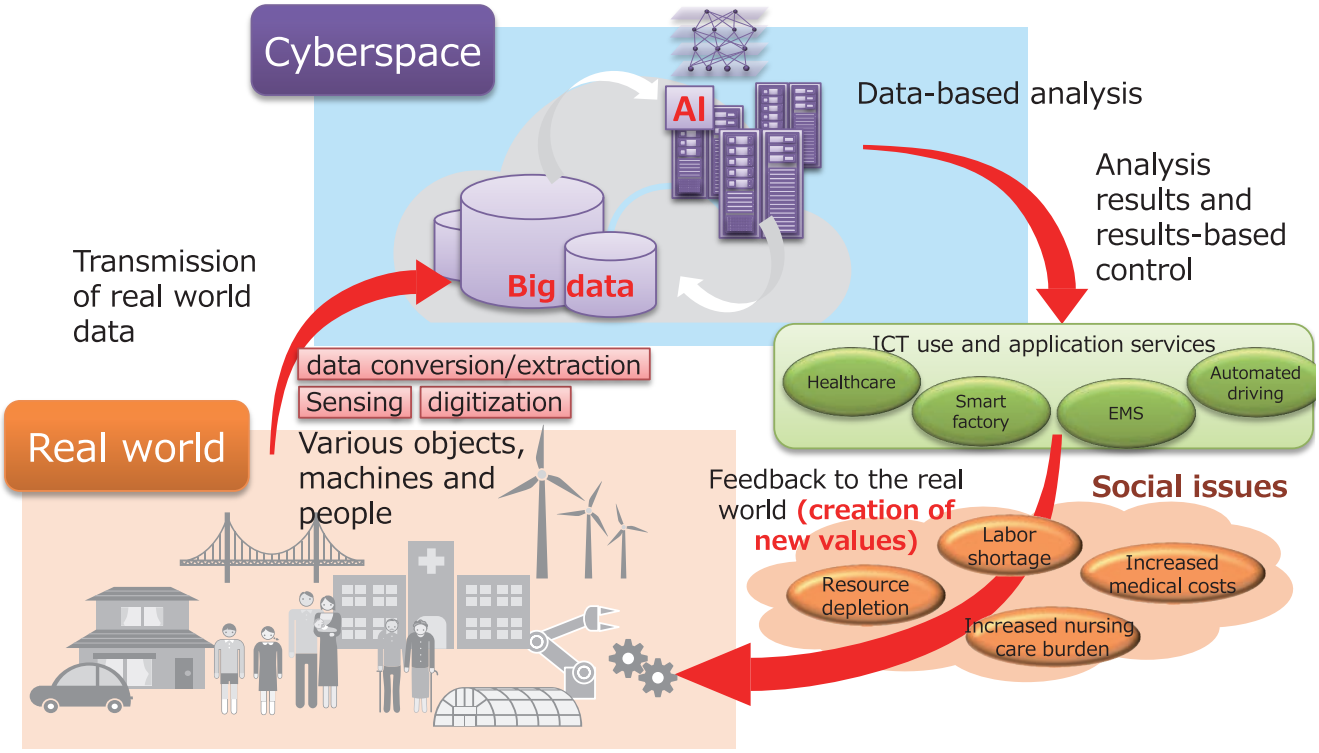
Key Points of the 2016 White Paper on Information and Communications in Japan

Key Points

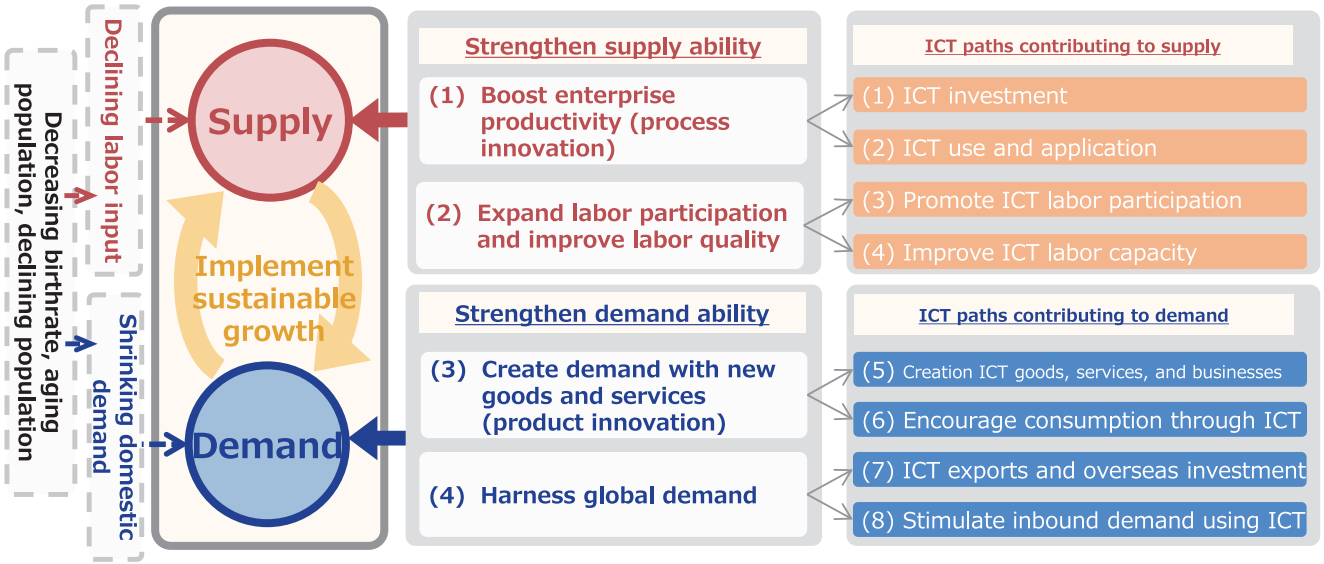
Part 1
Special Theme — IoT, Big Data, and AI: New Values Created by Networks and Data

Chapter 1
ICT-based Innovation and Economic Growth

◯Chapters 1 through 4 cover this year's special theme: IoT, Big Data, and AI: New Values Created by Networks and Data.

