technology trade is the equivalent value received from the provision (export) of patents, knowledge, technical direction, and other forms of technology transfers to other countries or the equivalent value paid to receive (import) the same forms of technology transfers from other countries.
4. 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 2016 survey that pertains to ICT enterprises.

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

a. General summary of the survey results

5,474 enterprises were engaged in ICT business operations with sales in excess of 48 trillion yen. Sales attributed to ICT business operations in FY 2015 totaled 48.0504 trillion yen (total sales by the enterprises were 71.9513 trillion yen). By sector, the telecommunications sector accounted for 34.6 percent of all sales (down 1.9 percentage points from the previous year), the software sector 31.5 percent (down 0.5 points), and the information processing services sector 11.7 percent (up 0.5 points) (Figure 6-1-4-1).

The number of enterprises engaging in ICT business operations (irrespective of whether ICT business operations are the enterprise’s mainstay operations) stood at 5,474. Operating profits were 5.9992 trillion yen, ordinary income was 6.1655 trillion yen, and the enterprises held 9,806 subsidiaries and associated companies.

b. Breakdown of sales

Enterprises capitalized at less than 100 million yen accounted for more than 50 percent of all enterprises in 8 of the 12 ICT industry sectors. A breakdown of ICT industry enterprises by capital size discovers that enterprises capitalized at less than 100 million yen accounted for more than 50 percent of all enterprises in 8 of the 12 ICT industry sectors. Of particular note, the broadcasting sector, which is often perceived as a traditional industry, accounted for 1.6 percent of all enterprises.

(Note) "Miscellaneous communication service providers" refers to enterprises that selected "other" as the primary business in the breakdown of sales attributable to ICT business operations.

(Source) Prepared from the "2016 Research Investigation Report on Science and Technology," MIC
ticular note is the video information production and distribution sector and the audio information production sector, where enterprises capitalized at less than 50 million yen accounted for more than 40 percent of all enterprises in the respective sectors (Figure 6-1-4-2).

5. 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 the highest. Sales in the telecommunications sector in FY 2015 were 14.0342 trillion yen (an increase of 2.5 percent from the previous year) (Figure 6-1-5-1). Fixed-line communications accounted for 29.5 percent of all sales in FY 2015, and mobile communications for 54.5 percent (Figure 6-1-5-2). Looking at sales by service category finds voice transmission services accounted for 29.2 percent and data transmission services for 54.8 percent (Figure 6-1-5-3). The average revenue per user (ARPU) among the main mobile communication service providers was 4,430 yen for NTT Docomo, 6,340 yen for KDDI, and 4,500 yen for SoftBank (Figure 6-1-5-4).

6. Broadcasting market trends

(1) Size of the broadcasting market

a. Broadcasters sales

Japanese broadcasters are divided into 2 categories: Japan Broadcasting Corp., a public broadcaster known as NHK, which depends on reception fee revenues, and private broadcasters that depend on advertisements or paid programming. Apart from these categories, the Open University of Japan provides broadcasting services for educational purposes.

The entire broadcasting sector’s sales, including revenues from broadcasting and non-broadcasting operations, increased in FY 2015 (by 1.0 percent from the previous year) to 3.9152 trillion yen. By category,
Figure 6-1-5-2  Telecom carriers’ sales breakdown by fixed-line communications and mobile communications

(Note) Calculating excluding sales breakdown “Unknown”
Prepared from *2016 Basic Survey on the Information and Communications Industry,* MIC / METI

Figure 6-1-5-3  Telecom carriers’ sales breakdown by service category

(Note) Calculating excluding sales breakdown “Unknown”
Prepared from *2016 Basic Survey on the Information and Communications Industry,* MIC / METI

Figure 6-1-5-4  Transitions in mobile ARPU in the past five years for 3 domestic mobile operators

(Note) Each company’s ARPU is calculated and released based on the respective company’s criteria. The figures were not calculated using the same method.
*Due to rounding, the total of individual ARPU figures may not equal the total ARPU figures.
*NTT Docomo includes Smart ARPU, KDDI includes value added ARPU, and SoftBank includes service ARPU.
*The ARPU figures for KDDI after FY 2012 were taken from au Communications ARPU under the personal segment. Applied discount amounts were subtracted from the voice ARPU.
*SoftBank ARPU figures included communication modules until FY 2011.
*SoftBank Mobile took over SoftBank BB, SoftBank Telecom, and Y!Mobile on April 1, 2015 (name changed to SoftBank on July 1, 2015).
Prepared from financial statements from each company
terrestrial-based private broadcasters’ sales were 2.3461 trillion yen (up 0.4 percent from the previous year), satellite-based private broadcasters’ sales were 380.9 billion yen (up 4.0 percent), cable TV broadcasters’ sales were 500.3 billion yen (up 0.6 percent), and NHK’s ordinary operating income was 687.9 billion yen (up 1.9 percent).

