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Industry 4.0

A.I.

Drone

2016 KOREA INTERNET WHITE PAPER

Smarthome

Healthcare

Machine Learning

Wearable



Ministry of Science, ICT
and Future Planning



Safe Internet, Happy Future



2016

KOREA INTERNET WHITE PAPER



Notes

- The numbers in the tables of statistics are rounded; therefore, the totals indicated may differ the actual sum of all values.
- The 2016 Korea Internet White Paper is a collection of the domestic and international issues and trends of 2015.





“We will launch the second phase of the Internet in Korea.”

Human civilization has embarked on a journey to overcome the limitations of “time” and “space.” Humankind started to resolve the limitation of “time” by writing and committing their knowledge, wisdom, and experience on paper which was invented in AD 105. The invention of the wheel enabled humankind to overcome the change to limitations of “space,” including speed, distance, and weight. However, with the advent of the U-paperless Society and the Hyper Roof, we are now living in the ICT new technology era in which we can discard paper and the wheel that introduced breakthroughs in human civilization, to usher in enhanced efficiency and development. The phenomenal development of ICT convergence technologies including automated vehicles, artificial intelligence (AI) robots, the Internet of Things (IoT), and virtual reality (VR) have been in the spotlight recently. Advances in these fields demand for the creative destruction of the familiar analogue thinking and system as well as the framework of the future society and world economy.



For these new technologies to expand human capabilities, to contribute to a harmonious realization of mankind's stable and safe civilization in the future society, and to continuously grow the Internet-based digital economy, it is essential to obtain a social consensus and practice for the “human-oriented technology”. The government has been proactively responding to the changes in the ICT ecosystem, including the establishment of the “K-ICT Strategy” and the “K-ICT Security Strategy” policies, the provision of the preliminary approval for Internet banking, the pursuit of global startup programs and IoT demonstration projects, and the improvement of Internet-related regulations.

The Korea Internet White Paper 2016, which is in its 17th publication, provides policies and technical propositions to proactively prepare for “the future Internet society where technologies and mankind interact in harmony,” and to create “a safe ICT industry development environment.” This white paper discusses in depth the future of the digital economy, covering issues such as the changes triggered by ICT convergence technologies including “AI and Industry 4.0,” “VR and 5G,” and “FinTech and IoT,” and new industries that will lead the national economy.

I hope that the Korea Internet White Paper 2016 will serve as a foundation to ensure effective policy-making and effectual project execution as a reliable reference to guide the direction toward proper changes in the future, and accurately reflect the current situation. I would like to thank the authors, the members of the editing committee, and the people who were involved in the publication of a more original and useful white paper for their time and effort.

Baik Keeseung President
Korea Internet and Security Agency

A stylized, handwritten signature in black ink, likely belonging to Baik Keeseung.



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History of Internet in Korea

Internet service was launched in Korea after the establishment of the System Development Network (SDN) in 1982, and it rapidly grew in 1994 when commercial services were launched. In 2013, the number of Internet subscribers in Korea exceeded 40 million. Since then, Korea became the first country to launch the commercial WiBro and HSDPA services in 2006, thus consolidating its position as an Internet powerhouse. Korea has since been striving to become "the world's top smart country," with the launch of the commercial IPv6 and Giga Internet services in 2014.

1981 1989

Industry Service

1981 ~ 1984

1982

- Launched the first Internet service

1983

- Launched the first information search service

1984

- Launched the first commercial email service (Dacom)

1985 ~ 1989

1985

- Launched the email service in Korean
- Launched the PC communication service (Dacom)

1987

- Launched the H-Mail service
- Launched the PC banking service

1988

- Launched a commercial PC communication service (Chollian)
- Launched a private bulletin board service (The FIRST)
- Developed an antivirus software following the first virus (Brain) attack
- Launched the EDI service (Dacom)

Infrastructure

1982

- SDN (TCP/IP) established (Seoul National University - Korea Institute of Electronic Technology)

1983

- Connected to SDN-EUNET/UUCPNET (Technical, academic information exchange network)
- Launched the PSTN data service
- Opened an overseas public data network

1984

- Connected to SDN-CSNET (information science network)
- Opened the PSDN DACOM - Net for the first time

1985

- Connected to the SDN-PACNET (Asia-Pacific academic research network)

1986

- The first IP address (128.134.0.0) assigned in Korean
- Introduced the Korean domain (.kr)

1988

- Connected to the SDN-MHSNET (academic network)

1989

- Launched an educational network (KREN), and a research network (KREONet)
- Established the SDN-HANA network (Korea Telecom: KT)

Policy

1981

- Korea Telecom was established

1982

- Korea Data Communication Corporation was established
- Established the first basic plan for administrative computerization

1983

- Enacted the Framework Act on Telecommunications (used the term 'information communication' for the first time)
- Established the business plan for the key national network project

1984

- Formed the key national network mediation committee

1985

- Established a promotion plan for the national administration network
- Held the first international computer network-related conference (PCCS)

1986

- Enacted the Act on the Expansion and Promotion of the Use of the Information and Communication Network

1987

- The Korea Computerization Agency was launched
- Established the first basic plan for the key national network
- Formed the computer network mediation committee

1994~1996

Launched the commercial Internet service (1994)
The Ministry of Information and Communication was founded (1994)

1997~2000

Launched the commercial broadband Internet service (1998)
The number of Internet users exceeded 10 million (1999)

1990



2000

1990 ~ 1993

1991

- Launched the online issuance service for a copy of the "resident registration"

1994 ~ 1996

1994

- Introduced a commercial Internet service (KT)
- Introduced a text-based MUD game for the first time
- Launched the first government agency websites (Chongwadae, etc.)

1995

- Launched the 'WWW' service
- The first Internet café (Netscape) was opened
- Introduced the Internet newspaper and broadcasting service (Joongang Ilbo and KBS)

1996

- Launched the ISDN Internet service
- Launched the first e-commerce and webzine services
- Introduced the first graphic-based MUG game
- Held an information EXPO

1997 ~ 2000

1997

- Launched the Internet stock trading service
- Launched a free Internet service, including search engine and email services
- Launched the first Internet portal service (Netsgo)

1998

- **Launched the first commercial broadband Internet service (Thrunet)**
- Launched the e-government service

1999

- Launched the ADSL service (Hanaro Telecom)
- Launched online banking services

1990

- The SDN-HANA network was connected to the IP-based Internet in the US

1993

- Launched a comprehensive administrative information network

1994

- Introduced commercial ISPs (KT, Dacom, iNet etc.)

1995

- Established a PC-Internet connection
- Established KIX and launched related services

1996

- Opened a public ISDN network

1997

- Launched a dedicated private circuit service
- Launched high-speed national Internet services
- The number of PC communication users exceeded 3 million

1999

- **The number of Internet users exceeded 10 million**
- The first IPv6 address was designated

2000

- Opened a commercial ATM exchange network
- The Korean ISP Association was founded

1990

- Established the Comprehensive Measures for the Information Society

1992

- Established the second basic plan for the key national network project
- Enacted the Act on Promotion of Information and Communications Network Utilization

1993

- Established the basic plan for the formation of super highway information communication infrastructures

1994

- **The Ministry of Information and Communication was founded**

1995

- Established a comprehensive plan for super highway information and communication infrastructures
- Enacted the Framework Act on Informatization Promotion
- The Korea Internet Safety Commission was founded

1996

- **Established the first basic plan for promotion informatization**
- Organized an informatization promotion committee
- The Korea Information Security Agency (KISA) was founded

1998

- Established an advancement promotion plan for an information and communications network
- Established a plan for the promotion of PC communication and Internet usage

1999

- **Established Cyber Korea 21**
- Enacted the Framework Act on Electronic Commerce and Digital Signature Act
- The Korea Network Information Center (KRNIC) was founded

2000

- Completed the second stage of the super highway communication network project
- Enacted the Software Industry Promotion Law and Knowledge Information Resource Management Act
- Established the guidelines for personal information protection
- Promoted the top 11 initiatives for e-government
- The Korea IT Industry Promotion Agency (KIPA) was founded

2001~2005

Korea was ranked No. 1 for the establishment of its broadband networks (2001)
 Enacted the Information Communications Network Act (2001)
 The number of broadband Internet subscribers exceeded 10 million (2002)
 Established "e- Korea Vision 2006" (2002)
 Established "Broadband IT Korea Vision 2007" (2003)
 Established "IT839 Strategy" (2004)
 The number of Internet users exceeded 30 million (2004)
 Launched commercial VoIP services (2005)

2006~2008

Launched the world's first WiBro and HSDPA services
 Established the basic plan for u- Korea (2006)
 Implemented the Restrictive Identification System (2007)
 The Korea Communications Commission was founded (2008)
 Held the OECD Ministerial Meeting on the future of the Internet economy (2008)

2001



2010

2001 ~ 2005

2006 ~ 2008

2009 ~ 2010

Industry·Service

2001

- The number of online banking users exceeded 10 million
- Introduced the Internet content class service

2002

- The size of the Korean game market exceeded KRW3 trillion

2003

- Launched the VDSL (20Mbps) service
- Launched the mobile banking service
- Launched the Korean.kr service

2005

- **Launched a commercial VoIP service**
- The number of mobile banking subscribers exceeded 1 million

2006

- **Launched the world's first WiBro and HSDPA services**
- The volume of online shopping mall transactions exceeded KRW 13 trillion
- Launched the mobile application service for the issuance of civil affairs documents

2007

- Launched the second-level .kr domain (QuickDom) service
- The total volume of e-commerce transactions exceeded KRW500 trillion

2008

- The number of the .kr domain registrations exceeded 1 million
- The number of online banking subscribers exceeded 50 million
- Launched a commercial IPTV service

2009

- The number of VoIP subscribers exceeded 6.5 million
- The number of mobile banking users exceeded 10 million

2010

- The number of real-time IPTV service subscribers exceeded 3 million
- The number of smartphone subscribers exceeded 7 million
- The amount of Wibro exports reached KRW1 trillion

Infrastructure

2001

- **Ranked as the world's No. 1 in the establishment of the broadband network (OECD)**

2002

- The number of broadband subscribers exceeded 10 million households
- Ranked as the world's No. 1 in the penetration of broadband Internet

2003

- The Internet security incident occurred on January 25th

2004

- The number of Internet users exceeded 30 million
- Promoted the pilot BcN project

2005

- Ranked as the world's No. 1 in the ITU Digital Opportunity Index (DOI)
- Launched a pilot in-flight Internet service (Korean Air)
- Established the international 'WiBro' standards (IEEE)

2006

- Ranked as the world's No. 1 in ITU DOI
- Launched the FTTH service

2007

- Ranked as the world's No. 1 in ITU DOI
- Achieved the international standardization of WiBro/DMB ITU

2008

- The number of broadband Internet subscribers exceeded 15 million
- Expanded the commercialization and coverage of WiBro Wave2

2009

- **Ranked as the world's No. 2 in the ICT Development Index**
- Began the Giga Internet pilot project
- DDoS occurred on July 7th

2010

- Ranked as the world's No. 1 in the UN e-Government Development Index and e-Participation Index
- Completed the BcN foundation establishment project

Policy

2001

- **Implemented the Act on Promotion of Information and Communications Network Utilization and Information Protection**

2002

- Established e-Korea Vision 2006

2003

- Established the Broadband IT Korea Vision 2007

2004

- Established the IT839 strategy
- Established the basic plan for the establishment of BcN

2005

- Established the basic plan for the promotion of IPv6 distribution
- Implemented the real name verification system for Internet civil affairs application

2006

- **Established the basic plan for u-Korea**
- Established the measures for the prevention of the illegal use of other people's names in online gaming and hacking
- Held the first Korea Internet Awards

2007

- Implemented the Restrictive Identification System
- Introduced i-PIN, an alternative measure for RRN registration
- The Korea IT International Cooperation Agency (KIICA) was founded

2008

- The Korea Communications Commission was founded
- Held the OECD Ministerial Meeting on the future of the Internet economy
- Enacted the Internet Multimedia Services Act

2009

- **The Korea Internet and Security Agency (KISA) was founded**
- Established a mid- to long-term broadcasting communication network development plan
- Established the primary and secondary wireless Internet activation promotion plan
- Held the 36th ICANN meeting in Seoul
- Established the comprehensive cloud computing activation plan

2010

- "☎118 Counseling Center" was founded
- Established the IPv6 transition promotion plan
- The Internet Cooperation Forum was founded
- Established a comprehensive promotion plan for the activation of the Internet ad market
- The Korea Internet Dream Star was founded

2009~2010

Ranked No. 2 in the ICT Development Index (2009)
Ranked No. 1 in the UN e-Government Development Index and e-Participation Index (2010)
The number of smartphone subscribers exceeded 7 million (2010)

2011~2012

Launched a commercial LTE service (2011)
Celebrated the 30th anniversary of the launch of the Internet in Korea (2012).

2013~2014

The number of domestic Internet users exceeded 40 million (2013)
Launched a commercial IPv6 service (2014)
Launched a Giga Internet service (2014)

2015

The number of online banking users exceeded 110 million
Ranked No.1 in the OECD Open, Useful, Reusable (OUR) Data Index
Established the K-ICT strategies
Enacted the Cloud Development Act and Information Protection Industry Promotion Act

2011

2011~2012

2011

- **Launched a commercial LTE service (SKT/LG U+)**
- Launched the "[Korea]" domain service
- The number of smartphone subscribers exceeded 20 million
- The number of online banking users exceeded 70 million
- The number of mobile banking users exceeded 20 million

2012

- The number of smartphone subscribers exceeded 30 million
- The number of IPTV service subscribers exceeded 6 million
- The number of LTE subscribers exceeded 15 million

2013~2014

2013

- **The number of domestic Internet users exceeded 40 million**
- The number of domestic mobile messenger (KakaoTalk) users exceeded 120 million
- Domestic mobile messengers started entering the foreign markets (Line, etc.)

