

Section 4 2005 to 2015: Rapid Penetration of ICT - Expansion of Broadband and Mobile Phone Utilization

The launch of iPhones spread worldwide, and both Apple and Google, providing OS for smartphones, established their position as global platformers. In Japan too, networks were further upgraded, smartphones spread rapidly and the use of mobile devices expanded widely, which was partially because various services were developed and provided as applications on smartphones. We name the period from 2005 to around 2015 as the **“Rapid Penetration of ICT - Expansion of Broadband and Mobile Phone Utilization”** and provide an overview of the situation of the ICT sector during this period.

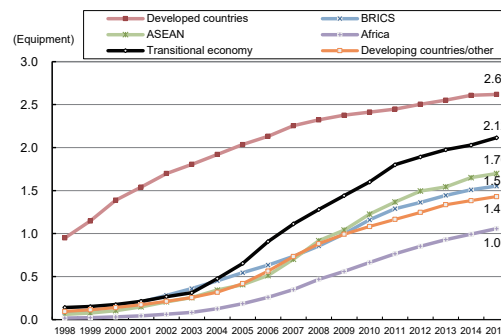
1. International Situation and Trends Outside of Japan

From the latter half of the 2000s, emerging countries began to rapidly increase their presence as exemplified by the increasing share of China and South American countries in the world's GDP. In particular, the fall of Japan's GDP to third place in the world behind China in 2010 symbolized the rise of emerging countries.³⁵

In the mid-2000s, the **spread of mobile phones accelerated in emerging and developing countries as**

well (Figure 1-4-1-1). The Internet diffusion rate, which in 2000 was 6.5% worldwide and under 10% in more than half of all countries, reached 38.5% in 2013. The number of subscriptions increased 3.1-fold in Japan, the United States, Canada and Europe from 2000 to 2013 and 16.6-fold in emerging/developing countries in the same period.³⁶ The internet spread rapidly in emerging/developing countries.

Figure 1-4-1-1 Changes in ICT equipment amount per capita by region



*ICT equipment amount is the sum of the number of fixed landline telephone lines, mobile phone subscribers, fixed broadband internet connections, internet users and households owning computers divided by the population.

(Source) Noguchi et al. (2018)³⁷

The upgrading of mobile networks (the expansion of broadband) expanded the use of the Internet via mobile phones.

In 2007, **sales of iPhones** started in the United States. The potential of smartphones to enable the use of

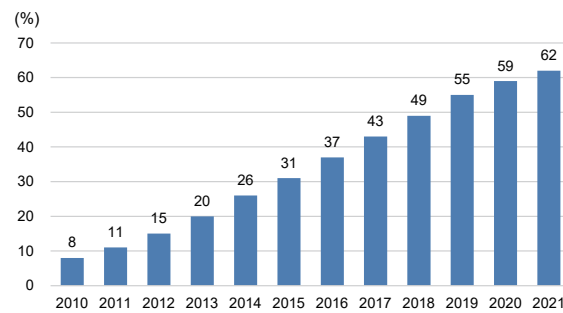
various contents and applications attracted global attention, and manufacturers followed suit by introducing their products one after another. As a result, **smartphones came to take the principal position in the mobile phone market (Figure 1-4-1-2).**

³⁵ https://www5.cao.go.jp/jj/wp/wp-je11/h02_01.html

³⁶ See 2015 Information and Communications White Paper Chapter 2 Section 3
<https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/h27/html/nc123210.html>

³⁷ NOGUCHI Masato, WASHIO Satoshi, SHINOZAKI Akihiro (2018) “Global transformation from digital divide to digital dividends – Long-term observation using 2015 global ICT data base”, InfoCom Research Inc., Infocom Economic Study Discussion Paper Series, No. 6
https://www.icr.co.jp/service/infocom-ict/download/discussion-paper/pdf/2018/DP_06_201806.pdf

Figure 1-4-1-2 Transitions in the spread of smartphones in the world

(Source) Prepared based on Statista³⁸

In tandem with the global spread of smartphones, **the marketing of content and applications** for end users (e.g. games, video/music streaming, maps, social media, search apps) **rapidly expanded**. As a result of this expansion, platform services that gather these con-

tents/applications also rapidly emerged. Within this process, a few **global platformers** who succeeded in gathering important contents/applications **started to increase their market power**.

2. Trends in the ICT sector of Japan

During this period, Japan also saw the **further upgrading of network infrastructure and progression in the diversification of services**, and **smartphone use rapidly spread**.

In the fixed telecommunication network sector, the spread of **faster FTTH** using optical fiber **progressed**. The total number of FTTH subscriptions reached 13.76 million in 2007, overtook DSL in fiscal 2007 and reached 28.79 million in fiscal 2015 (**Figure 1-4-2-1**). Areas where broadband is available also expanded during this period. The ratio of households that can use FTTH or other fixed ultrafast broadband³⁹ was 83.5% at the end of March 2007, and reached 99.0% at the end of March 2015.

The upgrading and expansion of mobile communication networks also continued: LTE services were launched in 2010 and the number of subscribers with 3.9-4th generation mobile phones (LTE) reached 87.39

million at the end of fiscal 2015.⁴⁰

With the speeding up and capacity enlargement of communication networks, an environment was gradually developed to post and view videos and other large volume contents, and services on the Internet were further diversified.

In 2008, iPhone was also launched in Japan and there was a remarkable **shift to smartphones** (**Figure 1-4-2-2**). As described above, a smartphone enables use of various original content and applications via a mobile OS. Users can select services from among diverse content/applications including games, video/music streaming, maps, social media and search services regardless of hardware, **which greatly expanded the uses of mobile devices**.