In terms of market share, terrestrial-based private broadcasters accounted for 72.7 percent (down 0.3 percentage points from the previous year) of private broadcasters’ sales.

7. Content market trends

(1) Size of Japan’s content market

The Japanese content market was valued at 11.5081 trillion yen, over 50 percent of which was attributable to video content, about 40 percent to text-based content, and less than 10 percent to audio-based content.

The Japanese content market was valued at 11.5081 trillion yen in 2015. By content segment, video content accounted for over 54.3 percent of the market, text-based content, about 39.2 percent, and audio-based content, 6.5 percent. (Figure 6-1-7-1).

The overall size of the content market in 2015 has remained essentially unchanged since 2011. The size of each content segment as well stayed flat between 2011 and 2012, after 2013 the video content segment expanded while the text-based content segment contracted (Figure 6-1-6-1).

(2) Trends in the online content market

The market for online content, which is downloaded or streamed via the Internet to computers or mobile phones, grew to 2.9633 trillion yen, accounting for 25.7 percent of the entire content market.

As part of the overall content market, the market for online content, which is downloaded or streamed via the Internet to computers or mobile phones, reached 2.9633 trillion yen. By content segment, the video content segment accounted for 55.7 percent of the online con-
The online content market has been growing steadily since 2011. The market by content segment shows that the video content segment which more than doubled from 2011 to 2015 in particular due to the hot game software portion increase, has been driving the online content’s market expansion (Figure 6-1-7-4).

The 2016 mobile content industry’s market increased 14.5 percent from the previous year to 5.0619 trillion yen (Source) “Survey on the Production and Distribution of Media Content,” Institute for Information and Communications Policy, MIC
is made up of the mobile content market\(^{40}\) and the mobile commerce market, continued to expand in 2016, reaching 5.0619 trillion yen (14.5 percent increase year-on-year), due to the growth and proliferation of smartphones and tablets. By individual segments, the mobile content market reached 1.8757 trillion yen (up 20.0 percent) and the mobile commerce market reached 3.1862 trillion yen (up 11.4 percent) (Figure 6-1-7-5).

(3) Trends in the broadcast content market

\(^{39} \) Export value of Japanese broadcast content was 28.85 billion yen in FY 2015

The export value of Japanese broadcast content in FY 2015 was 28.85 billion yen. Note that from FY 2010 onward, Internet distribution rights, video and DVD rights, format and restaging rights, merchandising rights, and similar rights, in addition to program broadcast rights, have been included in the export value of broadcast content (Figure 6-1-7-6). The traditional method of exporting broadcast content had been to sell the program broadcast rights. But today, methods have diversified, so that revenue streams other than program broadcast rights account for more than half of all revenue.

\(^{40} \) Cartoons and animations account for over 70 percent of export value by program category, followed by dramatic programs and variety shows, and Asia accounts for more than 50 percent of exports, followed by North America and Europe

Looking at the broadcast content export value by program category finds cartoons and animations account for 76.6 percent of total, variety shows, 10.8 percent, and dramatic programs, 10.0 percent, followed by documentaries and sports programs (Figure 6-1-7-7). The largest export market for broadcast content was Asia, at 56.4 percent of the total, followed by North America at 27.6 percent, Europe at 12.0 percent, and South and Central America. Diverse export destinations for Japanese broadcast content are developing, particularly in Asia.

\(^{39} \) The mobile content market refers to the market for digital content provided over the mobile Internet (including ringtones, music streaming, videos, games, and fortune-telling). The mobile commerce market refers to the sales of physical goods (mail-order sales, etc.), sales of services (ticket sales), and transaction fees (including stock brokerage commissions, auction fees, and other payments) conducted over the mobile Internet.