2014

- **Launched a commercial IPv6 service**
- The number of IPTV subscribers exceeded 10 million
- The number of LTE subscribers exceeded 36 million

2015

- **The number of online banking users exceeded 110 million**
- The number of broadband Internet subscribers exceeded 20 million
- The number of LTE subscribers exceeded 41 million
- The size of the Korea game market exceeded KRW10 trillion

2011

- **Ranked as the world's No. 1 in the ICT Development Index (as of 2010)**
- Established the LBS Business Support Center
- Ranked as No. 1 in the category of the wireless broadband Internet subscribers per 100 people (OECD)
- DDoS occurred on March 4th
- Completed the allotment of IPv4

2012

- Marked the 30th anniversary of the launch of the Internet in Korea
- The number of broadband Internet subscribers exceeded 18 million

2013

- **Ranked as the world's No. 1 in the ICT Development Index (as of 2012)**
- DDoS occurred on March 20th (affecting financial world and broadcasting companies)
- APT occurred on June 25th (affecting government and public agencies)
- Held a bidding for LTE frequencies allotment

2014

- **Launched a commercial Giga Internet service**
- Ranked as the world's No. 1 in the UN e-Government Development Index for three consecutive years
- Connected to the international IPv6 line
- Ranked as the world's No. 2 in the ICT Development Index as of 2013

- **Ranked No. 1 in the OECD OUR Data Index**
- Reclaimed the world's No. 1 ranking in the ICT Development Index as of 2014
- Confirmed the distribution method of 700MHz frequencies
- Korean Internet speed ranked No. 1 for 7 consecutive quarters
- The Korean team won the DARPA Robotic Challenge
- The Korean team won at the DEF CON Hacking Conference

2011

- Established the promotion plan for the activation of the NFC-based mobile smart life service
- Established a pan-government cloud computing policy council
- Implemented the Act on the Protection of Personal Information
- Introduced a mobile ad platform certification system

2012

- The Korea Internet Governance Alliance was founded
- The Day of Information Security was designated (second Wednesday of July)

2013

- **Opened the Phishing Response Center**
- **Launched the Ministry of Science, ICT and Future Planning**
- Enforced the Amendments of the Information Communications Network Act
- The Internet Startup Alliance was founded
- Announced the Guidelines for the Internet Search Service

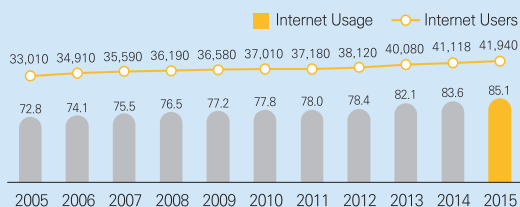
2014

- **Held the ITU Plenipotentiary Conference in Busan**
- The Multilateral Internet Governance Alliance was founded
- Opened the IoT Innovation Center
- Opened the Comprehensive IPv6 Support Center
- Launched the prohibition of RRN
- Launched a TFT for the improvement of e-commerce regulations

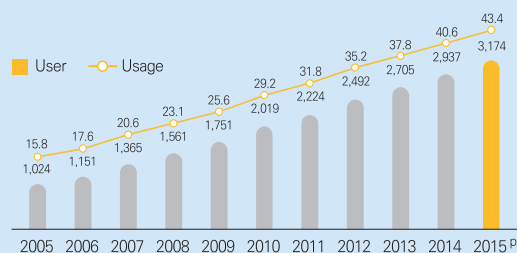
- **Established the K-ICT strategy**
- **Enacted the Cloud Development Act**
- **Enacted the Information Security Industry Promotion Act**
- Approved specialized Internet banks
- Opened the FinTech Support Center
- A private cloud activation regulation improvement bureau was founded
- Confirmed the S/W compulsory education for elementary and middle schools
- The Financial Security Institute was founded



Internet Statistics



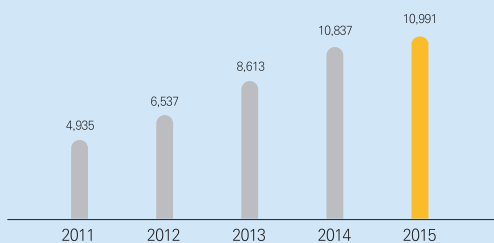
※ 3 years and older [KISA, 2015 Survey on the Internet Usage, 2015]



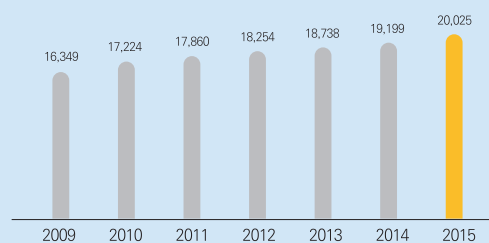
※ p: estimate [ITU, ITU Statistics, 2015]

Domestic Internet Usage and Users (Unit: %, 1,000 persons)

World Internet Usage and Users (Unit: %, 1 million persons)



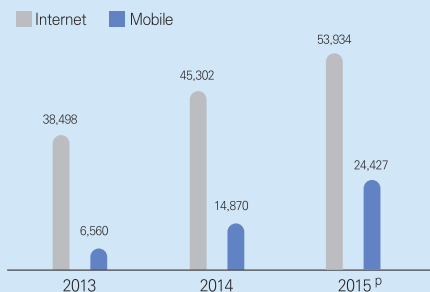
[Korea Association for ICT Promotion (KAIT), 2015 December Trend Report on Key ICT Items, 2016]



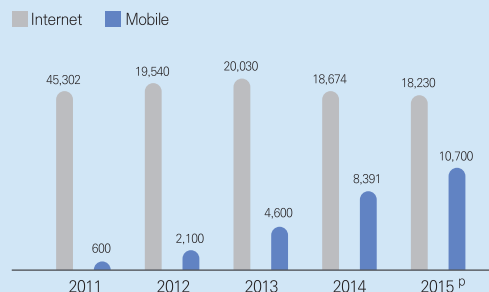
[Ministry of Science, ICT and Future Planning, Broadband Internet Subscribers Status (Revised), 2015]

IPTV Subscribers (Unit: 1,000 persons)

Broadband Internet Subscribers (Unit: 1,000 persons)



※ p: estimate [Korea National Statistical Office, 2015 December and Annual Retail Sales and Online Shopping Report, 2016]



※ p: estimate [Cheil World Wide 2015 Advertising Almanac, 2015]

Online Shopping and Mobile Shopping Transaction Volume (Unit: KRW1 billion)

Domestic Online Ad Sales (Unit: KRW100 million)

Category	2011	2012	2013	2014	2015 ^P	CAGR	YoY Growth
Infrastructure	42,437 (52.1)	43,632 (51.7)	47,664 (51.6)	47,608 (49.4)	43,567 (45.6)	0.7	▽8.5
Supporting Business	11,666 (14.3)	12,769 (15.1)	13,182 (14.3)	15,568 (16.1)	16,492 (17.3)	9.0	5.9
Application Industry	27,345 (33.6)	27,973 (33.2)	31,507 (34.1)	31,507 (34.5)	35,456 (37.1)	6.7	6.5
Total	81,448	84,374	92,353	96,456	95,515	4.1	▽1.0

※ P: estimate, (portion)

[KAIT, ICT Survey and Trend Report on Key ICT Items, 2016]

Category	2013		2014		2015		YoY Growth
	Revenue	Composition	Revenue	Composition	Revenue	Composition	
Content	5,864	19.9	6,457	20.1	6,894	19.8	6.8
Solution	2,705	9.2	3,034	9.4	3,466	9.9	14.2
Service	20,901	70.9	22,650	70.5	24,491	70.3	8.1
Total	29,470	100.0	32,141	100.0	34,851	100.0	8.4

[National IT Industry Promotion Agency, 2015 e-Learning Industry Survey (Revised), 2016]

Domestic Internet Industry Revenues (Unit: KRW1 billion, %)

Category	2012	2013	2014	YoY Growth
Online Game	6,783,902	5,452,283	5,542,468	1.7
Mobile Game	800,922	2,327,680	2,913,646	25.2
Video Game	160,869	93,617	159,806	70.7
PC Game	68,000	37,967	33,668	▽11.3
Arcade Game	79,113	82,492	52,848	▽35.9
Total	7,892,806	7,994,039	8,702,436	8.9

[Ministry of Culture, Sports, and Tourism Korea Creative Content Agency, 2015 Content Industry Statistics, 2016]

Revenue of e-Learning Service Providers (Unit: KRW100 million, %)

Category	2012	2013	2014	Sales Portion (%)	YoY Growth
Internet Mobile Comics Content Production and Distribution (CP)	15,644	18,017	21,564	21.3	19.7
Internet Comics Content Service	36,319	46,641	59,482	58.8	27.5
Mobile Comics Content Service	13,406	16,566	20,153	19.9	21.7
Total	65,369	81,224	101,199	100.0	24.6

[Ministry of Culture, Sports, and Tourism Korea Creative Content Agency, 2015 Content Industry Statistics, 2016]

Business-specific Revenue in the Game Industry (Unit: KRW1 million, %)

Ranking	Country (Index)		Ranking	Country (Index)	
	2015	2014		2015	2014
1	Korea(8.93)	Denmark(8.86)	8	Netherlands(8.53)	Finland(8.31)
2	Denmark(8.88)	Korea(8.85)	9	Hong Kong(8.52)	Hong Kong(8.28)
3	Iceland(8.86)	Sweden(8.67)	10	Norway(8.49)	Luxembourg(8.26)
4	UK(8.75)	Iceland(8.64)	11	Japan(8.47)	Japan(8.22)
5	Sweden(8.67)	UK(8.50)	12	Finland(8.36)	Australia(8.18)
6	Luxembourg(8.59)	Norway(8.39)	13	Australia(8.29)	USA(8.02)
7	Switzerland (8.56)	Netherlands(8.38)	14	Germany(8.22)	China(4.64)

[ITU, Measuring the Information Society 2015, 2015]

Online Comics Production Distribution Revenues (Unit: KRW1 million, %)

Category		2012	2013	2014(A)	2015(B)	Increase (B/A)	Rate of Increase (B/A)
No. of Transactions	View	40,473	48,378	60,102	70,967	10,865	18.1
	Fund Transfer	5,253	5,906	6,333	7,053	720	11.4
	Loan Application	1.7	1.7	1.6	1.9	0.3	17.0
	Total	45,728	54,285	66,437	78,022	11,585	17.4
Amount	Fund Transfer	33,223.9	33,647.3	36,839.3	40,249.6	3,410.3	9.3
	Loan Application	10.1	12.3	14.5	37.3	22.8	158.1
	Total	33,234.0	33,659.7	36,853.7	40,286.9	3,433.2	9.3

[Bank of Korea, 2015 Korea Internet Banking Service Usage, 2016]

ICT Development Index Ranking (based on the year of publication)

Online Banking Usage (Daily Average)

(Unit: 1,000 cases, KRW1 billion, %)

01 AI in everyday life

In October 2015, Google's artificial intelligence (AI), AlphaGo, competed against Fan Hui, a French Go player with a 2nd dan ranking, and won the match, 5:0. Then, in March 2016, AlphaGo competed against Lee Sedol, a Korean Go player with a 9th dan ranking, and won the match, 4:1. The match between AlphaGo and Lee was an opportunity for the general public to experience the imminent advent of the era of AI, demonstrating the possibility that AI could replace the world of intuition, which was considered as a unique quality of humans. Also, it prompted an in-depth discussion on the potential of AI technologies and the future of the society.

Related industries are also booming. Merrill Lynch Bank of America predicted that the volume of the global robot and AI market would reach USD100 billion by 2020, while KT Economic Management Institute's Digieco estimated the size of the domestic AI market to reach KRW27.5 trillion by 2030. Its services are expected to include the areas related to medical remote diagnostics, financial fraud prevention, secretarial, smart energy, information/reception, automated translation/interpretation, automated vehicle, smart factory, smart grid, housekeeping robot, specialized financial/legal, education, and infant/elderly care. At the Davos Forum, which was held in January 2016 under the theme, "Mastering the Fourth Industrial Revolution," there was a gloomy outlook that ordinary occupations, except jobs in the creative and innovative fields, would be replaced with AI.

The government has been aggressively moving to disseminate intelligent information, which will become the foundation of "Mastering the Fourth Industrial Revolution." The government launched the "National Intelligence Informatization Strategy" to promote a KRW300 billion-scale AI flagship project, build an intelligent information technology research center, and prepare for an intelligent information society within the next 5 to 15 years.



02 Blossoming of the AR/VR, drone, and IoT eras



New technologies, including augmented reality (AR), virtual reality (VR), drone, and Internet of Things (IoT), are emerging as new growth engines.

Since the beginning of this year, drone and AR·VR have been regarded as the new markets, and many related services and products have been released. In March 2016, Facebook acquired Oculus VR for USD2 billion (KRW2.409 trillion), which sparked competition in the VR market. Following Facebook's acquisition, global IT enterprises, including Apple, Microsoft, and Samsung Electronics, joined the competition and have released new AR·VR-related products.

The global drone market is expected to grow to KRW20 trillion by 2020. The government, while showing interests in cultivating the drone industry, has designated a pilot airspace for a safety verification pilot project in October 2015. There are 4 areas available for the drone safety test: Jangsapo in Busan; Guji-myeon, Dalseong-gun in Daegu; Deokpo-ri, Yeongwol in Gangwon; and Goso-ri, Goheung in Jeollanam-do. Fifteen pilot carriers, including Korean Air, Ucon, KT, and CJ Korea Express, were also chosen. In June 2015, the government announced that it would invest a total of KRW108.5 billion in 7 new pilot projects for the next three years to promote the IoT pilot project.

Moreover, major IT enterprises, including Samsung Electronics, LG Electronics, Google, and Apple, have unveiled real-life, applicable smart home solutions en bloc.

03 Domestic big data market shows more than 30% high growth

The domestic big data market grew rapidly, expanding to about 30% higher compared to the previous year.

According to the 2015 Big Data Market Status Survey by the Ministry of Science, ICT, and Future Planning, the Korean big data market recorded KRW262.3 billion in sales in 2015, a significant growth from 2014 (KRW201.3 billion). By sector, storage had the highest percentage of 26.9% of the whole market. Meanwhile, the growth of other areas, including software (23%), server (22.1%), service (19.5%), and network (8.4%), was also prominent. Among them, the percentage of service has increased by 7.2%, from 2014's 11.3% to 18.5% in 2015.

The big data adoption rate of domestic companies (with more than 100 employees) has increased from 2014's 3.9% to 2015's 4.3%. The adoption rate of the companies with more than KRW100 billion in sales has increased from 8.1% to 9.6% during the same period.

Most companies that introduced big data are expected to show significant growth in the areas of customer management and marketing, risk management, and business change monitoring. Three companies among 10 domestic companies with more than 100 employees announced that they will adopt big data in their business operations, and the big data is predicted to be utilized in areas that are directly linked to substantial revenue.

The legislation of related laws will attract attention with the beginning of the big data era. In September 2015, the legislation of the Big Data Industry Promotion Act that enables the utilization of non-distinguished personal information without user agreement was promoted, but it was automatically discarded following the completion of the 19th National Assembly.



04 Enforcement of the Internet·ICT-related laws, including the Cloud Computing Promotion Act



In March 2015, the Act on the Cloud Computing Development and User Protection to cultivate the domestic cloud industry has been established. Cloud computing, which allows users to rent ICT infrastructures, such as servers and storage via the Internet without establishing them within the user's company, is being disseminated to various areas.

The government plans to establish specific systems, including guidelines for private cloud usage in the public sector and security certification, and an introductory system in 2016. The government's objective is to increase the overall cloud usage rate in Korea to 30%, which is 10 times more than the current rate, by increasing the private cloud usage of the public sector up to 40%, based on the number of business systems. According to a market research agency, Gartner, and the related industry, the size of the domestic cloud market is expected to experience rapid growth, from USD540 million (KRW624 billion) as of 2014 to USD1.2 billion (KRW1.38 trillion) by 2019.

As a result, the domestic cloud market is becoming a major target for domestic and overseas IT companies. Domestic companies, including KT, Naver, and SKT, as well as global companies, such as Amazon, Microsoft, and IBM, have been accelerating their entry into the domestic cloud computing market.

05 Returned to the No. 1 ranking in the ICT Development Index, and was ranked No. 1 in the OECD OUR Data Index



Korea was ranked No. 1 among 167 countries in the ICT Development Index presented by the International Telecommunication Union in November 2015. The ICT Development Index assesses the ICT development rate of each country based on various ICT-related statistics from the previous year, and it is utilized as the most credible index that compares and analyzes the ICT capabilities of each country.

By subindex Korea was ranked No. 1 in ICT accessibility, No. 4 in ICT usage, and No. 2 in ICT literacy.

Korea was also ranked No. 1 in the area of public data openness. In the OECD's Government at a Glance 2015, Korea was ranked No. 1 in the OUR Data Index with 0.98 point (out of 1 point). This is significantly higher than OECD's overall average (0.58). Among 30 OECD countries, Korea ranked No. 1, followed by France in second place, the UK in third place, Australia in fourth place, Canada in fifth place, and the USA in 9th place.

The OUR Data Index is published by OECD to help each country establish its own public data openness strategy. It is composed of 19 indexes in three fields of availability, accessibility, and government support, and Korea received high points in all three areas. In the area of availability, Korea opens all data in four areas of election, central government expenditure, local fiscal expenditure, and census, and has 407 public data utilization services, which were highly regarded in the assessment. In the area of accessibility, it is considered that data is centered around the public data portal for easy usage in the private sector. The government support area received positive reviews after Korea reflected the data openness entries in the assessment of government and public agencies and in the pan-government entrepreneurship competition.