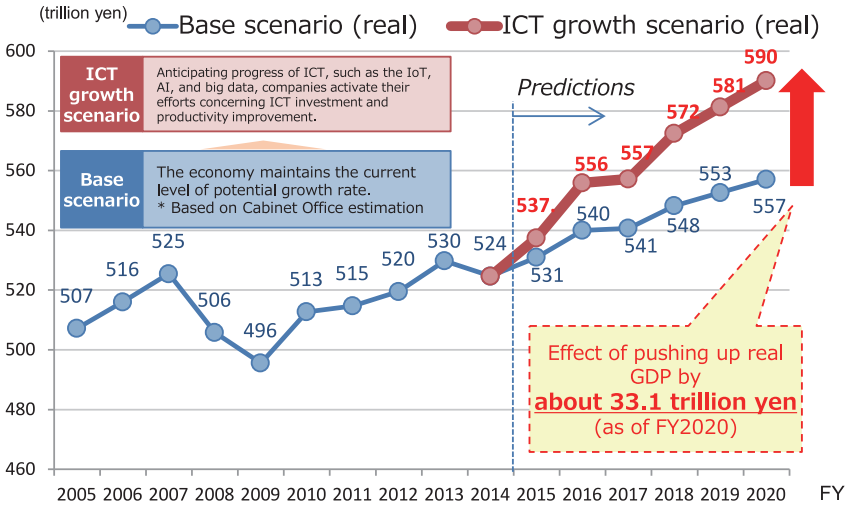


◯Given the decreasing birthrate, aging population, and other issues Japan faces, we classified and analyzed, along eight paths, how ICT contributes to economic growth from the supply side and the demand side.
◯We performed a quantitative analysis on supply-side paths to clarify how much ICT contributes to economic growth.

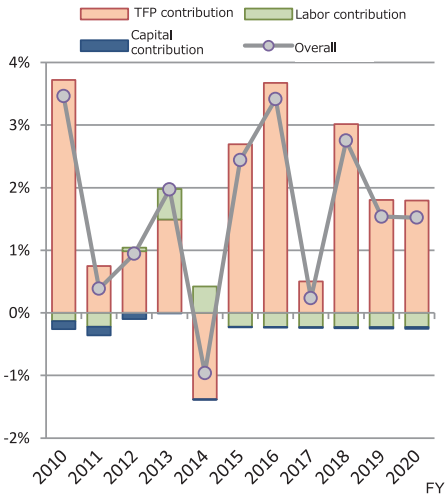


◯**Further ICT investment in the IoT, big data, AI, and other forms of ICT is expected to accelerate Japan's economic growth and boost the country's real GDP by about 33.1 trillion yen by FY 2020.**
◯**Total factor productivity (TFP) is one of the largest growth factors. ICT is expected to further increase the TFP contribution to growth.**

Impact of ICT growth on real GDP



Breakdown of growth factors (ICT growth scenario)



◯**The expansion of ICT use and application in various fields will contribute to creating demand as well as contribute to the supply side.**
Examples: Stimulating consumption through smart homes, EC, and other forms of ICT

◯**ICT also contributes to the creation of non-monetary values (which is not captured with existing statistics)**

Consumer surplus

- Difference between what consumers are willing to pay and what they actually pay
- ICT increases consumer surplus by making products and services cheaper or free

Time savings

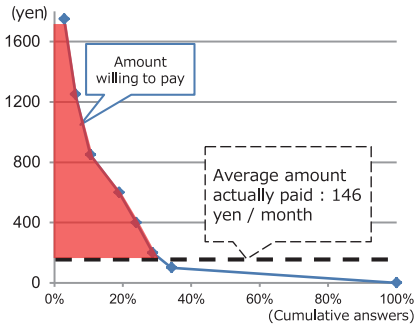
- ICT increases leisure time by saving time spent on daily tasks (searching for information, shopping, etc.)

Information assets

- Consumer social media posts and reviews are useful in selecting products and services and expanding the sharing economy

Sample estimate of consumer surplus

For music and video streaming services, per user in 20s per month

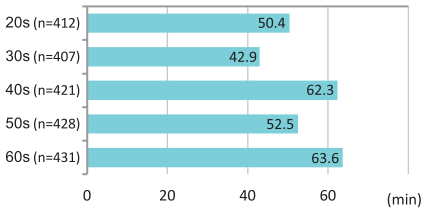


Note: Based on the example above, the annual national consumer surplus for music and video streaming services was calculated to be about 110 billion yen.
(Consumer surplus per user per month for the 20 to 69 cohort was estimated using statistical data on population estimates, Internet user population, and music and video streaming service usage rates.)