\(^{40} \) In 2010, the scope of the mobile content market was expanded to encompass the open platform market (such as smartphones).
1. Internet usage trends

(1) State of ICT device proliferation

a. State of major ICT device proliferation (households)

Ownership gap between smartphones and computers is closing to just 1.2 percentage points

The household ICT device penetration rate of 2016 was 94.7 percent for mobile terminals and 73.0 percent for computers. The penetration rate for smartphones, which are included in the mobile terminals category, has remained flat to 71.8 percent (down 0.2 percentage points from a year earlier), reducing the ownership gap with computers from 4.8 percentage points to just 1.2 percentage points, due to the decline of computer penetration rate (Figure 6-2-1-1).

(2) State of Internet proliferation

a. State of Internet usage

Both the number of Internet users and the Internet population penetration rate rose

The number of Internet users of 2016 was 100.84 million, an increase of 380,000 from 2015. The Internet penetration rate as a percent of the general population was 83.5 percent (up 0.5 points) (Figure 6-2-1-2). Those using computers to access the Internet accounted for 58.6 percent (up 1.8 points) of all Internet users, the largest portion, followed by 57.9 percent (up 3.6 points) for smartphones and 23.6 percent (up 5.3 points) for tablets (Figure 6-2-1-3).

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Section 2  ICT Service Usage Trends

1. Internet usage trends

(1) State of ICT device proliferation

a. State of major ICT device proliferation (households)

Ownership gap between smartphones and computers is closing to just 1.2 percentage points

The household ICT device penetration rate of 2016 was 94.7 percent for mobile terminals and 73.0 percent for computers. The penetration rate for smartphones, which are included in the mobile terminals category, has remained flat to 71.8 percent (down 0.2 percentage points from a year earlier), reducing the ownership gap with computers from 4.8 percentage points to just 1.2 percentage points, due to the decline of computer penetration rate (Figure 6-2-1-1).

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The figures for mobile terminals includes, mobile phones and FHS handsets, personal digital assistants, or PDAs, since the end of 2009 to the end of 2010.
Among all age groups, the most common purpose of using the Internet was “sending and receiving emails.” Viewing the results by age group finds that larger num-
number of users in all age groups use the Internet for "sending and receiving emails," the number of users varies by age groups for "using social media," and "using video posting / sharing sites" (Figure 6-2-1-4).

(3) Challenges for safe, secure Internet usage

a. Matters of concern with Internet usage and problems with ICT networks

- Individuals are concerned about personal information, and enterprises are concerned about personnel shortage

The percentage of individuals who feel insecure with the Internet which includes respondents of both “insecure” and “somewhat feel insecure” reached 61.6%, some 60% feel insecure (Figure 6-2-1-5). Among households with concerns about using the Internet, 87.8 percent cited “personal information and internet access histories will be disclosed or exposed externally without permission” as a concern. This was followed, in order, by “computer virus infections” (67.4 percent) and “False billing and other types of Internet fraud” (51.6 percent) (Figure 6-2-1-6).

Among enterprises, 48.8 percent, the highest response rate, mentioned “concern about virus infections” as a problem when using the Internet, internal LANs, or other networks, indicating heightened security concerns among enterprises (Figure 6-2-1-7).

b. Information security measures

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

Looking at the state of information security measures taken by households that use the Internet finds that 67.7 percent of households have taken some form of information security measures. The leading security measures were “install or update security software” (47.7 percent) and “sign up for or renew a security service” (24.6 percent) (Figure 6-2-1-8).

Looking at the state of information security measures implemented by enterprises that use ICT networks finds that 98.4 percent of enterprises have implemented some form of information security measures, almost all the enterprises. The leading security measure was “install anti-virus programs on computers and other devices (operating systems, software, etc.),” which is done by 88.2 percent of enterprises. This was followed, in order,
Figure 6-2-1-5 Percentage to feel insecurity with Internet usage at individuals (multiple answers permitted)

Figure 6-2-1-6 Matters of concern with Internet usage of individuals

Figure 6-2-1-7 Problems with Internet and intranet LAN usage at enterprises (multiple answers permitted)

Figure 6-2-1-8 Implementation of information security measures at households (multiple answers permitted)
by “install anti-virus programs on servers” (66.8 percent) and “control access with IDs and passwords” (55.3 percent) (Figure 6-2-1-9).

c. Personal information protection measures

Nearly 90 percent of all enterprises have implemented personal information protection measures. The percentage of enterprises that have implemented some form of personal information protection measures was 86.0 percent. The most cited protection measure, given by 49.5 percent of enterprises, was “enhance internal training” followed, in order, by “appoint a personal information protection and management officer” (47.8 percent) (Figure 6-2-1-10).