06 FinTech takes off and "the pay battle becomes fierce"

2015 was the year of the great pay war. When Apple opened fire with the launch of its mobile payment service, Apple Pay, in September 2014, Samsung Electronics set a counter fire with Samsung Pay in August 2015. In October 2015, Google joined the competition by releasing its latest model with Android Pay.

The interest in the mobile payment market was also high. In 2015, about 20 mobile payment services were launched in the domestic market. After Kakao launched Kakao Pay, the first mobile payment service in Korea, in 2014, prominent Korean enterprises in the manufacturing, Internet, distribution, content, and service industries all joined the competition with their own mobile services. They include Naver's Naver Pay, Shinsegae's SSG Pay, Interpark's Yellow Pay, LG U+'s Paynow, BC Card's BC Pay, and TMON's TMON Pay. Samsung Pay quickly became a powerhouse with its subscribers exceeding 1 million, and 100,000 daily transactions were recorded in just two months after its launch. It is assessed that the mobile payment service, supporting both the near field communication (NFC) method and the magnetic secure transmission (MST) technology that is used in credit card terminals, was effective.

However, some pointed out that the release of diverse services is confusing consumers. Thus, it is expected that the market will be reorganized, focusing on competitive mobile payment services in the long term.



07 Completion of 700MHz Wavelength Distribution Policy



The allocation policy of the so-called golden frequency, 700MHz, has been completed. The 700MHz bandwidth is an excellent spectrum because of its long cell range and less diffraction loss. The national integrated network, including the national disaster safety network, railway network, and marine network, uses the 700MHz bandwidth. The bandwidth range of 700MHz is 4 to 7 times broader than 2.1 to 2.6 GHz so it will incur less investment costs under similar conditions.

For years, mobile carriers and terrestrial broadcasting companies played tug-of-war for 700MHz. The mobile carriers wanted 700MHz as a margin frequency to prevent a possible mobile crisis occurring from traffic explosion, and broadcasting companies provided a logical argument that they need 700MHz for next-generation broadcasting, UHD (ultra high definition) broadcasting. Moreover, there were different views among government agencies on the frequency allocation method for 700MHz.

The government confirmed the 700MHz frequency allocation measures in July 2015, which allotted 30MHz bandwidth to the 4 terrestrial broadcasting companies and 40MHz to 1 mobile carrier. Korea is the only country in the world that uses three services of mobile communication, terrestrial broadcasting, and public purpose within 700MHz.

However, the three mobile carriers did not participate in the tender for the 700MHz bandwidth so the seat for the golden frequency is still empty. Thus, the Ministry of Science, ICT, and Future Planning will include the 700MHz bandwidth in the bandwidth allocation plan in the second half of the year.

08 The era of Internet banking

In November 2015, K Bank and Kakao Bank were chosen as Korea's first Internet banks.

It was the first entry of new business entities in the banking industry in 23 years since the opening of Peace Bank of Korea in 1992. Thus, it is a meaningful occasion as the IT and finance sector have converged. With the rapid rise of FinTech as a new growth engine, a discussion on Internet banking has reopened and the non-face-to-face channel idea has materialized, which led to the approval of Internet banking.

However, the launch has been delayed as the Amendments to the Banking Act that allows IT companies (non-financial business)' retention of bank shares from 4% to 50% was not processed in the National Assembly. Kakao Bank plans to reduce transaction costs by directly connecting customers and stores, and then offer online commercial transactions, payment data, and loans with mid-level interest rates through a credit evaluation system based on SNS activities, KakaoTalk-based simple remittance services, and asset management services.

KT's K Bank plans to establish multiple customer contact channels by using the maximum capabilities of the participating shareholders. The key features of K Bank include a loan service with a mid-level interest based on the big data on communication, payment, and retail information, mobile payment service (Express Pay), simple remittance services based on the user's mobile phone number and email address, and AI-based asset management services (robo-advisors).



09 Full-fledged execution of O2O



The interest in the O2O (Online to Offline) service that connects online and offline transactions continues. If a food delivery application (app) using the O2O service was the talk-of-the-town in the beginning, a taxi app in the center of O2O followed in 2015. After Uber shut down its service in Korea, various call-taxi apps have competed to take over the vacancy.

Kakao Group's KakaoTaxi was the most prominent contender. KakaoTaxi became popular because the service enabled users to call a cab via their smartphone by inputting their destinations without actually hailing a cab. The service, which was launched in March 2015, dominated the existing service by achieving 5 million calls in 3 months, and 10 million calls within just 4 months of its release.

Kakao, which launched a luxury call taxi service, Kakao Taxi Black, in November 2015, revealed that it will expand its O2O business into other fields in November this year. There is also a chauffeur service, Kakao Driver. Moreover, the company plans to release new O2O services every quarter in the next one to two years, including shipping, home services, and delivery.

The delivery O2O service has been the vanguard of growth of the O2O market. Woowa Brothers & Sisters leads the market by declaring 0% commission for Baemin. Moreover, Syrup and YAP apps, which transmit discount information of nearby stores according to the user's location, Dabang and Zigbang apps, which introduced innovation in the area of real estate brokerage services, and Good Choice and Yanolja apps, which caused a sensation in the area of accommodation reservations, are considered as prime O2O examples of services that enhanced user convenience.

10 Three big credit card companies pay for the damages suffered by the victims of personal information leaks

The court's first ruling recognized credit card companies' liability for damages regarding the "three credit card companies' personal information leak" incident after more than 100 million customer data were compromised.

In January 2016, the Seoul Central District Court has ruled that "the defendants shall pay KRW 100,000 per plaintiff" in four damage suits in which 5,206 users of KB Kookmin Card and NH Nonghyup Card have claimed against KB Kookmin Card, Nonghyup Bank, and the Korea Credit Bureau (KCB).

The three credit card companies (KB Kookmin Card, NH Nonghyup Card, and Lotte Card)' personal information leak that occurred in June 2013 became controversial when it was revealed in January 2014. The incident occurred because the credit card companies neglected the management of their clients' personal information after commissioning KCB to develop a computation program. The extent of the damage was massive after victimizing many consumers.

The companies have been claiming that, "As actual damage from the leak cannot be proven, we are not responsible to pay compensation." However, it was not accepted. The justice department revealed, "It is most likely that the leaked personal information was already viewed or would be viewed by a third party. It is appropriate to see that the personal information leak had caused damage."

More than 100 legal actions related to the personal information leakage incident have been filed all over the country.



1. Internet Industry

A. Status of the Internet Industry

The Internet industry, which is represented by the overall economic activities generated from the Internet based on information technologies, can be largely divided into three categories: base industry, support industry, and application industry [Table 1-1-1].

Table 1-1-1

Classification of the Internet Industry

Main Category	Sub Category	Third-level Category
Base Industry	Internet terminal	Smartphone, DTC, computer (desktop, notebook, medium and large computers, other compact computers), set-top box, etc.
	Transmission equipment	VoIP, videophone, pair and coaxial cable transmission system, photo transmission system, signal converter, multiplication system, etc.
	Network equipment	Wired LAN equipment (router, network switch, hub, etc.) wireless LAN equipment (access point, etc.), subscriber's modem (optical modem, xDSL modem etc.), network security equipment, etc.
Support Industry	System S/W	Security S/W, IT operation and management S/W, middleware S/W, etc.
	IT system management and support services	IT system management, hosting service, IT support service, etc.
Application Industry	Wired and wireless access service	Integrated digital service network (ISDN), Internet phone, Internet backbone service, leased line service, high-speed Internet network service, mobile communication service (data), portable Internet (WiBro), wireless LAN
	Network access service	Optional network service, Internet-based access service, Internet management service, Internet support service, etc.
	Application service	High-speed faxing service, credit card information system (CCIS), online reservation service, electronic data interchange service, remote communication service, electronic payment service, online information processing service, etc.
	Content service	Webcasting, Internet media, Internet gaming, online education, provision of specialized information, provision of digital image, provision of digital sound, provision of digital publication, etc.

[Korea Association for ICT Promotion]

1. Internet Industry

The market size of the Internet industry in 2015 was worth KRW95.52 trillion, as shown in [Table 1-1-2], with an average annual increase rate of 4.1% since 2011, while the market grew -1.0% from 2014's KRW96.46 trillion.

Table 1-1-2 Revenue of the Domestic Internet Industry

(Unit: KRW1 billion, %)

Category	2011	2012	2013	2014	2015 ^P	CAGR	YoY Growth
Base Industry	42,437 (52.1)	43,632 (51.7)	47,664 (51.6)	47,608 (49.4)	43,567 (45.6)	0.7	△8.5
Support Industry	11,666 (14.3)	12,769 (15.1)	13,182 (14.3)	15,568 (16.1)	16,492 (17.3)	9.0	5.9
Application Industry	27,345 (33.6)	27,973 (33.2)	31,507 (34.1)	33,280 (34.5)	35,456 (37.1)	6.7	6.5
Total	81,448	84,374	92,353	96,456	95,515	4.1	△1.0

* P: estimate: (portion)

* CAGR: Average annual growth rate between 2011~2015

[Korea Association for ICT Promotion, ICT Status Survey and A Survey on Key ICT Trend Items, 2016]

Table 1-1-3 Revenue of Internet-based Industries

(Unit: KRW1 billion, %)

Category	2011	2012	2013	2014	2015 ^P	CAGR	YoY Growth
Internet Terminal	40,926 (96.4)	42,412 (97.2)	46,383 (97.3)	46,374 (97.4)	42,324 (97.1)	0.8	△8.7
Transmission Equipment	1,221 (2.9)	997 (2.3)	1,134 (2.4)	1,084 (2.3)	1,096 (2.5)	△2.7	1.1
Network Equipment	290 (0.7)	223 (0.5)	147 (0.3)	150 (0.3)	147 (0.3)	△15.6	△2.0
Total	42,437	43,632	47,664	47,608	43,567	0.7	△8.5

* P: estimate: (portion)

* CAGR: Average annual growth rate between 2011~2015

[Korea Association for ICT Promotion, ICT Status Survey and A Survey on Key ICT Trend Items, 2016]

Table 1-1-4

Revenue of Internet Support Industries

(Unit: KRW1 billion, %)

Category	2011	2012	2013	2014	2015 ^P	CAGR	YoY Growth
System S/W	1,745 (15.0)	1,921 (15.0)	2,154 (16.3)	2,820 (18.1)	2,905 (17.6)	13.6	5.9
IT System Management and Maintenance	9,921 (85.0)	10,848 (85.0)	11,028 (83.7)	12,748 (81.9)	13,588 (82.4)	8.2	3.0
Total	11,666	12,769	13,182	15,568	16,492	9.0	6.6

* P: estimate; (portion)

* CAGR: Average annual growth rate between 2011~2015

[Korea Association for ICT Promotion, ICT Status Survey and A Survey on Key ICT Trend Items, 2016]

Table 1-1-5

Revenue of Internet Application Industries

(Unit: KRW1 billion, %)

Category	2011	2012	2013	2014	2015 ^P	CAGR	YoY Growth
Wired and Wireless Access Services	11,011 (40.3)	9,887 (35.3)	9,871 (31.3)	9,635 (29.0)	9,518 (26.8)	△3.6	△1.2
Network Access Services	3,487 (12.8)	4,205 (15.0)	6,883 (21.8)	8,295 (24.9)	9,613 (27.1)	28.9	16.0
Application Services	3,811 (13.9)	4,160 (14.9)	4,465 (14.2)	4,624 (13.9)	4,941 (13.9)	6.7	6.9
Content Services	9,036 (33.0)	9,721 (34.8)	10,288 (32.7)	10,731 (32.2)	11,383 (32.1)	5.9	6.1
Total	27,345	27,973	31,507	33,280	35,456	6.7	6.5

* P: estimate; (portion)

* CAGR: Average annual growth rate between 2011~2015

[Korea Association for ICT Promotion, ICT Status Survey and A Survey on Key ICT Trend Items, 2016]

B. Internet Startups

Following the rapid growth of Korea's startup ecosystem, many foreign companies have been monitoring the rise of Korean startups. Google officially opened the first Google Campus in Asia, as its third one in the world. It is a system supporting and facilitating global entrepreneurs in Seoul, while a prominent accelerator based in Silicon Valley, 500 Startups, also launched a new fund that is exclusive for Korea, and

1. Internet Industry

announced its plan for a full-fledged investment in Korean startups.

Many Korean startups also received investments from prominent foreign venture capitalists. According to “2015 Startup Investment Trends in Korea”, published by Platum, a media specializing in Startups, the amount of public investments inputted in domestic startups in 2015 was KRW811.9 billion, which was a 4% increase from 2014’s KRW780.2 billion.

To help Internet Startups develop global competitiveness, the Korea Internet & Security Agency (KISA) has been operating “K-Global Startup” since 2010. The program selects creative and innovative ideas, and incubates teams over a period of five months in cooperation with leading Korean and foreign Internet companies, such as Google and Naver.

As of 2015, K-Global Startup has supported 174 teams, as shown in [Table 1-1-6], and produced many startups that entered the global market through strong growth. Nori, which had won the grand prize of K-Global Startup in 2012, won the top prize in an educational application competition held in New York City in January 2013, and has launched a trial service of its application in 80 schools in the US. Malang Studio, which had won the runner-up prize of K-Global Startup in 2012, signed a publishing contract with Baidu in China, and a character licensing and publishing contract with Plug & Works in Brazil.

Table 1-1-6

The Number of K-Global startup ventures and Commercialization and Investment Attraction Performance

Category	2010	2011	2012	2013	2014	2015	Total
Number of Applicants	5	20	29	35	40	45	174
Number of Ventures	2	9	23	27	30	28	119
Number of Commercialization	2	6	23	21	32	18	102
Investment Attraction (KRW100 million)	–	–	170.3	84.2	37.2	22.1	313.8

[Ministry of Science, ICT and Future Planning, 2015]

C. e-Payment Services

In the FinTech industry, payment services refer to convenient payment services via mobile devices when paying for goods or services online and offline. The most representative method is paying with mobile payment or a mobile card that enables users to use a payment service via their smartphones.

Remittance in the FinTech industry refers to convenient fund remittance by using one's mobile device with the existing account number, mobile phone number, email address, or a certain SNS ID.

In June 2015, as part of the activation of the domestic FinTech industry, the Korea government decided to introduce a foreign exchange transfer business to expand the overseas remittance business that was only allowed in banks to non-financial institutions. However, with the concerns about the possibility that it could be used for illegal trades, such as illegal transactions in foreign currencies or money laundering, the remittance limit will be set at the sum of USD50,000 per person.

As of September 2015, there are 83 electronic financial business operators registered in 147 businesses. The non-financial institutions include various IT companies, mobile carriers, network operators, open-market operators, and retail providers that are involved in the provision, settlement, and payment processes. The domestic convenient payment service operators are shown in [Table 1-1-7].