Sample estimate of time savings

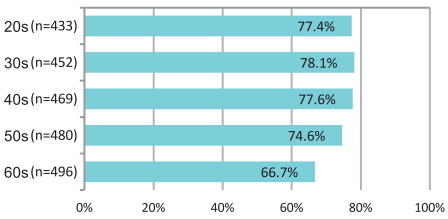
(Online shopping)

Time savings per online shopping event



Information assets and value creation by individuals

Close to 80 percent of people between 20 and 49 refer to reviews when online shopping



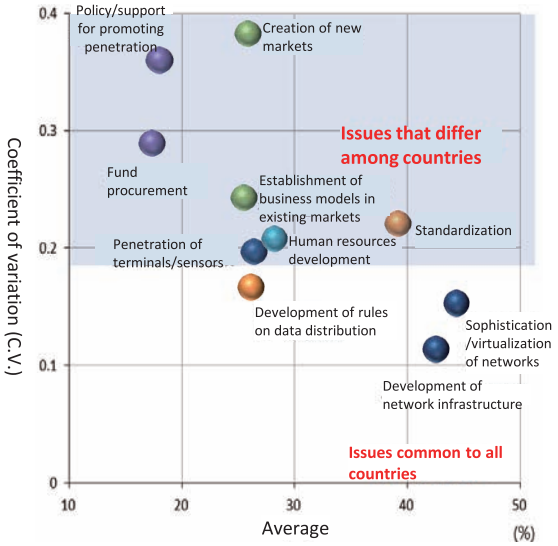
Individual-to-individual transactions and economic activities not possible before are enabled by lenders and renters reading reviews and rating each other. The picture shows a home party held by renting a vacant space.

Key Points

Chapter 2
Analysis of ICT Industrial Trends in the IoT Era

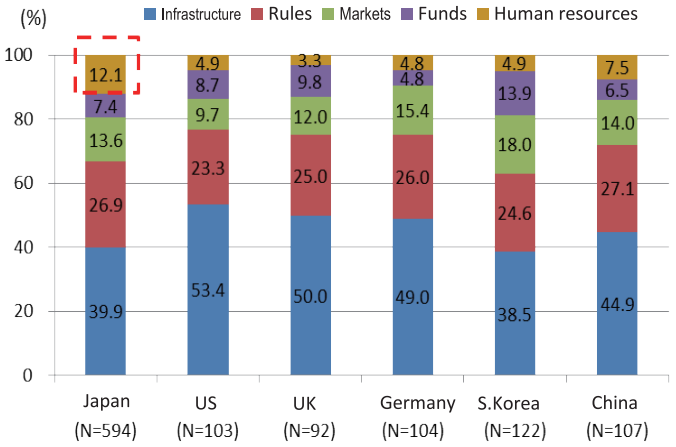
◯On an international survey of enterprises on issues with ICT progress (Japan, United States, United Kingdom, Germany, South Korea, and China), fewer enterprises in Japan had concerns about infrastructure in comparison with the other countries, but many expressed concerns with human resources development.

Average and coefficient of variation of issues concerning IoT progress



* Deviation value divided by the average. When the coefficient of variation is small, the factor is commonly recognized by all countries as an issue, and when the coefficient of variation is large, there are differences among countries as to whether they recognize the factor as an issue.

Gravest issue among issues concerning IoT progress



This figure groups the issues from the figure on the left as follows.

- Human resources: "human resources development"
- Funds: "policy/support for promoting penetration" "fund procurement"
- Markets: "creation of new markets" "establishment of business models in existing markets"
- Rules: "development of rules on data distribution" "standardization"
- Infrastructure: "sophistication/virtualization of networks" "development of network infrastructure" "penetration of terminals/sensors"

◯Japan's IoT advancement index is low in comparison with its infrastructure build-out. This suggests a need for measures to promote IoT use and application, such as training personnel and presenting IoT usage scenarios to user enterprises.

International comparison of IoT progress

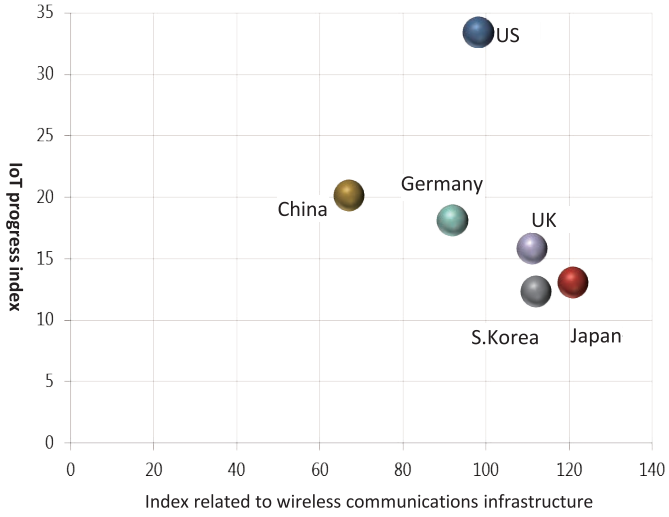
IoT progress index
(Index which comprehensively represents the status of operational efficiency improvement (process) and development/provision of new goods/services that stimulate latent demand (product) achieved by using the IoT)

IoT progress index (based on a questionnaire survey of companies)	weight
Process	
Rate of introducing IoT solutions	0.25
Amount of IoT-related capital investment by companies that have introduced IoT solutions (percentage of total sales)	0.25
Product	
Rate of providing IoT goods/services	0.25
Amount of sales of IoT goods/services by companies that provide IoT goods/services (percentage of total sales)	0.25

Status of development of infrastructure for wireless communications

Index related to wireless communications infrastructure (ITU*)	weight
Mobile-cellular telephone subscriptions per 100 inhabitants	0.5
Active mobile-broadband subscriptions per 100 inhabitants	0.5

* Source: "ICT Development Index," ITU.