(4) Cloud service usage trends of enterprises

a. State of cloud service usage

The percentage of enterprises using cloud services rose from 2015. Of enterprise respondents to the survey, 46.9 percent said they had used cloud services either partially or extensively, up 2.3 percentage points from 44.6 percent at 2015 (Figure 6-2-1-11).

b. Breakdown of cloud service usage

The most frequently used cloud service is “email,” cited by 51.7 percent of respondents, followed, in order, by 50.7 percent for “file storage and data sharing” and 46.7 percent for “server usage” (Figure 6-2-1-12).

(Source) “Communications Usage Trend Survey,” MIC
Figure 6-2-1-11 State of cloud service usage

Use company wide | Use at some sales locations and divisions | Do not use presently, but plan to use in the future | Do not use presently and have no plans to use in the future

2015 (n=1,821)
- Use company wide: 22.9%
- Use at some sales locations and divisions: 21.7%
- Do not use presently, but plan to use in the future: 21.7%
- Do not use presently and have no plans to use in the future: 15.0%

2016 (n=2,017)
- Use company wide: 24.4%
- Use at some sales locations and divisions: 24.4%
- Do not use presently, but plan to use in the future: 22.5%
- Do not use presently and have no plans to use in the future: 15.0%

Figure 6-2-1-12 Breakdown of cloud service usage

- Email: 30.0% (2015) vs 29.3% (2016)
- File storage and data sharing: 44.6% (2015) vs 46.9% (2016)
- Server usage: 15.0% (2015) vs 14.5% (2016)
- Internal information sharing / portals: 22.8% (2015) vs 21.7% (2016)
- Schedule sharing: 4.6% (2015) vs 4.4% (2016)
- Data backups: 2.5% (2015) vs 2.3% (2016)
- Payrolls, financial accounting, HR: 10.4% (2015) vs 9.3% (2016)
- Marketing assistance: 7.4% (2015) vs 7.1% (2016)
- e-learning: 7.1% (2015) vs 6.8% (2016)
- Production, distribution, and retail outlet management: 3.5% (2015) vs 3.3% (2016)
- Sharing information with trading partners: 10.0% (2015) vs 9.1% (2016)
- System development and Website construction: 3.5% (2015) vs 3.4% (2016)
- Purchasing: 5.4% (2015) vs 5.2% (2016)
- Order-taking and sales: 4.8% (2015) vs 4.7% (2016)
- Project control: 7.4% (2015) vs 7.2% (2016)
- Billing and payment systems: 5.7% (2015) vs 5.5% (2016)
- Authentication systems: 3.5% (2015) vs 3.4% (2016)
- Research and development: 7.4% (2015) vs 7.1% (2016)
- Other uses: 0.0% (2015) vs 0.0% (2016)

Figure 6-2-1-13 Reasons for introducing cloud services

- No need for inhouse assets or maintenance arrangements: 44.6% (2015) vs 46.9% (2016)
- Services can be accessed anywhere: 4.4% (2015) vs 4.6% (2016)
- Stable operation and higher availability: 2.6% (2015) vs 2.6% (2016)
- Cheap initial costs: 13.4% (2015) vs 13.6% (2016)
- Greater security against information theft, loss, etc.: 18.0% (2015) vs 17.5% (2016)
- Cheaper than existing systems: 5.9% (2015) vs 5.8% (2016)
- High service reliability: 1.9% (2015) vs 1.8% (2016)
- Able to adjust system capacity quickly: 7.2% (2015) vs 7.1% (2016)
- Greater system scalability: 1.2% (2015) vs 1.1% (2016)
- Use equivalent services on all devices: 1.3% (2015) vs 1.3% (2016)
- Services can be accessed anywhere: 2.6% (2015) vs 2.7% (2016)
- Can terminate services at any time: 3.4% (2015) vs 3.3% (2016)
- Simple license management: 4.9% (2015) vs 4.8% (2016)
- Enhanced service lineup: 8.8% (2015) vs 8.7% (2016)
- Other reasons: 10.4% (2015) vs 10.3% (2016)
c. Reasons for introducing cloud services

- "No need for in-house assets or maintenance arrangements" was the most frequently cited reason for introducing cloud services, chosen by about 40 percent.