In November 2015, the Korea Financial Services Commission gave a preliminary approval for the two consortiums, Korea Kakao Bank and K Bank, as Internet banks, as part of the financial reform for financial services innovation and competition promotion in the banking industry through the convergence between ICT and the financial sector. The primary step approves two institutions under the current Banking Act, and the second step will approve additional Internet banking institutions. Internet banks must follow electronic financial transaction methods (transactions based on the Electronic Financial Transaction Act Article 2, Section 1). That is, an Internet bank must provide financial products and services via electronic devices (CD, ATM, computer, mobile phone, etc.) so the user can avail himself of automated financial products and

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Table 1-1-7

Classification of Major e-Payment Service Providers

Region	Industry	Company	Service	Online	Offline		
					NFC	QR/ Barcode	Others
Korea	Internet Service	Kakao	Kakao Pay	○			
		Naver	Naver Pay	○			
		NHN Entertainment	Payco	○	○		
	Manufacturing	Samsung	Samsung Pay		○		Magnetic
	Retail	Auction, Gmarket	Smile Pay	○			
		Shinsegae	SSG pay	○		○	
	Payment Gateway	KG Inisis	Kpay	○			
		LG U+	Paynow	○			
Overseas	Internet Service	Google	Android Pay	○	○		
		Tencent	Tenpay	○	○		
	Manufacturing	Apple	Apple Pay	○	○		
	Retail	Amazon	Amazon Payment	○			
		Alibaba	Alipay	○	○	○	
	PG	Paypal	Paypal	○			Beacon

[BNK Finance Research Institute, 2015]

services without dealing face-to-face with the service provider. The two consortiums that received preliminary approval are expected to provide financial services after they obtain a proper approval in the second half of 2016.

D. Financial Services

As of late 2015, the number of Internet banking service users (if the same person was registered in multiple banks, the number was added and multiplied) in 17 financial institutions have reached 116.85 million, which was a 13.2% increase from the end of 2014 [Table 1-1-8].

Table 1-1-8

Number of Users Registered at Financial Institutions and Internet Banking

(Unit: 1,000 persons, 1,000 cases, %)

Category	2012	2013	2014(A)	2015(B)	Increase (B-A)	Increase Rate(B/A)
Individual	81,384	89,788	96,825	109,760	12,935	13.4
Corporate	5,046	5,704	6,363	7,093	730	11.5
Total	86,430	95,492	103,188	116,853	13,665	13.2

[The Bank of Korea, The Status of Domestic Internet Banking Service Usage in 2015, 2016]

Meanwhile, the number of mobile banking service subscribers recorded 76.56 million people, which was a 27.4% increase from late 2014, due to the increase in the number of smartphone-based mobile banking subscribers.

In 2015, the number of overall Internet banking (including mobile banking) usage (daily) reached 7,802 cases, and the transaction amount (daily) was KRW40.29 trillion, representing an increase of 17.4% and 9.3%, respectively, from 2014 [Table 1-1-9].

Table 1-1-9

Internet Banking Service Usage of Financial Institutions (Daily Average)

(Unit: 1,000 cases, KRW1 billion, %)

Category	2012	2013	2014(A)	2015(B)	Increase (B-A)	Increase Rate(B/A)
Number of Usage	View	40,473	48,378	60,102	10,865	18.1
	Fund Transfer	5,253	5,906	6,333	720	11.4
	Loan Application	1.7	1.7	1.6	0.3	17.0
	Total	45,728	54,285	66,437	11,585	17.4
Volume of Transaction	Fund Transfer	33,223.9	33,647.3	36,839.3	3,410.3	9.3
	Loan Application	10.1	12.3	14.5	22.8	158.1
	Total	33,234.0	33,659.7	36,853.7	3,433.2	9.3

[The Bank of Korea, The Status of Domestic Internet Banking Service Usage in 2015, 2016]

As of 2015, the number of mobile banking usage (daily average) was 42.39 million, up 36.1% increase from 2014. Among them, the number of page views was 38.95 million, which was a 36.9% increase from 2014, while the fund transfer also showed a significant increase of 27% from 2014 to 3.44 million transactions.

1. Internet Industry

E. e-Commerce

According to the Statistics Korea data, the volume of retail sales in 2015 was KRW366.52 trillion, which was a 1.9% increase from 2014's KRW359.75 trillion. The volume of online shopping business amounted to KRW53.93 trillion, a 19.1% increase from 2014's KRW45.39 trillion [Table 1-1-10]. Moreover, the mobile shopping transaction volume among the online shopping transaction volume was KRW24.43 billion, which was a 64.3% increase from 2014.

Table 1-1-10

Volume of Retail Sales and Online Shopping Transaction

(Unit: KRW1 billion, %)

2013			2014			2015			YoY Increase Rate	
Retail Sales	Online	%	Retail Sales	Online	%	Retail Sales	Online	%	Retail Sales	Online
353,642	38,498	10.9	359,746	45,302	12.6	366,518	53,934	14.7	1.9	19.1

* p: estimate

[Statistics Korea, 2015 Q4 Annual Retail Sales and Online Shopping Trend, 2016]

The 2015 online shopping transaction volume per key product group showed that tour and reservation services increased by 18.9%, life and automotive goods by 32.4%, food and beverage by 34.2%, while books had a 10.1% drop, and office and stationery materials decreasing by 2.2% [Table 1-1-11].

Table 1-1-11

Online Shopping Transaction Volume per Product Group

(Unit: KRW1 billion, %)

Category	2014		2015		YoY Increase Rate	
	Online	Mobile	Online	Mobile	Online	Mobile
•Total	45,302	14,870	53,934	24,427	19.1	64.3
Computer and Accessories	3,414	498	3,605	870	5.6	74.9
Home and Electronic and Communication Appliances	4,962	1,356	5,880	2,235	18.5	64.8
Software	58	5	60	8	3.3	61.7
Books	1,280	221	1,151	279	-10.1	26.1
Office and Stationery	471	62	460	108	-2.2	74.5

Category	2014		2015		YoY Increase Rate	
	Online	Mobile	Online	Mobile	Online	Mobile
Record and Video and Musical Instruments	163	32	169	54	4.0	66.4
Clothing	5,111	2,088	5,839	3,225	14.2	54.4
Shoes	847	339	940	511	11.1	50.7
Bags	622	217	785	401	26.2	84.9
Fashion Accessories	766	280	899	461	17.4	64.8
Sports and Leisure Goods	1,899	591	2,088	891	10.0	50.8
Cosmetics	2,669	1,038	3,527	1,902	32.1	83.4
Children and Baby Supplies	2,227	1,012	2,709	1,616	21.7	59.6
Food and Beverage	3,611	1,299	4,844	2,497	34.2	92.2
Agricultural and Livestock and Marine Products	1,171	345	1,443	657	23.2	90.4
Life and Automotive Goods	4,056	1,505	5,372	2,739	32.4	82.0
Furniture	1,119	313	1,295	510	15.7	62.7
Pet Supplies	198	64	260	130	31.6	103.3
Tour and Reservation Services	8,383	2,724	9,969	3,901	18.9	43.2
Various Services and Others ¹⁾	2,276	879	2,637	1,430	15.9	62.7

1) Flowers are included under various services and others

* p: estimate

[Statistics Korea, 2015 Q4 Annual Retail Sales and Online Shopping Trends, 2016]

The KISA has been operating the Electronic Document and Electronic Commerce Dispute Committee in accordance with the 「Framework Act on Electronic Document and Transaction」, Article 32. The number of applications for dispute mediation in 2015 was 2,267.

Table 1-1-12

**Electronic Document Consultation and Dispute Mediation
Application Status per Year**

(Unit: Case, %)

Category	2010	2011	2012	2013	2014	2015	Increase Rate from 2014
Dispute Consultation	17,993	22,829	24,915	48,415	44,814	29,489	-52.0
Mediation Application	4,521	4,546	5,596	6,758	3,382	2,267	-49.2

[KISA, 2016]

F. O2O

O2O (Online to Offline) includes all activities that attract customers to transact through smartphones and the Internet, and induce them to purchase goods or use services in offline stores. Like Uber and Airbnb in the US, and Didi Kuaidi in China, when a user places order via his/her mobile phone or online, the order information is sent to the offline stores, and the goods and services are immediately sent to the user. O2O encompasses day-to-day life in general from sharing car and accommodation services to food delivery services. The form of trade is diversified from an exclusive ownership purchase, and the sale or rental of service or goods between individual to individual or individual to service provider. Some O2O services, including sharing of car or accommodation services, have been growing so fast because of the advantages of immediate accessibility, convenience, and cost competitiveness, thus threatening the business of existing industries.

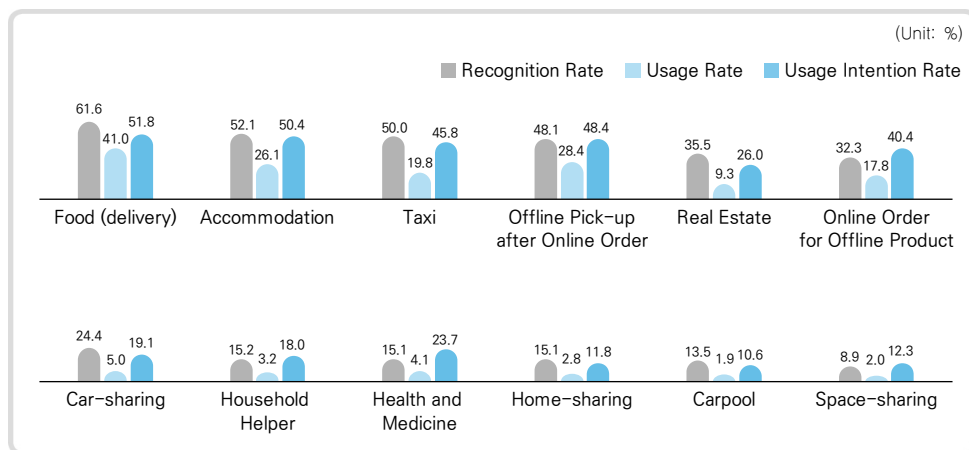
Based on its chatting application, KakaoTalk, which is used by a population of 40 million, has been expanding its business into various industries with Kakao Taxi, Internet banking, and the entertainment business. Zigbang, a mobile studio apartment and real estate service, has newly created a relevant market, which was previously ignored in the offline real estate market due to its small trade volume, through mobile technologies.

At the moment, many domestic O2O companies are facing a variety of difficulties. A market that is significantly smaller than those in the US and China, a consumer culture that adamantly refuses monetization, checks from regulations, and the existing system have been threatening the survival of O2O Startups. Call Bus, a late-night bus O2O service, and Hey Dealer, a used car dealing O2O service, are representative cases of companies experiencing survival difficulties due to the opposition from regulations and existing systems, despite their innovative attempts at utilizing mobile technologies.

According to the KISA's "2015 Survey on the Internet Economic Activities", in the recognition, usage, and usage intention of the O2O services category, the recognition

(61.6%) and usage (41.0%) of food (delivery) service has registered the highest numbers. It is followed by the recognition rates for “accommodation” (52.1%), “taxi” (50.0%), and “offline pick-up after online order” (19.8%), while the usage rate is ranked in the order of “offline pick-up after online order” (28.4%), “accommodation” (26.1%), and “taxi” (19.8%). The usage intention in the future was ranked in the order of “food (delivery)” (51.8%), “accommodation” (50.4%), “offline pick-up after online order” (48.4%), and “taxi” (45.8%), while the usage intention for “online order for offline product” (40.4%) and “health and medical” (23.7%) were higher than the recognition rates.

Figure 1-1-1

Recognition, Usage, and Usage Intention Rates for O2O Services
(Multiple Answers)

The primary reason for using O2O services was “Faster and more convenient than the existing method” with 70.3%, followed by “Low-cost with discount/event”, (51.9%), “Real-time information about offline stores and services” (28.4%), and “Information exchange including product review and vendor” (25.0%).

1. Internet Industry

G. Game Industry

The revenue of the Korean game industry has recorded KRW9.98 trillion in 2014, which was a 2.6% increase from the previous year. The revenue in 2013 had decreased by 0.3% compared to that of 2012, but due to its growth in 2014, the overall revenue of the gaming industry has come close to KRW10.0 trillion. The revenue of the game production and publication sector in 2014 was KRW8.70 trillion, while the revenue of the game distribution sector was KRW1.27 trillion. The revenue of the game production and publication sector has been continuously increasing.

The revenue of online games has achieved KRW5.55 trillion in 2014, which was a 1.7% increase from KRW5.45 trillion in 2013. The revenue of mobile games was KRW2.91 trillion, which was a 25.7% increase from that of the previous year.

Table 1-1-13

Revenue per Business in the Game Industry

(Unit: KRW1 million, %)

Category		2012	2013	2014	YoY Increase
Game Production and Publication	Online Games	6,783,902	5,452,283	5,542,468	1.7
	Mobile Games	800,922	2,327,680	2,913,646	25.2
	Video Games	160,869	93,617	159,806	70.7
	PC Games	68,000	37,967	33,668	▽11.3
	Arcade Games	79,113	82,492	52,848	▽35.9
	Sub-total	7,892,806	7,994,039	8,702,436	8.9
Game Distribution	Computer Game Rooms	1,793,201	1,661,800	1,227,696	▽26.1
	Digital Game Rooms	66,531	63,844	40,489	▽36.6
	Sub-total	1,859,732	1,725,644	1,268,185	▽26.5
Total		9,752,538	9,719,683	9,970,621	2.6

[Ministry of Culture, Sports, and Tourism (MCST) and Korea Creative Content Agency, 2015 Content Industry Statistics, 2016]

H. Online Advertising

Domestic online advertising has become the second-largest advertising medium in 2011 after beating out the newspaper medium, and, in 2012, it has become the largest advertising medium by beating out the terrestrial broadcasting sales. Internet advertising enjoyed high growth from the 2000s, but the growth has been slowing down as it entered maturity recently. On the other hand, mobile advertising, which made its appearance with the distribution of the smartphone, is estimated to achieve KRW1 trillion in 2015 from KRW60 million in 2011, and it has been leading the growth of the overall online advertising industry [Table 1-1-14].

Table 1-1-14

Volumes of the Domestic Advertising Market

(Unit: KRW100 million)

Category	2011	2012	2013	2014	2015 ^p
Broadcasting	36,343	36,072	35,712	34,880	36,114
Newspaper	17,092	16,543	15,447	14,943	14,600
Magazine	5,236	5,076	4,650	4,378	4,250
Internet	18,560	19,540	20,030	18,674	18,230
Mobile	600	2,100	4,600	8,391	10,700
Outdoor	8,448	9,105	9,645	9,362	9,750
Production	5,725	5,418	5,810	5,850	5,890
Total	92,004	93,854	95,893	96,477	99,534

* p: estimate

[Cheil Worldwide, 2015 Advertising Yearbook, 2015]

Online advertising is a key profit model of Internet service providers, and in the case of Google and Facebook, ad sales take up about 90% of their overall sales. The ad sales of Korea's major portal companies, NHH, Kakao, and SK Communications, also take up 69.8%, 62.2%, and 88.3%, respectively, out of their overall sales in 2015 Q3, which was about 70% of their overall sales.

Table 1-1-15

Revenues of Three Major Portals in Korea

(Unit: KRW100 million, %)

Company	2012		2013			2014			2015. Q3		
	Overall	Ad	Overall	Ad	% of Ad Sales	Overall	Ad	% of Ad Sales	Overall	Ad	% of Ad Sales
Sum	30,399	21,096	29,712	22,611	76.1	37,542	26,818	71.4	10,894	7,474	68.6
NHN	23,893	15,532	23,120	16,754	72.5	27,619	20,193	73.1	8,400	5,870	69.8
Kakao (formerly, Daum)	4,534	4,112	5,309	4,911	92.5	8,984	5,834	64.9	2,296	1,429	62.2
SK Comms	1,972	1,452	1,283	946	73.7	939	791	84.2	198	175	88.3

[Each Company's IR Data (Reconstructed), 2015]

2. Internet Convergence Services

A. IoT

IoT has been drawing attention as a type of technology that enables users to exchange data in real-time by attaching a sensor on everything from a person to a thing and retrieve the next blue ocean to lead the future hyper-connected society.