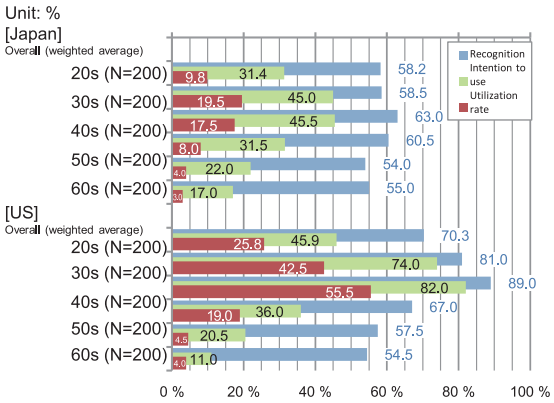
Chapter 3
New Products and Services in the IoT Era

Key Points

◯FinTech and the sharing economy have emerged as two new services symbolizing the IoT era. Examples are beginning to appear of these services contributing to new value creation and problem solving.
◯Intention to use and actual use of these services are most advanced in the United States, by country, and among the youth, by age bracket.

FinTech

Example of awareness, intention to use, and usage rates (FinTech asset management service)



The sharing economy

Sharing economy mechanisms (vacation rentals)

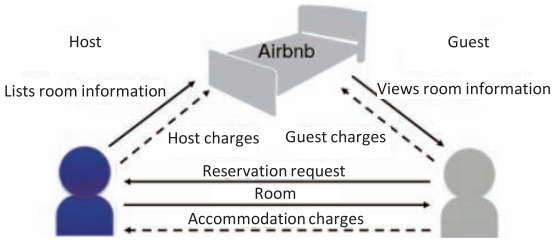
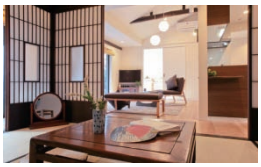


Image of a room listed on a vacation rental



Wearable devices

Promote the use of wearable devices from the services field (examples of applications in tourism and security)

Service robots

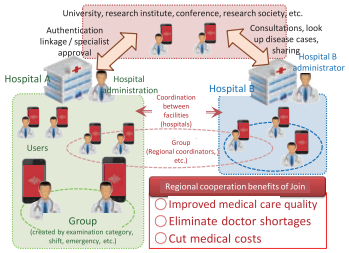
Kibiro communication robot ↙

HOSPI, a robot that transports medicine and samples in a hospital→

◯ICT contributes to solving social issues

Medical care sector

Join, a mobile app for medical practitioners



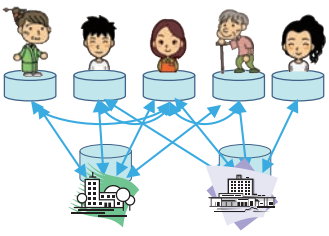
Education sector (Study Suppli)

Members can use more than 3,000 video lessons by top-notch instructors for 980 yen a month. Provides many students with opportunities to learn. Expanding overseas as well.

→ **Attention is focusing on the possibilities of blockchain and other distributed management technologies as ways of using and distributing data while ensuring security and low costs**

Distributed management of personal data by individuals

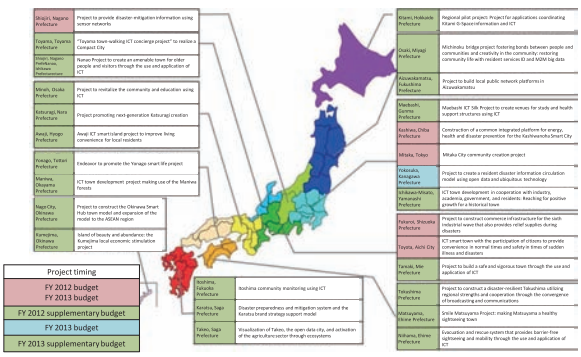
Share data with healthcare providers or other individuals when necessary



◯ICT contributes to regional revitalization

ICT Town Development Promotion Projects (FY 2012 to 2014)

- Implemented model projects (outsourced) based on plans submitted by communities for three years, starting in FY 2012
- Sequentially extended the results from the pilot projects carried out in 27 locations nationwide