- "No need for in-house assets or maintenance arrangements" was the most frequently cited reason for introducing cloud services, chosen by 40.9 percent of respondents, followed, in order, by "services can be accessed anywhere" (36.5 percent) and "stable operation and higher availability" (29.6 percent). Respondents mainly cited functional and cost reasons for introducing cloud services (Figure 6-2-1-13).

2. State of telecommunication service provision and usage

(1) State of provision

a. Overview

Subscriptions to fixed-line communications are trending downward while subscriptions to mobile communications and OABJ-IP phone services have increased steadily.

Subscriptions to fixed-line communication services (including NTT East and West subscriber telephone services (including ISDN), non-NTT telephone services, and cable TV-based telephone services but excluding OABJ-IP phone services) have been declining, while those to mobile communication services (mobile phone 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 7.2 times more mobile communication subscriptions than fixed-line communication subscriptions (Figure 6-2-2-1).

b. State of broadband usage

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

- The number of subscriptions to fixed-line broadband services at the end of FY 2016 stood at 38.69 million (up 2.3 percent from the previous year). Subscriptions to mobile ultra-high-speed broadband services broke down into 102.19 million for 3.9G and 4G (LTE) services (up 17.0 percent) and 47.89 million for BWA services (up 36.3 percent) (Figure 6-2-2-2).

b. Mobile communications

- Subscriptions to mobile communication services have risen each year; subscriptions to MVNO services counted as mobile communication subscriptions also surged.

Subscriptions to mobile communication services (mobile phones, PHS handsets, and BWA) at the end of FY 2016 totaled 167.92 million (an increase of 3.6 percent from the previous year). The net growth was 5.84 million subscriptions, which continues the upward trend (Figure 6-2-2-3).

The carrier (Group) shares by mobile communication subscription numbers were 44.6 percent for NTT Docomo (up 1 percentage points from the previous year), 29.4 percent for the KDDI Group (up 0.5 percentage points), and 26.0 percent for the SoftBank Group (down 1.5 percentage points) (Figure 6-2-2-4).

Subscriptions to MVNO services counted as subscriptions to mobile communication services (mobile communication services cover mobile phone and PHS services).

(Notes) *Subscriptions to mobile communication services cover mobile phone and PHS services.

*Figures for mobile communication services from FY 2013 forward are the figures after adjusting for internal group transactions. After adjusting for internal group transactions refers the adjustments made to count 1 mobile phone device as 1 contract and not 2 contracts so as not to diverge from the actual state of affairs, 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 1 mobile phone device.

Prepared from "Announcement of Quarterly Data on Telecommunication Service Contracts and Market Shares (4Q of FY 2016 (March 31, 2017))," MIC 44, 45, 46
phones, PHS handsets, and BWA) continue to increase, reaching 15.86 million (an increase of 25.0 percent from the previous year) at the end of FY 2016 (Figure 6-2-2-5).

(2) State of telecommunication usage

a. Traffic conditions

(i) Internet traffic

Total download traffic by broadband service subscribers in Japan reached an average of 8.3 Tbps during November 2016, 52.2 percent increase from the same month of a year ago.

Transitions in broadband service subscriptions

Fixed-line broadband services

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<th>Year</th>
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<th>DSL (tens of thousands of subscriptions)</th>
<th>CATV (tens of thousands of subscribers)</th>
<th>FWA (tens of thousands of subscriptions)</th>
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Mobile ultra-high-speed broadband services

<table>
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<th>LTE (tens of thousands of subscriptions)</th>
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<td>2016</td>
<td>3,869</td>
<td>6,778</td>
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</tbody>
</table>

b. Traffic conditions

(i) Internet traffic

Total download traffic by broadband service subscribers in Japan reached an average of 8.3 Tbps during November 2016, 52.2 percent increase from the same month of a year ago.