In May 2014, the Ministry of Science, ICT, and Future Planning (MSIP) proposed the “IoT Master Plan” to cultivate about 350 IoT small and medium-sized companies, and to establish a creative and dynamic IoT ecosystem. The ministry established the “IoT Information Protection Roadmap” in October 2014 and to realize its strategies, it launched the “Three-year (2015~2017) Execution Plan for IoT Information Protection Roadmap” in June 2015.

The IoT-relevant content is included in the “K-ICT Strategy” that the MSIP has established in March 2015. The specifics include ① the establishment of large-sized IoT test complex (healthcare, smart city), ② the creation of market demand for the IoT industry in the early stage through the business-specific test projects with 7 strategies, ③ the cultivation of domestic IoT Startups and ventures as a global enterprise through cooperation with global and large companies, ④ the development of the “sensor industry” through cooperation with relevant government agencies, ⑤ the establishment of necessary infrastructure to activate the IoT industry, including the development of low-power communication technology for IoT, and ⑥ the establishment of an IoT security center for checking security performance and addressing weaknesses.

The IoT Convergence Test Project, which was implemented following the K-ICT policy, is scheduled to be conducted for three years from May 2015 for 4 areas (Open home IoT, smart grid security test, development of aftercare technology for the patients with severe illness, and smart car-talk test).

2. Internet Convergence Services

The IoT-based application services are still in the testing stage or pilot project level that is sporadically conducted. However, according to the MSIP's "2015 IoT Industry Status Survey", the volume of the IoT market is increasing with KRW4.8 trillion in 2015, which was a 28% increase from 2014, and the industry-specific application range and demonstration cases are gradually increasing, based on steadily-developed, innovative solutions. Thus, it is expected that a number of commercial services will appear soon.

B. Smart Home

In 2015, the volume of the domestic smart home market is expected to reach KRW10.94 trillion, which was a 17.8% increase from 2014's KRW8.57 trillion. The average annual growth (CAGR) for the next 4 years (2015~2019) is expected to be at 20.4%, which is a significantly high level, considering that the latest growth rate of the domestic ICT market is about 6.3% [Table 1-2-1].

Table 1-2-1

Outlook of the Domestic Smart Home Market

(Unit: KRW100 million)

Category	2014	2015	2016	2017	2018	2019	CAGR
Market Size	85,677	100,940	111,422	132,806	166,767	211,763	20.4%

[Korea Association of Smart Home, Smart Home Industry Status and Policy Outlook, 2016]

Among the top five business industries that comprise the smart home industry, the largest industry in 2015 is "Smart TV and Home Entertainment". The market size of the "Smart TV and Home Entertainment" industry in 2015 is estimated at KRW5.80 trillion, which takes up 57.5% of the overall smart home market [Table 1-2-2].

Table 1-2-2

Outlook of the Domestic Smart Home Market in Top 5 Industries

(Unit: KRW100 million)

Category	2014	2015	2016	2017	2018	2019	CAGR
Smart Convergence Appliance	26,260	30,690	35,294	42,353	55,059	81,853	27.8%
Home Automation	3,200	3,550	4,083	5,537	9,936	14,149	41.3%
Smart Home Security	5,794	7,520	9,790	19,411	29,562	36,143	48.1%
Smart Green Home	969	1,179	1,355	1,559	1,870	2,245	17.5%
Smart TV and Home Entertainment	49,454	58,001	60,901	63,946	70,340	77,374	7.5%
Total	85,677	100,940	111,422	132,806	166,767	211,763	20.4%

[Korea Association of Smart Home, Smart Home Industry Status and Policy Outlook, 2016]

Communication companies have been promoting the creation of a new business profit model and an increase in subscribers through smart home services that are based on the existing wired and wireless network infrastructures and smartphones in the domestic mobile market that has reached its saturation level. Moreover, Samsung Electronics and LG Electronics have been leading the premium appliance-oriented smart home market through consumer electronics, such as in the IFA 2015 and CES 2016.

The “Open Smart Home Technology Development and Test Project (Smart Home Test Project)” that is being implemented as a part of the MSIP’s K-ICT strategy aims to develop open integrated technology and interoperability-based services for the compatibility and connectivity of various smart home products and services, strengthen the competitiveness of the smart home industry through the establishment and operation of test beds and the acceleration of a market where large and small and medium-sized companies can grow together.

The Ministry of Trade, Industry, and Energy (MOTIE) announced the “New Electronic Industries Promotion Policy” in May 2015, and established the “Strategy for strengthening the key competitiveness of the next generation electronics industry” by grafting new electronics technologies, including IoT and VR, to the existing industries of appliances and medical equipment, and, ultimately, creating new added values as a convergence product manufacturing industry.

C. Connected Cars

The MOTIE has been promoting the creation of a future car convergence ecosystem through its “Automotive Convergence Alliance”. There are 50 company members in the alliance, including Hyundai Motors, LG Electronics, KT, Naver, Hanwha Advanced Materials, and Obigo.

In March 2016, the government announced the “2016 Future Growth Engine Action Plan”. The plan includes the investment plan for the relevant area, including smart cars and 5G mobile communications. According to the plan, the government will invest KRW51.8 billion in the smart car-related technologies, and KRW101.5 billion in 5G mobile communications, which is closely connected to future connected cars in 2016. Other investments will be made to the intelligent IoT and intelligent semiconductor areas that are related to connected cars.

In 2015, the MSIP has invested KRW4.5 billion in the connected car-related smart car talk test project in the automotive industry as among the 2015 IoT test projects. The smart car talk test environment project established a smart car service test environment to preoccupy the global smart vehicle market, develop key services, and verify their effectiveness. The project will develop a simulation system, improve road test sites, create a test infrastructure, and develop and test a service model.

In the commercialization of smart cars and connected cars, it is important to respond to both domestic and overseas standards. At the moment, the Korea Agency for Technology Standards has been meeting international standards through ISO TC 22 (road vehicle) and TC 204 (ITS). To establish the ADAS standard basis for commercial autonomous driving, the Smart Car Standardization Promotion Committee was formed, which included the related department, affiliated organization, and academic experts.

According to the 2015 report by an American market research company, Statista, the sales of the domestic connected car market has recorded USD523 million in 2015, and it is estimated to achieve USD724.7 million in 2016 [Table 1-2-3]. Moreover, it is expected to record an average annual growth of about 33.5%, and raise USD2.31 billion in sales by 2020. The penetration rate of connected cars in 2016 is very low at 5.6%, but it is expected to increase up to 22.6% by 2020.

Table 1-2-3

Prospect of Major Countries' Connected Car Volumes in 2016

(Unit: USD1 million)

Country	Estimated Sales Volume
USA	8,011.0
China	7,668.2
Japan	3,760.9
Germany	3,021.7
UK	2,027.9
Korea	724.7

[Statista, 2015]

The connected car service in Korea falls far behind those of the major countries. The commercialization of most aspects, including app download service and smartphone connection service, is being delayed. The 2015 Statista Report showed that the sales volume in Korea is 1/22 of that of USA, 1/5 of that of Japan, 1/4 of Germany's and 1/3 of the UK's [Table 1-2-3]. Moreover, Korea's distribution rate is comparatively lower compared to other countries, such as North America's 8.2%, Germany's 6.7%, France's 5.3%, UK's 5.2%, and Japan's 5.1%. A significantly lower sales volume directly showed that various services were lacking. Thus, a heavy investment in the distribution of connected cars and its services is of utmost necessity.

D. IPTV

IPTV is a pay TV broadcasting service. In 2015, the number of IPTV service subscribers, and its sales have continuously increased. Since its launch in October 2008, IPTV has shown rapid growth and the number of its subscribers has exceeded 8 million in just 5 years. As of December 2015, IPTV has 10.99 million subscribers, including 5.1 million with KT, 3.36 million with SK Broadband, and 2.53 million with LG U+.

Table 1-2-4 Number of Domestic IPTV Subscribers

(Unit: 10,000 persons)

Category	2011	2012	2013	2014	2015
Total	493.58	653.75	861.36	1,083.71	1,099.17
KT	307.63	403.08	496.83	584.91	510.19
SK Broadband	98.14	144.48	209.58	281.93	335.64
LG U+	87.81	106.18	154.96	216.88	253.34

* 2015's content is the result of the verification of the MSIP's market share summation regulation (2016)

[Korea Association for ICT Promotion (KAIT), 2015 Q4 Survey on Key ICT Items, 2016]

Meanwhile, there is increasing demand for VOD following an increase in the number of subscribers, and the revenue of the IPTV service in Korea in 2015 was KRW1.98 trillion, which was a 28.5% increase from that of 2014. The sales of IPTV between 2016 ~ 2020 is expected to reach KRW2.72 trillion by 2020 with an average annual growth of 7.3%.

Table 1-2-5 IPTV Sales Outlook

(Unit: KRW100 million)

Category	2014	2015	2016	2017	2018	2019	2020	Average Growth during 2016~2020
Sales	14,984	18,062	20,470	22,387	23,994	25,563	27,154	7.3%
Rate of Increase	(33.2%)	(20.5%)	(13.3%)	(9.4%)	(7.2%)	(6.5%)	(6.2%)	

Note: (YoY increase rate)

[MSIP and Korea Communications Commission (KCC), 2015 Broadcasting Industry Survey, KISDI Outlook after 2015]

According to the 「Broadcasting Act」, cable TV and IPTV providers cannot exceed 1/3 of the market share. However, satellite broadcasting services like KT Skylife are not restricted by such regulations. Thus, the 「Internet Multimedia Broadcast Services Act」 and the 「Broadcasting Act」, which restrict one contractor's market share to under 1/3, were revised in March 2015, when paid broadcasting services like satellite broadcasting, cable TV, and IPTV began merging.

E. OTT

Following the development of high-speed Internet and the expansion of mobile smartphone distribution, the introduction of OTT services has been seriously affecting the cable TV and IPTV markets. More people are consuming video contents by accessing OTT services via the Internet, which, in turn, reduce the demand for pay broadcasting, such as cable TV and IPTV.

Starting with KT's Olleh TV Mobile that was launched in May 2011, Korea's three major IPTV companies have been offering OTT services, including SK Broadband's Btv Mobile (Oksusu) and LG U+'s U+ HDTV. Three more IPTV companies, terrestrial broadcasting, and cable TV providers are also providing OTT mobile services. The most representative cases are CJ Hellovision's streaming service "Tiving" that was launched in June 2010, and an N screen service platform, POOQ, created by the terrestrial broadcasting companies KBS, EBS, MBC, and SBS. Naver and Kakao, which offer search and messaging services, have launched their own OTT services, including Naver TV Cast and Daum TV Pot. A global OTT service company, Netflix, launched its service in Korea in January 2016.

According to the result of Nielsen Korea's "2015 Mobile Video Application Survey", the most used smartphone application in Korea is YouTube (19.76 million). It is followed, in order, by Naver's Naver Media Player (5.16 million) and V (1.13 million). A one-person Internet video streaming service, Afreeca TV (3.26 million), also had many subscribers. The communications companies' mobile video services were ranked in order by LG U+'s LTE Video Portal (2.35 million), SK Telecom's Btv Mobile (2.09 million), and KT's Olleh TV Mobile (1.74 million).

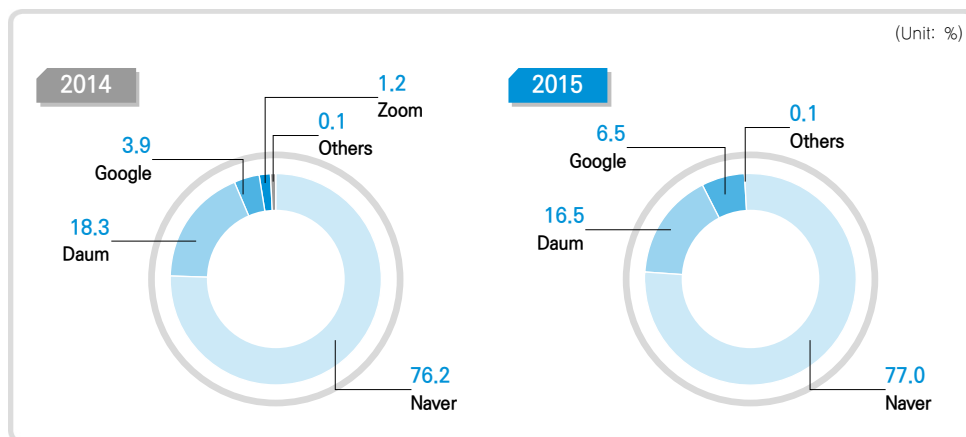
The Korea Information Society Development Institute (KISDI)'s "2015 Broadcasting Medium Usage Survey" showed that the usage rate of domestic OTT services was 14% of the entire number of respondents. The devices for using OTT services were ranked in the following order: smartphone/tablet (90.8%), desktop PC (22.2%), and notebook (14.3%). (multiple answers)

3. Internet Information Services

A. Information Search

The Query Count (QC, the number of search hits) in the major Internet portals in Korea in 2015 showed that Naver and Daum had high market shares of 77.0% and 16.5%, respectively, in the PC search market, while Google had 6.5% market share, which was a 2.6% increase from that of 2014. However, the market share of other search engines, including Zoom, has dropped insignificantly. Naver and Google have increased 0.8% and 2.6% each, compared to figures in late 2014.

Figure 1-3-1 PC-based Major Search Engines' QC Market Share in Korea

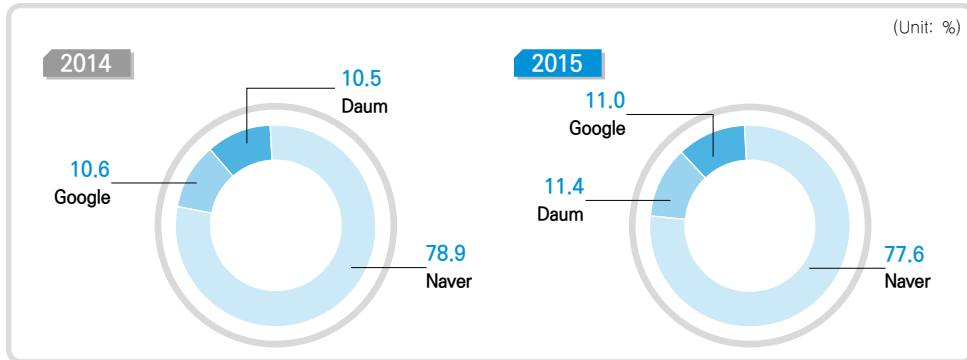


[KoreanClick, www.koreanclick.com, 2016]

The drop in Naver's market share in Korea's mobile web search market was shared by those of Daum and Google. As of December 2015, Naver was on top with 77.6%, followed by Daum's 11.4% and Google's 11.0%.

Figure 1-3-2

Market Share of Mobile Web Search QC in Korea



[KoreanClick, www.koreanclick.com, 2016]

B. Communications

1) SNS

The difference between males (44.3%) and females (41.8%) on SNS usage in 2015 is 2.5%, which is less than that (3.4%) of the previous year when there was a reduction in the difference in SNS usage per gender. By age group, the SNS usage rate of people in their 20s is highest at 75.6%, followed in order by people in their 30s (65.1%), teenagers (51.3%), those in their 40s (50.2%), and those in their 50s (30.4%). Meanwhile, the SNS usage rate of people in their 30s, 40s, and 50s showed a relatively sharp increase in 2014 and again in 2015, and the increase rates are becoming larger with the higher age groups, showing that more people in the middle-age groups were actively using SNS.

The ranking market share of major SNS services is in the following order: Kakao Story (45.7%), Facebook (30.0%), Twitter (10.8%), and Naver Band (7.2%). Moreover, following the increase in the usage rates of Facebook and Naver Band, the gaps between the 1st and 2nd ranks and the 3rd and 4th ranks are decreasing.