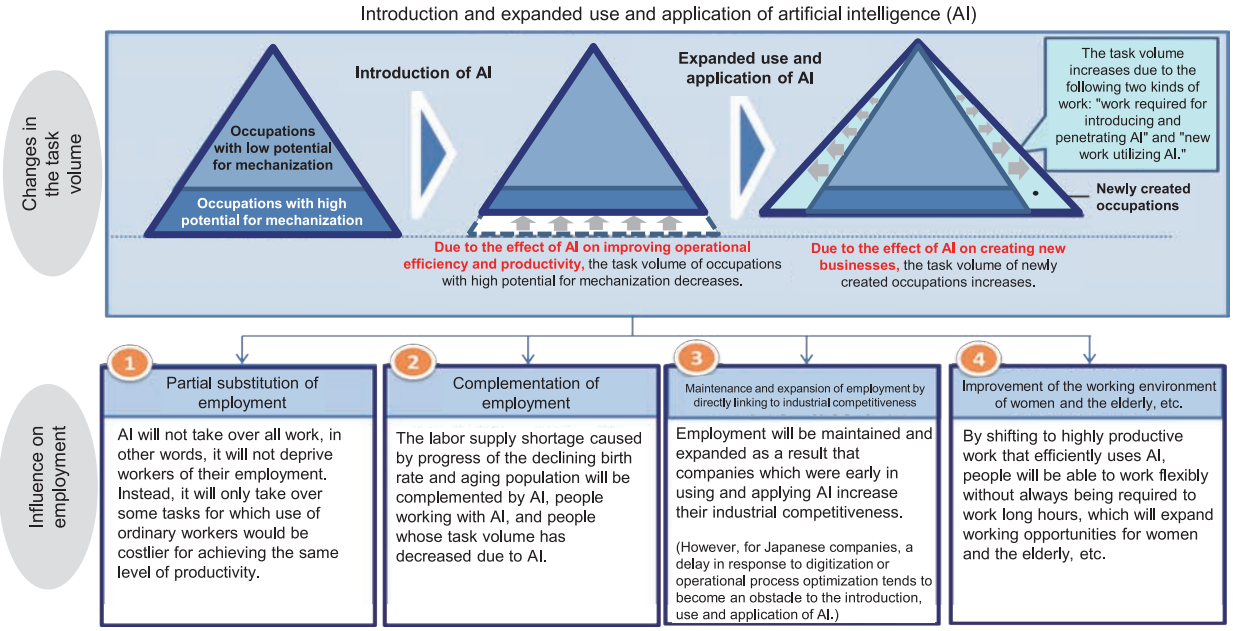


Key Points

Chapter 4
ICT Progress and Future Work Styles

◯Artificial intelligence adoption is expected to increase the volume of tasks in jobs needed to introduce and expand AI and new jobs that make use of AI.

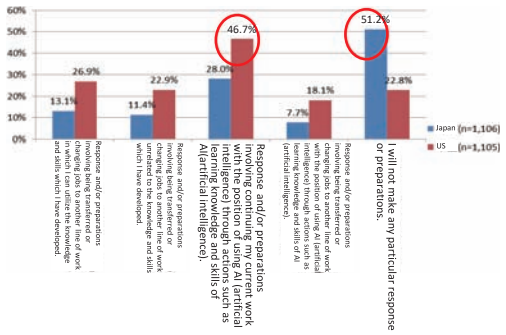
Envisioned impact of AI adoption on employment



◯Compared to U.S. workers, Japanese workers are noticeably behind in preparing for AI and have low motivation to acquire skills to use AI.

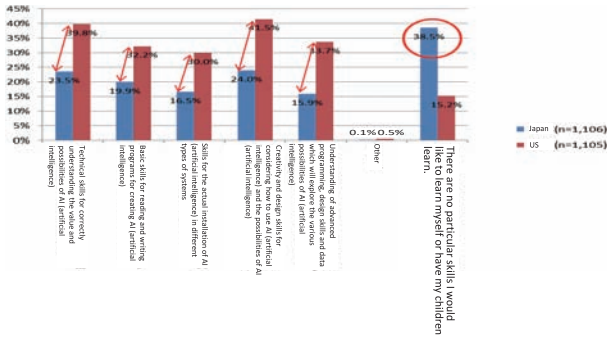
Preparations to handle future AI growth

- More than half of Japanese workers said "I'm not doing anything specific to prepare for or deal with AI."



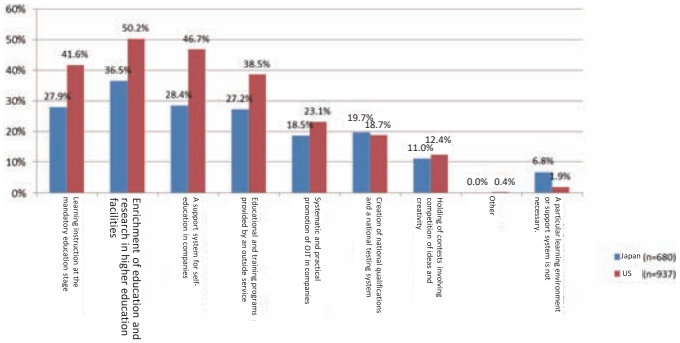
AI application skills respondents wish to obtain or wish their children to obtain

- On all items, Japanese workers were less motivated than U.S. workers to obtain AI application skills.



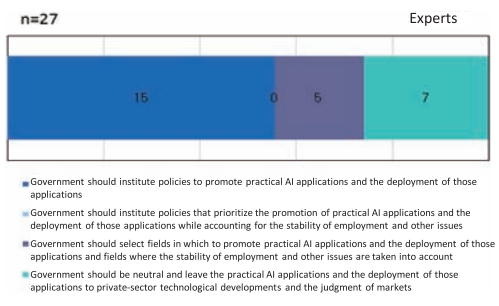
Need for a learning environment and support systems for learning skills for using AI

- Many Japanese and U.S. workers said it is necessary to "enrich education and research at higher education facilities."



Roles expected of government in promoting AI research and development and spreading AI in society

- More than half of domestic experts answered "government should institute policies to promote practical AI applications and the deployment of those applications."