Transitions in mobile phone subscriptions

<table>
<thead>
<tr>
<th>Year</th>
<th>Mobile phones (net total)</th>
<th>PHS / BWA (net total)</th>
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</tr>
<tr>
<td>2015</td>
<td>19,559</td>
<td>19,559</td>
</tr>
<tr>
<td>2016</td>
<td>19,978</td>
<td>19,978</td>
</tr>
</tbody>
</table>

KDDI Group share includes KDDI, Okinawa Cellular, and UQ Communications; SoftBank Group share includes SoftBank, Y!Mobile, and Wireless City Planning.
The gap has been increasing (Figure 6-2-2-6). Over the last year, reaching an average of 1815.6 Gbps over the last year, continuing the increase in traffic from the same month 1 year ago, this was a 52.2 percent increase from the same month 1 year ago, continuing the increase in traffic over the Internet (Figure 6-2-2-6).

(b) Transitions in traffic exchanged between ISPs

The traffic exchanged with major domestic internet exchanges (IXs) (B1), the traffic exchanged with domestic IXs (B2), and traffic exchanged with overseas ISPs (B3), data inflow has exceeded outflow in all types. The gap has been increasing (Figure 6-2-2-6).

(c) Estimations in traffic passing over the Internet in Japan

We estimated the total download traffic by broadband service subscribers in Japan from A1 — the traffic of ISPs — broadband service subscribers (DSL, FTTH, CATV, FWA) — and the percentage of ISPs' subscriptions among all broadband subscriptions in Japan. This estimate found that an average of approximately 8.3 Tbps of traffic passed over the Internet during November 2016. This was a 52.2 percent increase from the same month 1 year ago, continuing the increase in traffic over the Internet (Figure 6-2-2-6).

(d) Mobile communication traffic

Mobile communication traffic increased at a pace of about 1.4 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 communication carriers (NTT Docomo, KDDI, SoftBank, UQ Communications, and Wireless City Planning) worked together to tabulate and analyze data on mobile communication traffic volumes (non-voice traffic). According to this group's figures, as of March 2016 mobile communication traffic increased about 1.4 times over the last year, reaching an average of 1815.6 Gbps (Figure 6-2-2-7).

### Figure 6-2-2-5 Transitions in subscriptions to MVNO services (excluding MVNOs that are MNO)

Prepared from " Announcement of Quarterly Data on Telecommunication Service Contracts and Market Shares (4Q of FY 2016 (March 31, 2017)) /MIC"

### Figure 6-2-2-6 Tabulations and estimates of Internet traffic in Japan

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Total traffic by broadband service subscribers in Japan (estimated) (Gbps)</th>
<th>Traffic per broadband service subscriber (estimated) (kbps)</th>
<th>[A1] Traffic by broadband service subscribers (DSL, FTTH, CATV, FWA, etc.) (Gbps)</th>
<th>[A2] Traffic by other subscribers (leased lines, data centers, etc.) (Gbps)</th>
<th>[B1] Traffic exchanged between major domestic IXs and ISPs (Gbps)</th>
<th>[B2] Traffic exchanged between overseas IXs and ISPs without passing through major domestic IXs (Gbps)</th>
<th>[B3] Traffic exchanged between overseas IXs and ISPs (Gbps)</th>
<th>[O] ISP share (calculated from subscription number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>May</td>
<td>658</td>
<td>1,730</td>
<td>18.8</td>
<td>49.3</td>
<td>287.8</td>
<td>756.6</td>
<td>251.5</td>
<td>243.0</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>666</td>
<td>1,905</td>
<td>18.9</td>
<td>54.0</td>
<td>294.0</td>
<td>840.3</td>
<td>268.3</td>
<td>257.2</td>
</tr>
<tr>
<td>2013</td>
<td>May</td>
<td>770</td>
<td>2,275</td>
<td>21.7</td>
<td>64.2</td>
<td>347.4</td>
<td>1,027.8</td>
<td>300.3</td>
<td>286.4</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>834</td>
<td>2,582</td>
<td>23.3</td>
<td>72.3</td>
<td>370.0</td>
<td>1,146.3</td>
<td>336.5</td>
<td>326.2</td>
</tr>
<tr>
<td>2014</td>
<td>May</td>
<td>905</td>
<td>2,892</td>
<td>25.2</td>
<td>80.4</td>
<td>398.9</td>
<td>1,274.5</td>
<td>359.2</td>
<td>317.2</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>930</td>
<td>3,552</td>
<td>25.7</td>
<td>98.2</td>
<td>407.6</td>
<td>1,557.6</td>
<td>496.1</td>
<td>426.1</td>
</tr>
<tr>
<td>2015</td>
<td>May</td>
<td>1,086</td>
<td>4,582</td>
<td>29.3</td>
<td>123.5</td>
<td>437.0</td>
<td>1,928.9</td>
<td>525.6</td>
<td>440.2</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>1,051</td>
<td>5,423</td>
<td>28.0</td>
<td>144.5</td>
<td>452.9</td>
<td>2,336.1</td>
<td>581.1</td>
<td>503.6</td>
</tr>
<tr>
<td>2016</td>
<td>May</td>
<td>1,324</td>
<td>6,876</td>
<td>34.8</td>
<td>180.5</td>
<td>551.5</td>
<td>2,863.5</td>
<td>632.7</td>
<td>570.5</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>1,464</td>
<td>8,254</td>
<td>37.9</td>
<td>213.3</td>
<td>602.5</td>
<td>3,396.6</td>
<td>1,246.0</td>
<td>653.6</td>
</tr>
</tbody>
</table>