A user's daily average usage rate of SNS services was 65 minutes, which was about 5 minutes more than the daily average usage rate in 2014. The age group that uses

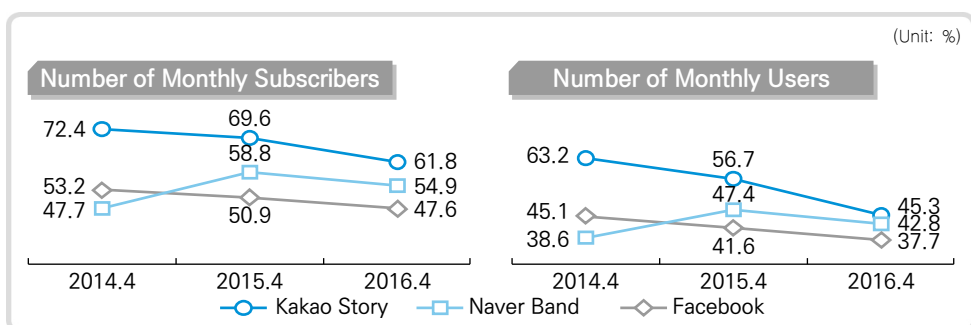
3. Internet Information Services

SNS the most consisted of people in their 20s, using it for an average of 80 minutes, and it is followed by teenagers (70 minutes), people in their 50s (58 minutes), those in their 40s (56 minutes), and those in their 30s (51 minutes). The SNS usage of people in their 50s has increased by 12 minutes from the daily average time of 46 minutes in 2014 to 58 minutes in 2015, which was higher compared to those people in their 30s and 40s.

The number of subscribers and users for the representative mobile SNS services, Kakao Story, Facebook, and Naver Band, all dropped in the past year.

Figure 1-3-3

Number of Monthly Subscribers and Users of Major SNS Services

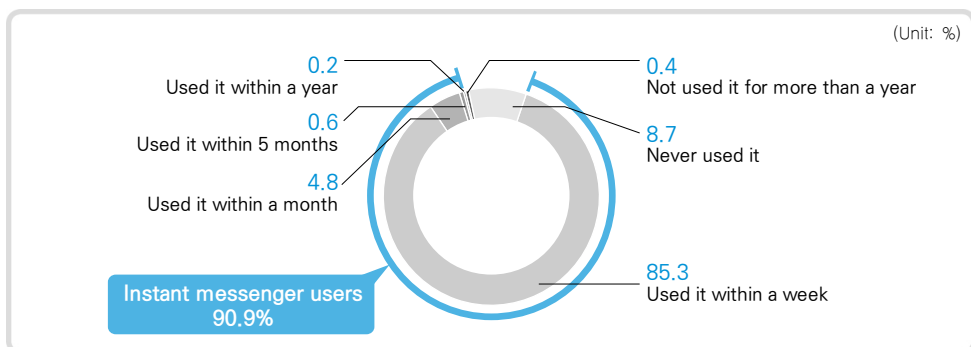


[TNS Korea, Digital World Quarterly Reports, 2016]

2) Instant Messaging

Figure 1-3-4

Instant Messaging Usage (Internet Users Aged 6 and Older)



[KISA, 2015 Survey on the Internet Usage, Dec. 2015]

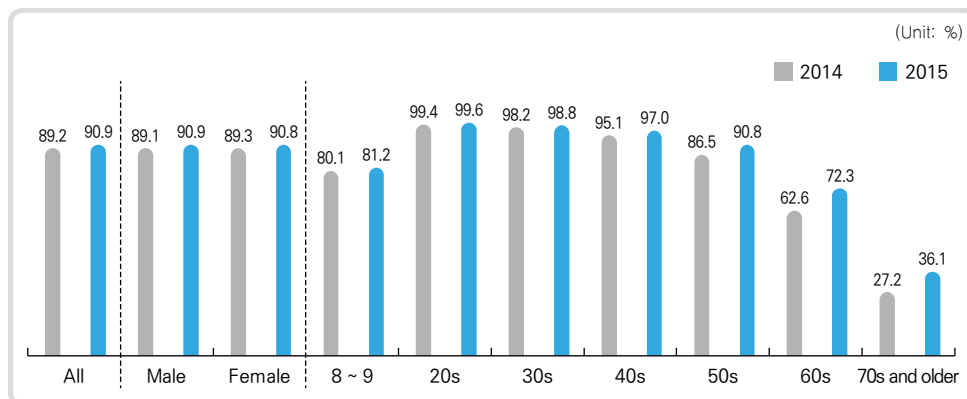
In Korea, the number of mobile messenger KakaoTalk's MAU has reached 40.06 million, and its global users reached 48.32 million. Kakao Talk is used in 15 languages in 230 countries.

According to the KISA's "2015 Survey on Internet Usage", 90.9% of Internet users have used instant messaging within a year, which was a 1.7% increase from the previous year. Moreover, the survey result showed that 8 out of 10 people (85.3%) used instant messaging "within a week".

The difference in instant messaging usage rate between genders was similar in males (90.9%) and females (90.8%), and by age group, the usage rate from people in their 20s to 50s was more than 90%. The increase rate in the elderly group, including people in their 70s and older, was noticeable compared to those in the previous year (people in their 60s at 9.7%, and people in their 70s and older at 8.9%).

Figure 1-3-5

SNS Usage rate in Korea by Gender and Age (Internet Users Aged 6 and Older)



[KISA, 2015 Survey on the Internet Usage, Dec. 2015]

3) Email

A traditional means of communication, email, has been showing a slow decline after maintaining the user rate of 59% in the past year, despite the steady increase in the usage rate of instant messaging and SNS. Since its drop is not significant, it still maintains its supplementary role.

3. Internet Information Services

According to the KISA, the email usage rate of domestic Internet users within the past year was 59.2%, which was a 0.2% drop from 2014, while the email usage rate in the past month was 49.6%.

The gender-specific email usage rate showed that males (64.2%) used email 11.7% more than females (53.9%), and by age group, it is ranked in the order of people in their 20s (87.8%), those in their 30s (82.3%), and those in their 40s (64.8%).

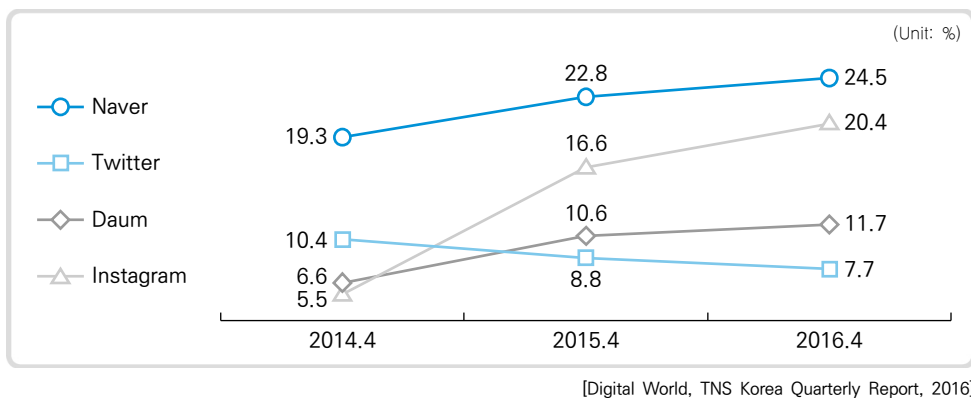
Moreover, 59.4% of the email users who are aged 6 and older are using email for personal use more than once a week. In the work email user group, 77.2% of them use email for work, while 27.9% of them (36.2% of the work email users) use email for work “more than once a day”.

4) Internet Café

The usage rate of café services provided by portal companies has been increasing in the mobile environment. The user rates of Naver and Daum cafés have reached 24.5% and 11.7%, respectively, as of April 2016, increasing by 5.2% and 5.1%, respectively, within the past two years. Moreover, the monthly user rate of Instagram, which was only at 5.5% two years ago, has increased up to fourfold to 20.4% as of April 2016.

Figure 1-3-6

Monthly User Rate of Major Portals' Internet Café Services



C. Contents

1) Video and Web Drama

The size of the broadcasting industry is around KRW15.77 trillion, which was a 5.6% increase from 2014. The sales of IPTV showed a significant increase, owing to an upsurge in the number of users, and earned KRW1.50 trillion, which was a 33.2% increase from that of 2014. The number of IPTV subscribers has increased by 24.2% from 2014's 10.86 million (2013's 8.74 million).

Table 1-3-1

Average Sales per Broadcasting Company and per Worker (as of 2014)

Category		No. of Companies (company)	No. of Workers (person)	Revenue (KRW1 million)	Average Sales per Company (KRW1 million)	Average Sales per Worker (KRW1 million)
Terrestrial TV	Broadcaster	53	14,365	4,004,870	75,564	279
	Mobile Multimedia Broadcaster	3	103	10,431	3,441	101
	Sub-total	56	14,468	4,015,301	71,702	278
Cable TV	Comprehensive Cable Broadcaster	92	4,692	2,346,191	25,502	500
	Relay Cable Broadcaster	65	151	3,098	48	21
	Sub-total	157	4,843	2,349,289	14,964	485
Satellite TV	Satellite Broadcaster	1	320	553,239	553,239	1,729
	Mobile Multimedia Broadcaster	-	-	-	-	-
	Sub-total	1	320	553,239	553,239	1,729
Program Production for TV Channel	Program Provider	181	14,339	6,306,708	34,844	440
Internet Program Production	IPTV	3	645	1,498,383	499,461	2,323
Independent Program Production	Independent Program Provider	496	6,782	1,051,715	2,120	155
Total		894	41,397	15,774,634	17,645	381

[MSCT and Korea Creative Content Agency (KOCCA), 2015 Korean Content Industry Statistics, 2016]

According to the Korean Film Council's "2015 Korean Movie Industry Report", the revenue of the Korean movie industry in 2015 has exceeded KRW2 trillion for two consecutive years, and earned KRW2.11 trillion in 2015, which was a 4.2% increase from 2014. The total sales of the digital online market in the movie industry in 2015 reached KRW335 billion, which was a 12.7% increase from that of 2014. The sales of IPTV and digital cable TV (TV VOD) services have been steadily increasing.

Table 1-3-2

Revenue of the Digital Online Market within the Movie Industry

(Unit: KRW100 million, %)

Category	2013		2014		2015	
	Sales	Increase Rate from 2012	Sales	Increase Rate from 2013	Sales	Increase Rate from 2014
IPTV and Digital Cable	1,737	32.6	2,254	29.7	2,609	15.7
Internet VOD (Mobile + N Screen)	729	18.0	499	▽31.5	582	16.7
Package Product	210	▽8.7	218	3.0	158	▽27.4
Total	2,676	24.0	2,971	11.0	3,349	12.7

[Korea Film Council (KOFIC), 2015 Korean Movie Industry Report, 2016]

2) Music

According to the "2015 Korea Content Industry Statistics", the total sales of the music industry has annually increased by 11.7%, from 2010's KRW2.96 trillion to 2014's KRW4.61 trillion. The sales of the online music distribution business reached KRW1.18 trillion, which was an 11.3% increase from the previous year, and earned an average annual growth of 11.3% for the past three years, from 2012 to 2014.

Table 1-3-3

Revenues of Type-specific Online Music Distribution Businesses

(Unit: KRW1 million)

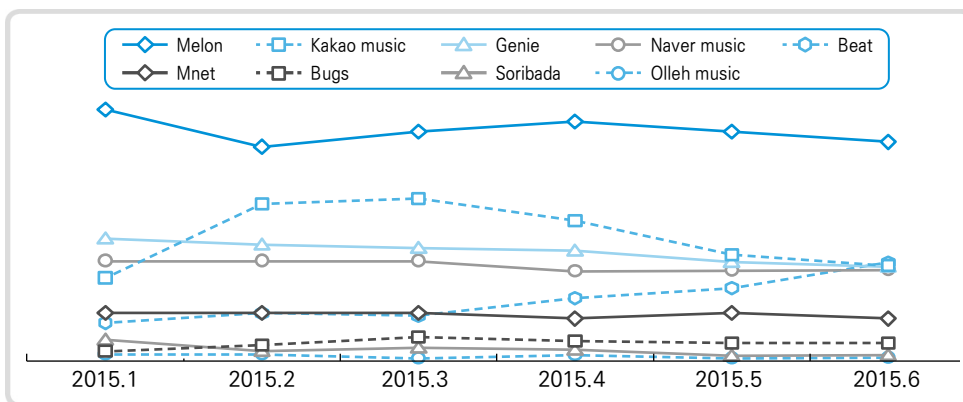
Category	2012	2013	2014	Increase Rate from 2013 (%)	Average Annual Growth Rate (%)
Internet/Mobile Music Service	780,121	881,207	995,260	12.9	13.0
Digital Music Brokerage	91,279	97,694	102,632	5.1	6.0
Internet/Mobile Music Content Production and Distribution (CP)	81,123	80,186	81,156	1.2	0.0
Sub-total	952,523	1,059,087	1,179,048	11.3	11.3

[MSCT and KOCCA, 2015 Korean Content Industry Statistics, 2016]

The medium of enjoying music is changing from offline records to digital music, and the method of using digital music is changing from downloading to streaming. [Figure 1-3-7] showed the “UV (Unique Visitors)” of Android-based mobile services, which have been predominantly used by domestic users.

Figure 1-3-7

Usage of Major Domestic Digital Music Services (Android-based, January–June 2015)



[KOCCA, 2015 Music Industry White Paper, 2016]

3) Publication and News

The eBook-related businesses in the domestic publication industry have been steadily growing in the past few years. The Internet/mobile e-publication production business has achieved 9.8% growth in 2014, following an 8.5% growth in 2013, and the Internet/mobile e-publication service has achieved 12.6% growth in 2014, following 2013's 11.6% growth.

Table 1-3-4

Revenues of eBook-related Businesses

(Unit: KRW1 million, %)

Category		2012	2013	2014	YoY Growth
Publication	Internet/Mobile e-Publication Production	190,671	206,935	227,230	9.8
Online Publication and Distribution	Internet/Mobile e-Publication Service	123,246	137,480	154,862	12.6

[MSCT and KOCCA, 2015 Korean Content Industry Statistics, 2016]

3. Internet Information Services

The news usage rates are 25% each for TV and the Internet, 18.9% for SNS, and 10.0% for radio. Those in the younger age groups have less contact and usage of news, whereas older generations take more advantage of news. The news usage shares in media are relatively high among the older generations.

Table 1-3-5 News Usage Share per Age Group and Media

(Unit: %)

Category	Overall Average	20s	30s	40s	50s	60s and Older
TV	25.0	19.3	23.0	25.7	27.3	26.3
Internet	Mobile Internet News	28.0	25.0	27.3	30.8	34.8
	Fixed Internet News	24.1	19.5	24.8	25.7	38.5
	Average of Fixed and Mobile News	26.2	22.4	26.1	29.2	36.2
	SNS	18.9	18.9	18.2	16.0	22.2
Newspaper	100.0	100.0	100.0	100.0	100.0	100.0
Radio	18.5	11.4	14.1	16.5	18.3	24.3
Total	26.6	21.4	24.9	28.1	29.8	30.1

* The news usage share per media refers to the portion of the news usage during the relevant media's time share.

[Korea Press Foundation (KPF), 2015 Media Audience Survey, 2015]

Watching the news via mobile devices is largely divided into portal apps and media apps. The news usage rate through mobile devices can be organized as shown in [Table 1-3-6].