Part 2
Basic Data and Policy Directions

Chapter 5
Basic Data on the ICT Field

Key Points

ICT Industry Trends

◯Japan's ICT industry's market size was 84.1 trillion yen, accounting for about 8.7 percent of all industries, the largest share of any industry. The ICT industry employed 4.124 million people, 7.2 percent of all industries in 2014.

◯The ICT industry's real GDP accounted for 10.8 percent of all industries in 2014, making it the largest of all major industries.

Figure: Market sizes of major industries (based on nominal domestic production) (2014)

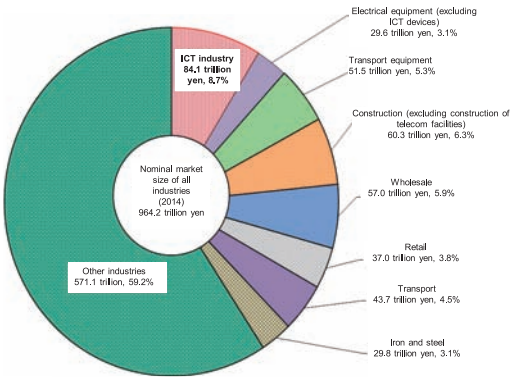
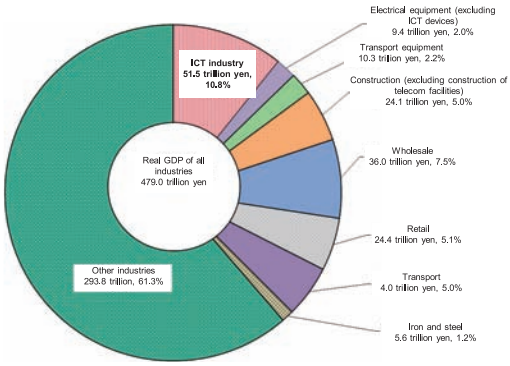


Figure: Real GDP of major industries (2014)



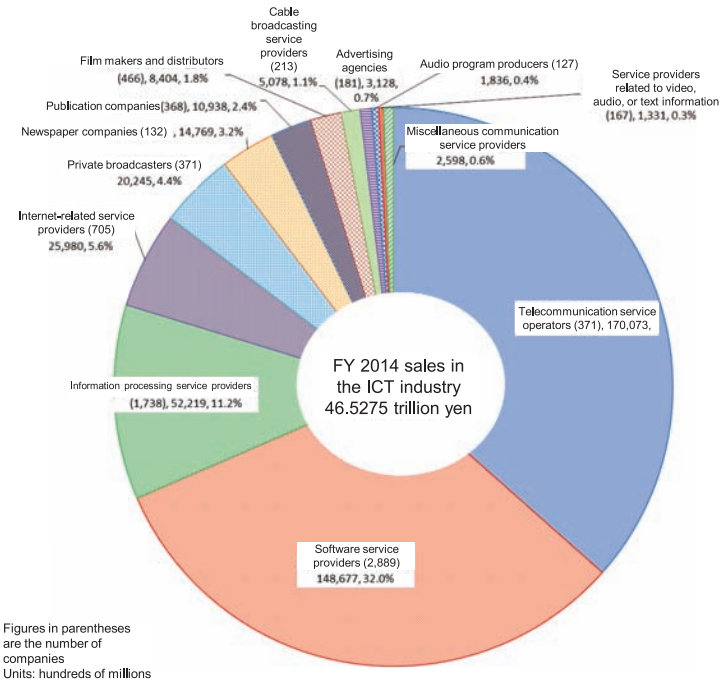
Research and development in the ICT field

◯The ICT industry spent 4.0493 trillion yen on research in FY 2014, accounting for 29.8 percent of all corporate research spending, and employed 182,730 researchers, or 36.1 percent of all corporate researchers in Japan.

State of ICT enterprise operations

◯There were 5,519 enterprises engaged a ICT business with FY 2014 sales of 46.5275 trillion yen.

Figure: ICT industry sales



Figures in parentheses are the number of companies
Units: hundreds of millions of yen

Key Points

Internet usage trends

◯The number of Internet users at the end of 2015 rose 0.3 percent year-on-year to 100.46 million. The penetration rate among the general population was 83.0 percent, the same as last year-end. The percentage of households owning smartphones climbed 7.8 percentage points year-on-year to 72.0 percent.

Figure: Transitions in the number of Internet users and the penetration rate among the general population

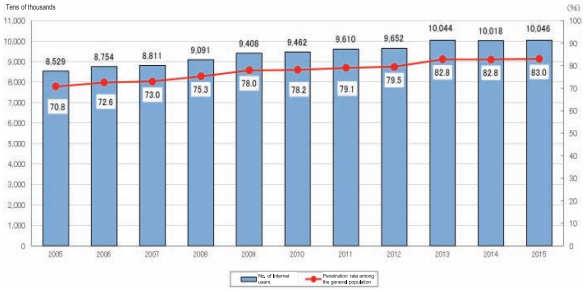
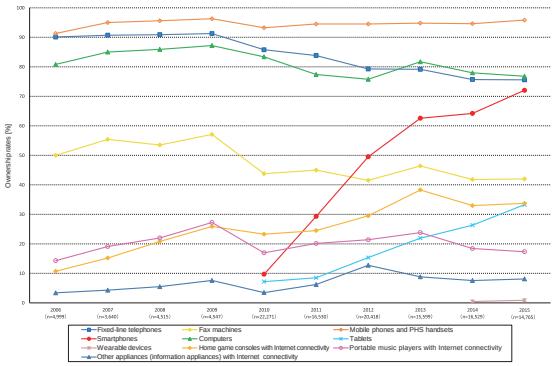


Figure: Transitions in household ownership rates for ICT devices



Cloud service usage trends

◯The percentage of enterprises using cloud services at the end of 2015 rose to 44.6 percent from 38.7 percent at the end of 2014. The most commonly used service was E-mail.