(Notes) *1 ISP5 is the total for five cooperating ISPs, namely the Internet Initiative Japan (IIJ), NTT Communications, K-Opticom, KDDI, and SoftBank. *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 ISPs broadband service subscribers (A1) and the ISP5 share of all subscriptions O. *4 Estimation by linear interpolation using the data of "Announcement of Quarterly Data on Telecommunication Service Contracts and Market Shares"

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(A) Mobile phones / PHS, BWA

(B) Fixed lines, FTTH, CATV

(C) Satellite, data centers, leased lines

(D) Japan (estimated)

(E) Internet Multifeed, Equinix Japan, Japan Internet Exchange, BBIX, and WIDE Project.
3. State of broadcasting service provision and usage

- Subscriptions to NHK terrestrial, NHK-BS, WOWOW, 110° East CS, and cable TV services in FY 2016 increased from the previous year.
- Subscriptions to all broadcasting services, except 124/128° East CS broadcasts, increased in FY 2016 (Figure 6-2-3-1).
4. Promoting ICT applications in government services

(1) Promoting e-government

The online usage rate increased for procedures handled by national administrative bodies. The usage rate of applications, notifications, and other national administrative procedures filed online was 47.3 percent (261,316,784 procedures were filed online, an increase of 1.9 percentage points from the previous fiscal year). The online usage rate of the improvement promotion procedures frequently used by citizens and enterprises was 43.3 percent (174,681,859 procedures were filed online, an increase of 2.1 percentage points from the previous fiscal year) (Figure 6-2-4-1).

(2) Promoting ICT applications in local governments

The usage rate of local government administrative procedures was 49.1 percent in FY 2015 (Figure 6-2-4-2).

Figure 6-2-4-1 Transitions in the online usage of applications, notifications, and procedures handled by national administrative bodies

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>All application, notification, and other procedure filings</th>
<th>Filings done online</th>
<th>Online usage rate [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improvement promotion procedures</td>
<td>Improvement promotion procedures</td>
<td>Improvement promotion procedures</td>
</tr>
<tr>
<td>2015</td>
<td>552,359,761</td>
<td>403,222,027</td>
<td>261,316,784</td>
</tr>
<tr>
<td>2014</td>
<td>497,521,456</td>
<td>394,918,846</td>
<td>226,076,760</td>
</tr>
<tr>
<td>(Priority procedures)</td>
<td>(Priority procedures)</td>
<td>(Priority procedures)</td>
<td>(Priority procedures)</td>
</tr>
<tr>
<td>2013</td>
<td>475,409,156</td>
<td>432,579,446</td>
<td>209,558,711</td>
</tr>
<tr>
<td>2012</td>
<td>458,496,901</td>
<td>421,297,165</td>
<td>188,960,305</td>
</tr>
</tbody>
</table>

(Source) Prepared from "State of Online Administrative Procedures in FY 2015," MIC press materials

- The total number of applications, notifications, and procedures filed is for those procedures placed online.
- 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. In FY 2014, the improvement promotion procedures accounted for 79.4 percent of all filings made for applications, notifications, and procedures available online. Improvement promotion procedures excluded procedures with high usage rates (90 percent or more) from the priority procedures selected in the New Online Usage Plan, which operated until FY 2013.
- The targeted procedures were those selected for online usage promotion under the E-Local Government Online Usage Advancement Policy.
1. State of radio spectrum 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 2016 increased by 8.8 percent from a year earlier to 217.35 million, including 214.57 million mobile phones and other land mobile stations, a jump of 8.9 percent. Mobile phones and other mobile land stations accounted for a huge 98.7 percent of all radio stations. The number of convenience stations climbed by 6.7 percent to 1.12 million (Figure 6-3-1-1).