Table 1-3-6 Usage Rate for Portal and Media News via Mobile Devices

(Unit: %)

Category	Overall	20s	30s	40s	50s	60s and Older
Using Portal App	42.9	47.4	50.1	42.0	35.4	30.9
Using Media App	16.7	18.8	22.0	14.3	13.0	11.0

[Korea Press Foundation (KPF), 2015 Media Audience Survey, 2015]

4) Comics and Animation

According to MCST's "2015 Korean Contents Industry Statistics", the revenue of the domestic comics industry in 2014 was KRW854.8 billion. The sales of online comics production and distribution amounted to KRW101.2 billion, which was about 11.8% higher, and it has been maintaining a sharp incline with a 24.6% increase in 2014.

Table 1-3-7

Revenue of Online Comics Production and Distribution Businesses

(Unit: KRW1 million)

Category	2012	2013	2014	Sales Portion (%)	Increase Rate from 2013 (%)
Internet/Mobile Comics Content Production and Distribution (CP)	15,644	18,017	21,564	21.3	19.7
Internet Comics Content Service	36,319	46,641	59,482	58.8	27.5
Mobile Comics Content Service	13,406	16,566	20,153	19.9	21.7
Total	65,369	81,224	101,199	100.0	24.6

[MSCT and KOCCA, 2015 Korean Content Industry Statistics, 2016]

According to the KOCCA's "Webtoon Industry Status Survey" released in June 2015, there were 28 webtoon service platforms, 4,661 Korean webtoon artists, and 4,440 series in progress in 2014.

According to "2015 Korean Content Industry Statistics" conducted by MSCT and KOCCA, there were 350 animation companies and 4,505 workers in the animation industry in 2014. The revenue was KRW560.2 billion.

Table 1-3-8

Average Sales of the Animation Industry per Business and Worker (as of 2014)

Sub-category	Third-level Category	No. of Companies (company)	No. of Workers (person)	Revenue (KRW1 million)	Average Sales per Company (KRW1 million)	Average Sales per Person (KRW1 million)
Animation Production	Animation Creation Production	181	2,541	260,365	1,438	102
	Animation Subcontract Production	101	1,652	108,330	1,073	66
	Online (Internet/Mobile) Animation Production	14	45	8,950	639	199
	Sub-total	296	4,238	377,645	1,276	89
Animation Circulation and Distribution	Animation Circulation, Distribution, and PR	37	132	171,623	4,638	1,300
Online Animation Distribution	Online Animation Service (Internet/Mobile)	17	135	10,980	646	81
Total		350	4,505	560,248	1,601	124

[MSCT and KOCCA, 2015 Korean Content Industry Statistics, 2016]

3. Internet Information Services

5) e-Learning

e-Learning, which includes educational activities that enable level-specific learning by using IT technologies without the restriction of time or space, collectively refers to learning services via electronic means and IT and radio/broadcasting technologies. It is also called “Internet learning”, “web-based learning”, “cyber learning”, “remote learning”, or “electronic learning”.

According to the National IT Industry Promotion Agency (NIPA)’s “2015 e-learning Industry Status Survey”, the revenue of domestic e-learning operators in 2015 was KRW3.49 trillion, which was 8.4% higher from that of 2014. On the composition of e-learning sales, the revenue of the e-learning service providers took 70.3%, followed by contents (19.8%) and solutions (9.9%).

Table 1-3-9 Revenue of e-Learning Service Providers

(Unit: KRW100 million, %)

Category	2013		2014		2015		Increase Rate from 2014
	Sales	Share	Sales	Share	Sales	Share	
Content	5,864	19.9	6,457	20.1	6,894	19.8	6.8
Solution	2,705	9.2	3,034	9.4	3,466	9.9	14.2
Service	20,901	70.9	22,650	70.5	24,491	70.3	8.1
Total	29,470	100.0	32,141	100.0	34,851	100.0	8.4

[NIPA, 2015 e-Learning Industry Status Survey, 2016(Reconstructed)]

The businesses offering e-learning services were divided into general companies (91.7%) and private institutes (7.9%), while main businesses of general companies are composed of education (48.3%), IT service (39.1%), and distribution (4.6%).

Table 1-3-10 Major Businesses of Service Providers

(Unit: %)

Category	General Company								Private Institute	Others
		Education	Radio/ Broadcasting	IT Service	Finance	Manufacturing	Distribution	Others		
Content	98.1	11.0	3.8	77.0	0.0	6.2	1.9	0.0	1.9	0.0
Solution	99.2	25.0	2.5	56.7	0.0	2.5	12.5	0.8	0.8	0.0
Service	87.8	69.0	2.3	19.4	0.8	1.6	3.9	3.1	11.6	0.7
Total	91.7	48.3	2.7	39.1	0.5	2.8	4.6	2.0	7.9	0.4

[NIPA, 2015 e-Learning Industry Status Survey, 2016(Reconstructed)]

The e-learning introduction rates of companies in 2015 showed that the companies with more than 300 employees had 66.2%, while the companies with less than 300 employees had 45.1%. The companies with less than 50 workers had 18.8%, and small companies with less than 10 workers had 4.7%. Meanwhile, the e-learning usage rate of the formal educational institutions that adopted and utilized e-learning is 87.9%, and the government and public agencies at 82.4%.

In terms of individual e-learning usage areas, the relevant market was mainly reflected in the needs of primary users, teenagers and people in their 20s. Thus, foreign language studies (26.9%) and license studies (18.6%) occupied a high portion of the e-learning market, followed by the elementary/middle/high school curriculum (13.2%), work (10.6%), and IT (10.2%).

In terms of the corporate usage of e-learning, work (60.8%) had the highest portion, followed by foreign language (6.3%), basic quality education (6.0%), license (5.3%), and industrial technology (4.0%).

Since the enactment of “the e-Learning Industry Development and e-Learning Utilization Promotion Act” in January 2004, the government has organized various support policies for the expansion of e-learning. The first step was promoting e-learning competitiveness enhancement and demand creation by establishing “The Primary Basic Plan for (2006~2010) e-Learning Industry Development and Activation”. In “The Secondary (2011~2015) Basic Plan”, the government promoted market creation in the industrial and public sectors to improve the e-learning industry ecosystem, develop e-learning-related technologies, cultivate relevant talents, and stimulate the utilization of e-learning. In terms of the new tertiary basic plan, the government has been collecting the opinions of experts from various fields to establish a three-year (2016~2018) plan.

D. Mobile Applications

Apple’s App Store was launched in 2008 with 500 applications, and the number has exceeded 1.5 million in 2016. Google Play was released next, followed by Amazon Web Store, RIM Store, and Window Marketplace. There are domestic app stores,

3. Internet Information Services

including T Store and Naver Store, as of 2015. The annual revenue of the domestic app per market is as follows.

Table 1-3-11 Annual Revenue of the Domestic App Market Content

(Unit: KRW100 million)

Category		2014	2015	2016
Apple App Store	Sales	15,370	20,752	35,417
	Market Share	32.3%	33.4%	34.9%
Google Play	Sales	24,338	31,903	37,589
	Market Share	51.1%	51.4%	51.7%
Domestic App Store	Sales	6,131	7,926	8,506
	Market Share	12.9%	12.8%	11.7%
Others	Sales	1,788	1,475	1,228
	Market Share	3.8%	2.4%	1.7%
Total		47,627	62,055	72,741

[MSCT, etc., 2015 Wireless Internet Industry Status, 2015]

Table 1-3-12 Revenue of Domestic App Market per Content Field (2015)

(Unit: KRW100 million)

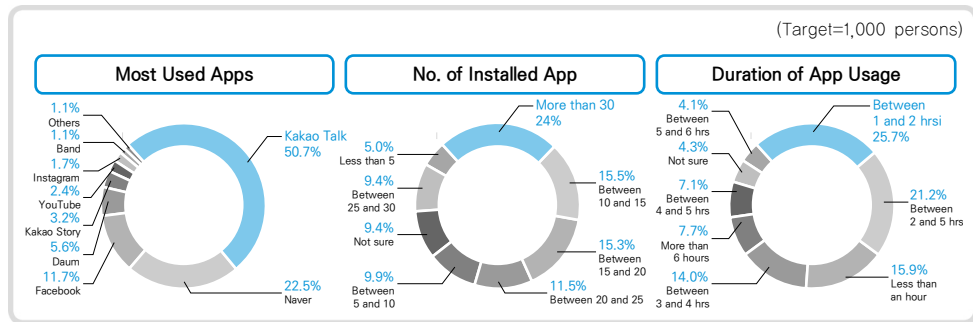
Category	Apple App Store		Google Play		Domestic App Store		Others	
	Sales	Market Share	Sales	Market Share	Sales	Market Share	Sales	Market Share
Game	7,879	27.8%	14,765	52.1%	4,960	17.5%	737	2.6%
Multimedia	3,812	40.9%	4,912	52.7%	596	6.4%	0	0.0%
Communication	1,433	38.2%	2,036	54.3%	281	7.5%	0	0.0%
eBook	1,857	39.1%	2,465	51.9%	283	6.0%	145	3.0%
Lifestyle	3,952	47.9%	3,647	44.2%	651	7.9%	0	0.0%
Business/Productivity	931	27.8%	1,722	51.4%	498	14.9%	199	5.9%
Educational Service	565	18.3%	1,721	55.8%	657	21.3%	142	4.6%
Other Contents	324	26.8%	634	52.4%	0	0.0%	252	20.8%
Total	20,752	33.4%	31,903	51.4%	7,926	12.8%	1,475	2.4%

[MSCT, etc., 2015 Wireless Internet Industry Status, 2015]

The Open Survey's research (Dec. 2015) showed that 24% of Korean smartphone users have installed more than 30 apps, with social network services as the most used apps. The highest duration of use was 1 to 2 hours.

Figure 1-3-8

Most Used Apps, the Number of Installed Apps, and the Duration of App Usage of Korean Smartphone Users



[Open Survey, 2015]

E. Location-based Services

Location-based services (LBS) offer a variety of information related to location, including location tracking, public safety, and moving distance by using the GPS (Global Positioning System) function of the mobile device, such as a smartphone, and the information from the mobile carrier's base station.

In May 2012, the 「Act on the Protection, Use, etc. of Location Information」 was revised so the National Emergency Management Agency, Korea Coast Guard (KCG), and the Police Headquarters could utilize individual location information in case of emergency. The revision in the 「Act on the Protection, Use, etc. of Location Information」 enabled the Police Headquarters to quickly identify the location of a person during an emergency an emergency such as kidnapping or abduction, and rescue the subject by using the individual location information.

Though it is now possible to widely utilize location information in case of emergency, there are still issues regarding the accuracy of the location information. The location information from the mobile carrier base is not very useful due to a large error range, and the GPS-based location information can only be used outdoors. Thus, the Korea Communications Commission (KCC), in consideration of many skyscrapers and underground facilities in Korea, developed the technologies and infrastructures that can

3. Internet Information Services

detect location indoors, and established a pilot location information utilization platform to widely utilize the social safety network of the location information in case of emergency. The pilot project aims to provide the services within 30 meters and less error range (80% reliability, within Wi-Fi overcrowded area) of location positioning through the expansion of the Wi-Fi AP DB establishment range.

In November 2011, Google launched its indoor map service through the Google Maps V6.0 upgrade for Android. In Korea, KT and Lotte Department Store launched the “Lotte Inside Eye” service based on the user’s location by using the Olleh Wi-Fi zone. The service offers an indoor directional guide and a parking space guide. SK Telecom and Shinsegae Department Store have been providing relevant service based on the smartphone-based customer care system. In December 2012, Naver launched an indoor map service through its map service, and, in February 2014, Hyundai MnSOFT developed and commercialized an indoor navigation service technology that guides cars as they enter a building.

The location-based service has been growing together with the smartphone market, which has been experiencing rapid growth since 2010. As of February 2016, there are 155 location information providers and 866 location-based service providers, and the numbers are growing every year.

Table 1-3-13

Permit and Registration of Domestic LBS Providers (As of Feb. 2016)

(Unit: Company)

Category	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Feb. 2016
Location Information Provider	19	29	36	48	57	74	84	97	114	132	155	155
Location-Based Service Providers	66	88	107	119	148	202	414	551	676	738	848	866
Total	85	117	143	167	205	276	498	648	790	870	1,003	1,021

[KCC, 2016]

F. Cloud Services

In Korea, many policy initiatives have been established since 2009 to activate the cloud market and enhance its global competitiveness. The enactment of the “Act on Cloud Computing Development and User Protection” in September 2015 is evaluated as a promulgation of legal and institutional means to promote domestic cloud computing and to enhance cloud-based, national ICT competitiveness.

The MSIP has established the “Measures for Cloud Computing Information Protection” in September 2015, and confirmed the “K-ICT Cloud Computing Activation Plan” (as the primary basic plan for cloud computing development) in cooperation with relevant ministries in November 2015.

The specifics of the basic plan are as follows. First, the switch to the government’s private cloud, G-Cloud, will be accelerated to proactively adopt cloud computing in the public sector. Second, the current rate of cloud computing usage in the private sector, which was 3.3%, will be increased to 30% by 2018 through the improvement of the safe cloud computing usage environment and system, and the application of cloud computing in small businesses and the relevant industry. Third, an ecosystem where the cloud industry can grow will be established to ensure smooth dissemination of cloud computing in the public and private sectors. The government will also expand the R&D investments (9% out of all software R&D in 2015 → 20% in 2018), operate a cloud talent cultivation institute to train personnel specifically to meet corporate demand, and increase the number of university research centers (ITRC) in the area of cloud computing (2 in 2015 → 4 in 2018).

According to NIPA’s “Survey on the Cloud Industry (2015)”, the size of the domestic cloud market in 2015 was worth KRW766.4 billion, a 46.3% increase from 2014. The shares of medium and greater companies and SMBs are KRW438.6 billion and KRW327.8 billion, respectively. In terms of sales growth per company size, larger companies had 39.5%, and SMBs had 56.4%, reflecting a significant growth of SMBs. The number of cloud companies has reached 353, a 36.8% increase from that of 2014. However, according to the “2015 Yearbook of Information Society Statistics”, the

3. Internet Information Services

usage of cloud computing in Korea has increased from 3.3% to 4.7%, a low increase rate.

It is estimated that the domestic companies' entry into the cloud market and globalization would be possible by focusing on SaaS, which has the biggest market size.

Table 1-3-14

Korean Companies' Entry into the Overseas Cloud Market

Category	Content	Note
 Polaris Office (Office)	- Infraware (Released in April 2014): The number of subscribers reached 26 million in 244 countries within 1 year of its release (Overseas users: 23.66 million, 91%) * Promoting the expansion of overseas market entry in connection with cloud services, including Amazon and Google	Amazon, Google-based
 Netoffice 24 (Office)	- Hancom (Released in April 2015): The number of current subscribers-3.3 million * Launched its full-fledged entry into the overseas market in 2016 (Aiming for 10 million subscribers)	Amazon-based
 K-System (ERP)	Younglim Softlab (Release in April 2015): Released in the Japanese and Chinese markets; to be launched in the Southeast Asian markets in 2016	Microsoft-based

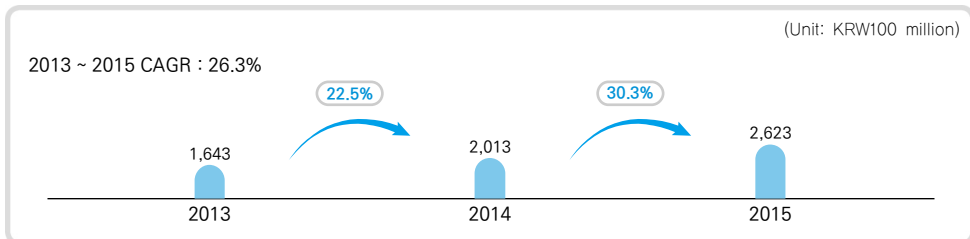
[Relevant agencies, K-ICT Cloud Computing Activation Plan, 2015]

G. Big Data Services

The size of the domestic big data market in 2015 was worth KRW262.3 billion, which translated into more than 30% growth over the previous year. Considering the domestic condition in the early introduction stage, it is viewed as a meaningful growth. As the government's big data-related investment has increased from 2013's KRW23 billion to 2014's KRW49 billion and 2015's KRW69.8 billion, the growth rate in the government was 42.4%, and 26.4% in private investment from 2014~2015.