Figure: State of cloud service usage in Japan

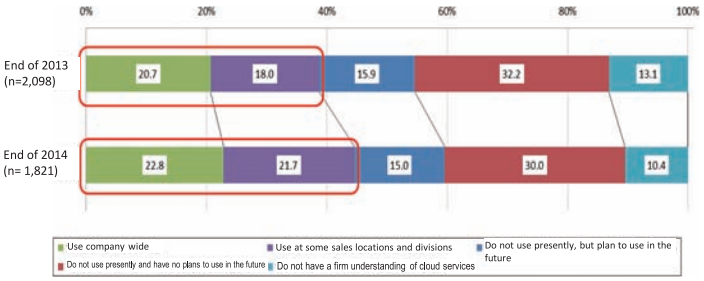
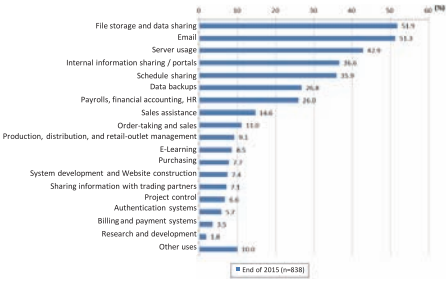


Figure: Breakdown of cloud service usage



Telecommunications business

◯Broadband development and usage in Japan are progressing every year. Ultra-high-speed broadband services were available at 99.98 percent of Japanese households at the end of March 2015.

◯Subscriptions to fixed-line broadband services at the end of FY 2015 stood at 37.81 million, and subscriptions to mobile ultra-high-speed broadband services broke down into 87.39 million for 3.9G and 4G mobile phone (LTE) services and 35.21 million for BWA services.

Figure: Transitions in the provision of broadband infrastructure

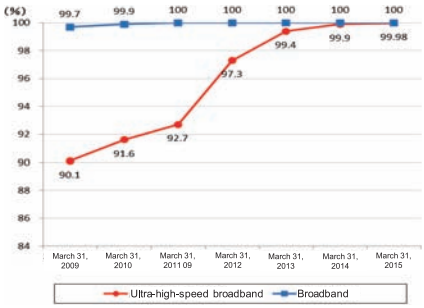
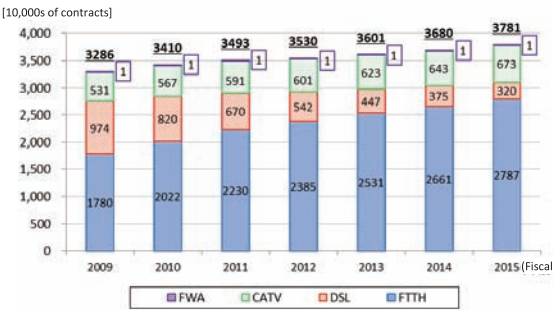
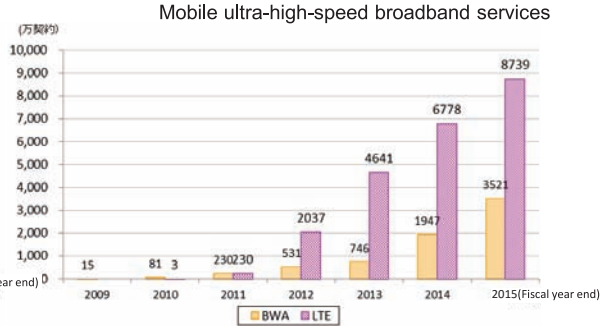


Figure: Transitions in broadband service subscriptions

Fixed-line broadband services



Mobile ultra-high-speed broadband services



Broadcasting business and content market

◯Broadcaster sales in FY 2014 were 3.8795 trillion yen. The share of terrestrial-based broadcasters continued to expand from the previous fiscal year.
◯The Japanese content market was valued at 11.4722 trillion yen, which broke down to 54.4 percent from video content, 39.0 percent from text-based content, and 6.5 percent from audio-based content.
◯The market for online content for PCs or mobile phones was 2.7385 trillion yen, accounting for 23.9 percent of the entire content market.
◯The export value of Japanese broadcast content was 18.25 billion yen in FY 2014.