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total procedure filings for the year</th>
<th>Filings done online</th>
<th>Online usage rate [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>337,590,000</td>
<td>135,031,153</td>
<td>40.0</td>
</tr>
<tr>
<td>2012</td>
<td>349,000,000</td>
<td>148,496,598</td>
<td>42.6</td>
</tr>
<tr>
<td>2013</td>
<td>367,327,000</td>
<td>165,922,189</td>
<td>45.2</td>
</tr>
<tr>
<td>2014</td>
<td>368,733,000</td>
<td>173,807,766</td>
<td>47.1</td>
</tr>
<tr>
<td>2015</td>
<td>384,473,000</td>
<td>188,831,889</td>
<td>49.1</td>
</tr>
</tbody>
</table>

(Note) The total yearly filings are an estimate for the entire country calculated based on the total number of filings and the populations in the jurisdictions of local governments that had already placed the targeted procedures online.

(Source) “State of Online Administrative Procedures in FY 2015,” MIC

Section 3 Radio Spectrum Usage Trends

1. State of radio spectrum 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 2016 increased by 8.8 percent from a year earlier to 217.35 million, including 214.57 million mobile phones and other land mobile stations, a jump of 8.9 percent. Mobile phones and other mobile land stations accounted for a huge 98.7 percent of all radio stations. The number of convenience stations climbed by 6.7 percent to 1.12 million (Figure 6-3-1-1).

(Note) The total yearly filings are an estimate for the entire country calculated based on the total number of filings and the populations in the jurisdictions of local governments that had already placed the targeted procedures online.

(Source) “State of Online Administrative Procedures in FY 2015,” MIC

Figure 6-2-4-2 Transitions in the usage of local government procedures selected for online-usage promotion

Figure 6-3-1-1 Transitions in the number of radio stations

(a) Other

(b) Base stations

(c) Convenience stations

(d) Amateur stations

(e) Land mobile stations

(f) Land mobile stations

(1) “Land mobile station” refers to a radio station that is operated either while in motion on land or while stationary in an unspecified location (such as mobile phones).

(2) “Convenience station” refers to a radio station used for simple radio communications.
2. Radio surveillance to eliminate interference with key radio communications

- There were 603 reports of interference with key radio communications in FY 2016, and 1,364 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 to 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 accepts interference reports around the clock. Radio authorities also monitor shortwave radio and cosmic radio waves at international radio surveillance facilities registered with the International Telecommunication Union (ITU).

- In FY 2016, there were 2,414 reports of radio interference or obstructions of all kinds, 83 fewer (3.3 percent) than the previous year. Among these, there were 603 reports of interference with key radio communications, 73 fewer (10.8 percent) than the previous year. In response to these reports, 2,235 actions were taken in FY 2016 (Figure 6-3-2-1).

- In FY 2016, 4,441 illegal radio stations were detected, 711 fewer (13.8 percent) than the previous year. In response, 1,364 actions were taken in FY 2016, a decrease of 1,022 actions (42.8 percent) from the previous year. These actions included 168 indictments (12.3 percent of all actions) and 1,196 directives (87.7 percent of all actions).

---

**Figure 6-3-2-1 Transitions in the number of radio station interference / obstruction reports and the number of actions taken in response**

- **Number of actions in response to interference / obstruction reports:**
  - Reports of interference with key radio communications: 512, 684, 512, 684, 572, 639, 561, 480, 547, 608, 771, 875, 683
  - Other interference report: 1,711, 1,991, 2,303, 1,646, 2,344, 1,995, 1,956, 1,746, 1,475, 1,346, 1,211, 1,097

- **Number of actions in response to interference / obstruction reports:**
  - Reports of interference with key radio communications: 2,155, 2,403, 2,745, 3,179, 2,772, 2,389, 2,235, 2,554, 2,346, 2,667, 2,348, 2,235
  - Other interference report: 2,155, 2,403, 2,745, 3,179, 2,772, 2,389, 2,235, 2,554, 2,346, 2,667, 2,348, 2,235

- The number of actions includes incomplete actions remaining from the previous fiscal year.