Figure 1-4-2-1 Changes in the number of fixed broadband subscriptions in Japan

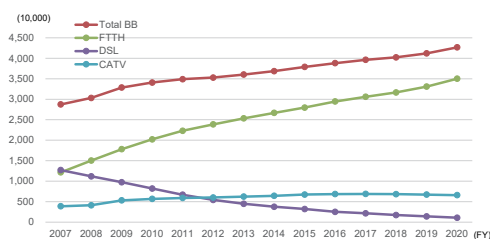
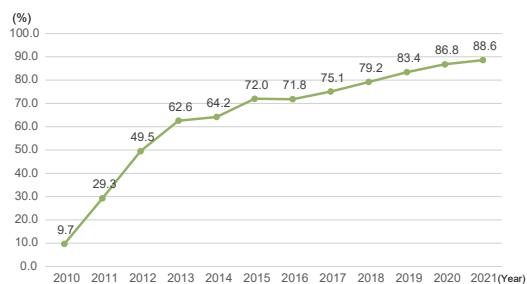
(Source) MIC "Information & Communications Statistics Database"⁴¹

Figure 1-4-2-2 Changes in the ratio of households with smartphones

(Source) Prepared from MIC "Communications Usage Trend Survey"⁴²³⁸ <https://www.statista.com/forecasts/1146202/smartphone-penetration-forecast-in-the-world>³⁹ Here, "fixed ultrafast broadband" refers to "FTTH, CATV Internet (downlink speed over 30Mbps)" as of the end of March 2007, and "FTTH, CATV Internet, FWA (downlink speed over 30Mbps except FTTH)" as of the end of March 2015.⁴⁰ <https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/h28/html/nc252210.html>⁴¹ <https://www.soumu.go.jp/johotsusintokei/field/tsuushin02.html>⁴² <https://www.soumu.go.jp/johotsusintokei/statistics/statistics05.html>

Around this time, **vertical separation and horizontal integration of layers** further progressed in the communications market of Japan as well. While amid the diversification and globalization of the markets, domestic businesses were also providing various online services, including search and internet shopping services, in the upper layers as mentioned above, Google, Amazon and other **global platformers** that provide various application services and functions for smartphone users **increased their influence** in the Japanese market as well.

In addition, against the background of the expansion of broadband as well as the downsizing, lower prices and high functionality of sensors, IoT started to spread during this period. Beyond conventional communication equipment, such as personal computers and smartphones, the concept of connecting **everything**, including equipment and daily necessities that had never been equipped with communication functionality before, such as cars, televisions, air conditioners, refrigerators, buildings and factories, **became connected to networks**.

The rapid spread of advanced and diversified ICT services brought about significant convenience in people's lives. However, the use of Internet and mobile phones by young people in this period gave rise to new problems, such as young people becoming involved in crime through the use of online dating services mainly from mobile phones and cyber bullying via underground websites, and this led to growing calls over the need to strengthen countermeasures.

To address this situation, MIC conducted R&D on filtering in cooperation with mobile carriers, and the mobile carriers **started filtering services in 2005**. The Act on the Establishment of an Enhanced Environment for Youth's Safe and Secure *Internet* Use (Act No. 79 of 2008) was enacted in 2008 and enforced in 2009. The act obliges mobile carriers to set a filtering function in mo-

bile phones that are to be used for internet access by young people (younger than 18) before providing the phones in principle.

With increasing phone fraud and other crimes using mobile phones, the Act on Identity Confirmation, etc. Performed by Mobile Voice Communications Carriers for their Subscribers, etc. and Prevention of Wrongful Use of Mobile Voice Communications Services (Act No. 31 of 2005) was enacted in 2005 and fully enforced in 2006 in order to promote subscriber management systems of mobile carriers and to prevent the wrongful use of mobile voice communication services. This act obliges mobile carriers to confirm the identity of subscribers when concluding a contract and at the time of contract transfer.

Furthermore, MIC in cooperation with the Ministry of Education, Culture, Sports, Science and Technology and carriers started **"e-net Caravan" for children to promote the safe and secure use of the Internet**.

With the transition to digital broadcasting, **1seg** for receiving television broadcasting with mobile devices **started** in 2006, and this enabled the viewing of digital broadcasting both outside of home and at home.⁴³

In 2008, NHK was allowed to distribute already broadcasted programs via the Internet for a fee as a "complemental use of broadcasting"⁴⁴ and it started "NHK on Demand" in December of the same year.

In 2011, BS analog broadcasting ended and BS broadcasting fully moved to digital. With **the end of terrestrial analog broadcasting** in all 47 prefectures in 2012, terrestrial broadcasting also **moved to digital broadcasting**.⁴⁵

In addition, in September 2013 NHK started **"hybrid casting,"** a new broadcasting service to provide applications and content via the Internet in conjunction with broadcast programs,⁴⁶ and private broadcasters followed suit from 2014.

⁴³ The 2007 amendment of the Broadcasting Act allowed broadcasting of programs different from ordinary television programs (independent use).

⁴⁴ Based on the 2007 amendment of the Broadcasting Act

⁴⁵ "Provisional project to eliminate poor terrestrial digital television reception through satellite" ended in March 2015. "The digital-analog conversion service" provided by cable TV broadcasters for smooth transition to terrestrial digital broadcasting also ended at the end of April of the same year.

⁴⁶ Use of hybrid cast realizes new broadcasting services fully taking advantage of communication services (bidirectional information exchange, distribution of large-volume contents, etc.) by using Web technologies, which include coordination with smartphones and other mobile terminals and provision of high-definition videos including 4K in addition to the conventional data broadcasting news, weather forecast, program-related information (program summary, etc.) and simple games (questionnaire, quiz, etc.)