Figure: Transitions in and breakdown of the broadcasting sector market size (total sales)

Figure: Breakdown of Japan's content market (2014)

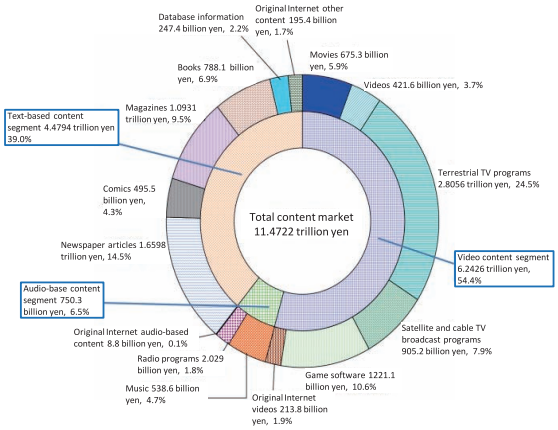
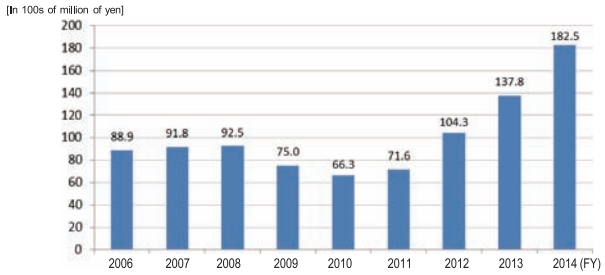


Figure: Export value of Japanese broadcast content

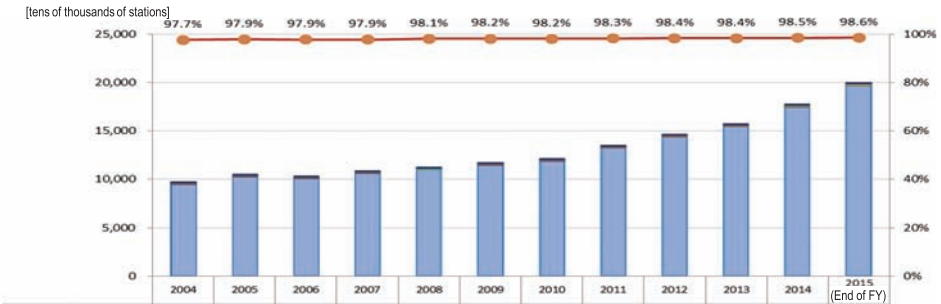


Note: Export value of broadcast content: total export value of program broadcast rights, Internet distribution rights, video and DVD rights, format and restaging rights, merchandising rights, and similar rights.
Note: From FY 2010 onward, the export value from other revenue streams has been included along with program broadcast rights in the export value of broadcast content. Figures prior to FY 2010 are the export value for program broadcast rights only.

Radio spectrum use

◯The number of radio stations in Japan continued to increase, reaching 199.84 million at the end of FY 2015 (a year-on-year increase of 12.6 percent). This total included 197.11 million mobile phones and other land mobile stations (a year-on-year increase of 12.7 percent). This category accounted for a huge 98.6 percent of all radio stations.

Figure: Transitions in the number of radio stations



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 (End of FY)
Other	34	36	41	49	49	48	46	43	46	50	50	55
Base stations	67	62	62	63	41	41	54	58	63	68	71	70
Convenience stations*2	64	65	66	68	70	72	74	77	84	90	97	105
Amateur stations	60	56	53	51	49	47	45	44	44	44	44	44
Land mobile stations*1	9,439	10,212	10,059	10,573	10,993	11,448	11,879	13,266	14,388	15,472	17,493	19,711
Percentage of land mobile stations	97.7%	97.9%	97.9%	97.9%	98.1%	98.2%	98.2%	98.3%	98.4%	98.4%	98.5%	98.6%

Key Points

Chapter 6
ICT Policy Directions

Comprehensive strategy promotions

○The Japanese cabinet decided the Japan Revitalization Strategy in June 2013. In the revised strategy, the directions to be promoted in the ICT field to ensure further growth of the nation and the economy include addressing issues centered on IoT, big data, the AI era, competition in the mobile market, and realizing the world's most advanced communications infrastructure.

Developments in telecommunications business policy

○MIC policies in this area include promoting mobile services, increasing the use of optical networks, promoting the establishment of free public Wi-Fi installations, revising and enhancing consumer protection rules, and ensuring the correct handling of personal and user information.

Developments in radio policy

○MIC policies in this area include promoting effective radio spectrum use, examining 5G mobile communications systems, promoting advanced Intelligent Transport Systems, and establishing radio usage environments.

Developments in broadcasting policy

○Some of MIC's policy efforts in this area include encouraging the distribution of broadcast content, advancing broadcast services, and reinforcing broadcast networks.

Promoting ICT use and application

○MIC promotes ICT use and application in education, healthcare, and other fields as well as regional stimulation using ICT platforms, ICT human resources development, and cyber security measures.

Promoting ICT research and development

○MIC will promote research and development from FY 2016 onward based on the July 2015 interim report by the Information and Communications Council. R&D topics include common IoT platform technologies, next-generation optical network technologies, multilingual voice-based translation technologies, next-generation artificial intelligence, and space communications technologies.

Promoting international ICT strategies

○MIC encourages the overseas adoption of Japan's standard for terrestrial digital TV (ISDB-T) and the export of Japanese ICT systems (such as disaster-response systems) to ASEAN and Central and South American countries, as well as promotes various multilateral and bilateral contributions and collaborations.

Promoting ICT applications in government services and disaster preparedness

○In addition to promoting e-local governments through the adoption of the Local Government Cloud, MIC promotes the application of ICT in the disaster preparedness field, such as establishing resilient fire, safety, and disaster preparedness communications networks and establishing a national early-warning system (J-ALERT).

Developments in postal service administration

○MIC ensures the universality of postal services while steadily promoting Japan Post privatization. MIC is also putting energy into the overseas deployment of postal infrastructure systems using Japan's superb postal business knowledge.