Figure 1-3-9

Volumes of the Domestic Big Data Market



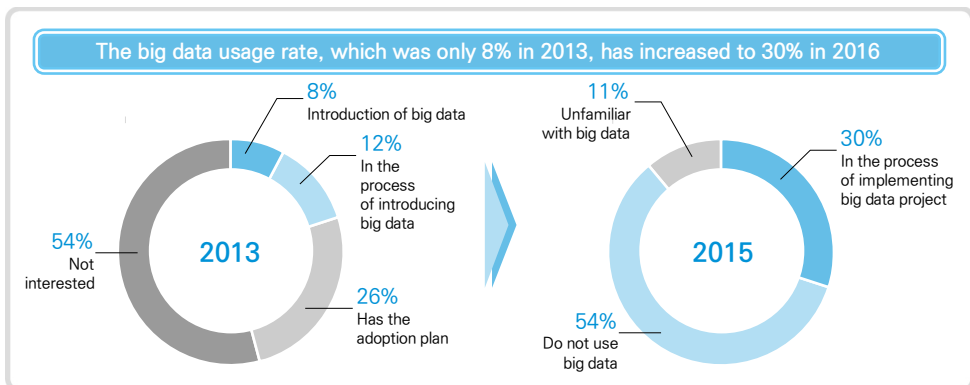
[National Information Society Agency (NIA), 2015 Big Data Market Status Survey, 2015]

The size of the private investment, which requires the establishment of big data platform and system, was KRW179.1 billion in 2015. The volume of the government's investment was worth KRW69.8 billion, showing that the share of public investment in the overall big data market is 26% and more.

The domestic companies' adoption rate of the big data system (100 employees and more) was about 4.3%, showing a small increase from the previous year. The big data adoption rate of global companies was, however, close to 30%, so Korea is still in the early stages.

Figure 1-3-10

Global Big Data Adoption Rate

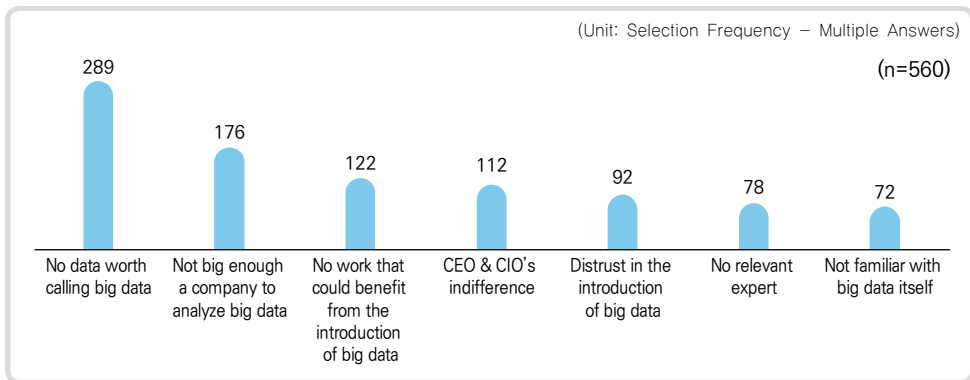


[Techpro Research, Big Data and IoT, 2015]

Most companies that do not use big data tended to think that they were unrelated to big data due to the nature of their business, and manufacturing companies had

massive distrust in the effect of introducing big data.

Figure 1-3-11 Reasons for Not Adopting Big Data



[NIA, 2015 Big Data Market Status Survey, 2015]

4. Internet Services in the Public Sector

A. Services for the General Public

The government's Minwon24 (www.minwon.go.kr) is a comprehensive online civil administrative portal where the general public can take advantage of civil administrative services anytime and anywhere via the Internet, without personally visiting the administrative agency. As of December 2015, it offers information on 5,000 types of court administration works, 3,000 types of requests, and Internet browsing and issuance services on 1,100 civil affairs forms. The number of Internet civil affairs issuances has increased from 16.25 million in 2009 to about 60.00 million in 2015.

An electronic tax system, Hometax (www.hometax.go.kr), is a comprehensive tax administration service that allows taxpayers to conveniently handle all their tax issues, including electronic reports, electronic payments, electronic notifications, and copy issuances at any time of the day without personally visiting the tax office. As such, the rates of electronic tax reports have been increasing annually. As of 2014, 98.9% of withholding taxes, 98.0% of corporate taxes, 92.5% of total income taxes, and 87.2% of value-added taxes have been paid online.

Bokjiro (www.bokjiro.go.kr) is a welfare portal that allows citizens to conveniently search for information on welfare and tailored welfare services offered by relevant departments. It also provides access to a service cost calculator and online applications. As of 2015, the Bokjiro service is offering information on 360 welfare services from 21 government agencies and online applications for 11 welfare supports, including basic pension and child care benefits.

The ministries' information disclosure portal (www.open.go.kr) is a one-stop information disclosure service that combines information disclosure services provided by each agency into one single service. In 2013, the 「Official Information Disclosure

4. Internet Services in the Public Sector

Act¹ was amended, requiring that all information categorized as public information be disclosed, even without a citizen petition. As of March 2016, central government agencies, metropolitan and municipal governments, the metropolitan and municipal offices of education (each school), and 117 public agencies disclosed their information for public viewing. As of December 2015, the number of disclosed documents includes 160,000 in the central administrative agencies, 520,000 in the metropolitan and municipal offices, 840,000 in the cities and countries, and 5.31 million in the educational offices. Moreover, the cumulative downloads of the source information has reached 1.44 million.

The public data portal (www.data.go.kr) is an integrated channel that discloses a variety of information, produced or acquired by public institutions, to the public. The sets of disclosed public information has increased from 5,272 in 2013 to 15,912 in 2015, and disclosure performance has tripled, the number of usage increased 56 times, and the service development increased by 16.5 times in 2015, compared to those in 2013. The number of companies utilizing public data has increased by 3.6 times from 2014's 84 companies to 300 in 2015, thus showing the development of the public data industry.

The E-people (www.epeople.go.kr) is a comprehensive online portal and a venue of participation for the general public to submit civil complaints and suggestions. As a national communication channel where citizens can submit civil complaints about the government, their suggestions, and policy reviews, it is connected to all the administrative agencies, including the central administrative agency and local government, the Department of Justice, and major public agencies. It ensures that all submissions are forwarded to the most appropriate institutions, and the results are disclosed directly to citizens who made the submissions or requests.

Table 1-4-1

Number of Requested and Processed Civil Affairs Submitted Through E-People

(Unit: Case)

Category	2008	2009	2010	2011	2012	2013	2014	2015
No. of Cases	623,434	696,470	797,873	1,068,811	1,242,826	1,514,043	1,689,785	1,903,019

[Anti-Corruption and Civil Right Commission, 2015 Civil Rights White Paper, 2016]

The online administrative appeal service (www.simpan.go.kr) is a relief procedure to address the violation of a private right of a citizen due to the illegal act or unfair ruling of an administrative agency and other use or non-use of public authority. The number of administrative appeal cases submitted in the Central Administrative Appeals Commission in 2015 was 24,425, that was 876 less than that of the previous year.

B. G2B Services

The government promoted G2B (Government to Business) informatization to provide companies efficient service and to support the enhancement of corporate competitiveness by improving corporate-related processes and services, including licensing and approval and information disclosure. Through this process, the companies received standardized and simplified civil affairs forms, largely improving the average times and costs of doing business, following the delay in administrative processes, and creating new added values by focusing on their businesses.

Typical examples are the provision of an integrated information service that links related agencies so that the administrative procedures for business startups and factory construction as well as the provision of integrated logistics, trade, and customs clearance services, which used to be provided by separate agencies, are now combined for the purposes of convenience. Moreover, comprehensive policy information services are provided to SMBs, such as policy information related to the management of SMBs, prices of raw materials, and overseas market information, and the procurement processes of agencies and public institutions have been put online to ensure transparent procurement and provide civil services to suppliers. Additionally, the patent service enables all patent procedures, such as those of industrial property right applications, evaluations, registration, judgments, and bulletin publication, to be handled electronically without having to visit an office in person.

4. Internet Services in the Public Sector

Table 1-4-2

Internet Services for Enterprises in the Public Sector

Services	Website	Contents
Government for Business	G4B (www.g4b.go.kr)	A corporate support portal service offering the government's civil affairs administration and industrial information that accompanies the whole process of the company's activity period
National Logistics/Trade Information Linkage/Integration	National Logistics Information Center (www.nlic.go.kr)	A user-centric logistics information service that collects, integrates, and offers independently existing ground, marine, and air logistics information
	Shipping and Port Integrated Data Center (www.spidc.go.kr)	A service supporting the provision of comprehensive marine and port logistics information, and the joint utilization of information among main maritime logistics agents and their cooperation
	uTradeHub (www.utradehub.or.kr)	An e-trading service that processes the overall trading businesses from marketing, trading, logistics, customs, and foreign currency exchange
	UNI-PASS (portal.customs.go.kr)	An electronic customs clearance service and the Internet-based import/export customs reporting system that supports the customs report submission, approval, customs payment and refund, and requirement verification
SMB Policy Information Service	Bizinfo (www.bizinfo.go.kr)	A comprehensive information provision service for SMBs on SMB support, SMB policy, business guide, and consulting for comprehensive civil affairs
Comprehensive e-Procurement Service	Korea Online E-Procurement System (www.g2b.go.kr)	A single window service for national, comprehensive three-step procurement where the user can handle and verify entire government procurement services, from bidding, contract conclusion, inspection, and payment over the Internet
Patent Information Service	Korea Intellectual Property Office (www.patent.go.kr)	A service for general patent-related businesses, including online applications for patent registration and inquiring of progress information

[Agency-specific Services Websites for Companies (Reconstructed), 2016]

**KOREA INTERNET
WHITE PAPER**

2016

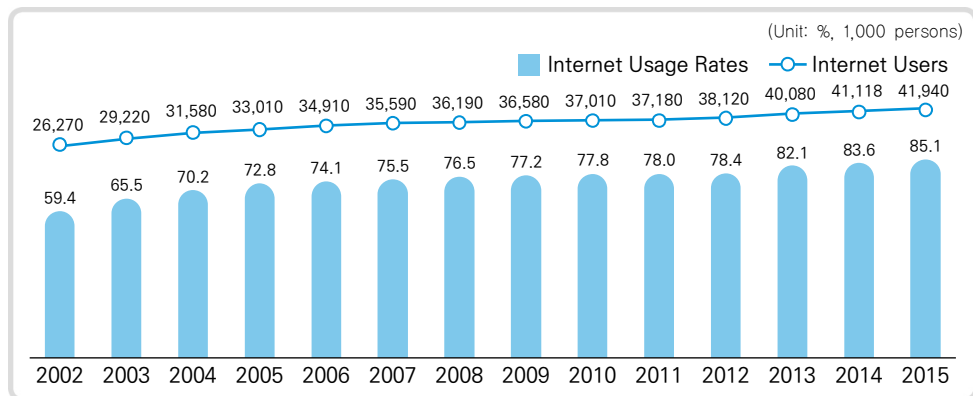
1. Internet Utilization

A. Individuals and Households

According to the “2015 Survey on Internet Usage” conducted by the MSIP and the KISA, the Internet usage rate of people aged three years and older (who used the Internet at least once within the past month) was 85.1%, which increased 1.5% from the previous year, bringing the total number of Internet users to 41.94 million (822,000 more users than that of 2014). The Internet usage rate was 59.4% (26.27 million users), but with the rapid dissemination of high-speed Internet infrastructures and mobile Internet, the rate has increased by 28.5%, and the number of users reaching about 17.56 million (1.7 times more). Meanwhile, the Internet usage rate of users aged 70 years and older has increased 17.9%, with the number of users at 806,000 (up 3.8%, or 190,000 people from 2014), showing a steady increase.

Figure 2-1-1

Changes in Internet Usage Rates and Users



* 2002~2005: Users aged 6 years and older

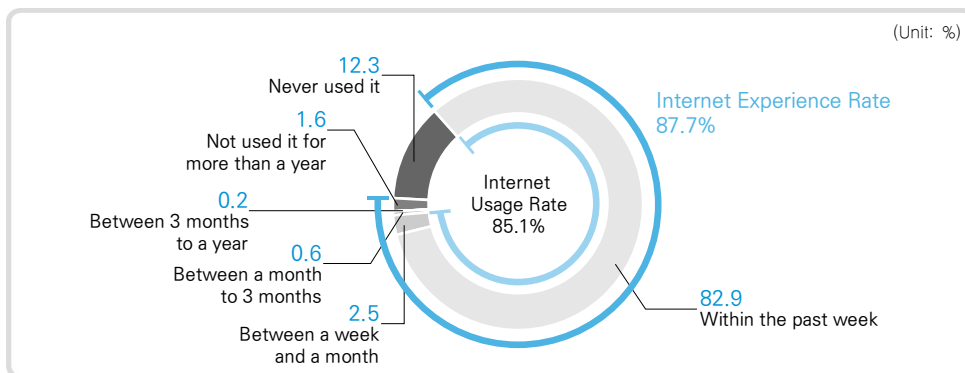
* After 2006: Users aged 3 years and older

[KISA, 2015 Survey on Internet Usage, 2015]

Among those aged three years and older, approximately 87.7% had some experience using the Internet, and by Internet usage time, 85.1% answered “within the past month”, 85.8% answered “within the past three months”, and 86.0% answered “within the past year”.

Figure 2-1-2

Recent Internet Usage



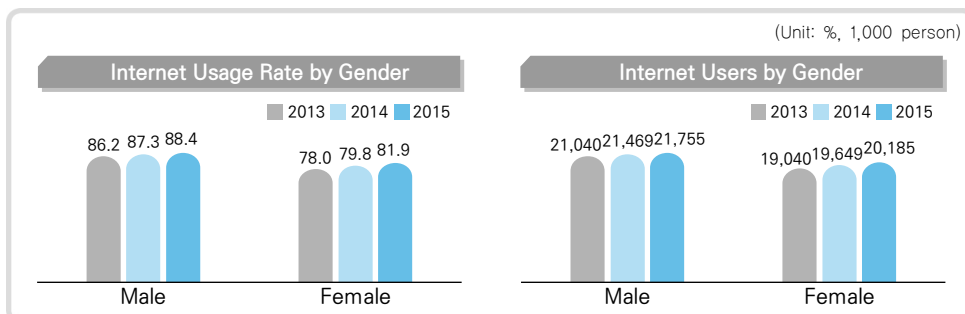
* Users aged 3 years and older

[KISA, 2015 Survey on the Internet Usage, 2015]

Among those aged three years and older, the Internet usage rate of males was 88.4%, while that of females was 81.9%, and of the total number of Internet users, there were 21.76 million male users and 20.19 million female users. Looking at the gender ratio, it was 51.9% for males, and 48.1% for females, which showed that males used the Internet with higher probability than females.

Figure 2-1-3

Gender-Comparison of Internet and Users Usage Rate and users



* Users aged 3 years and older

[KISA, 2015 Survey on Internet Usage, 2015]

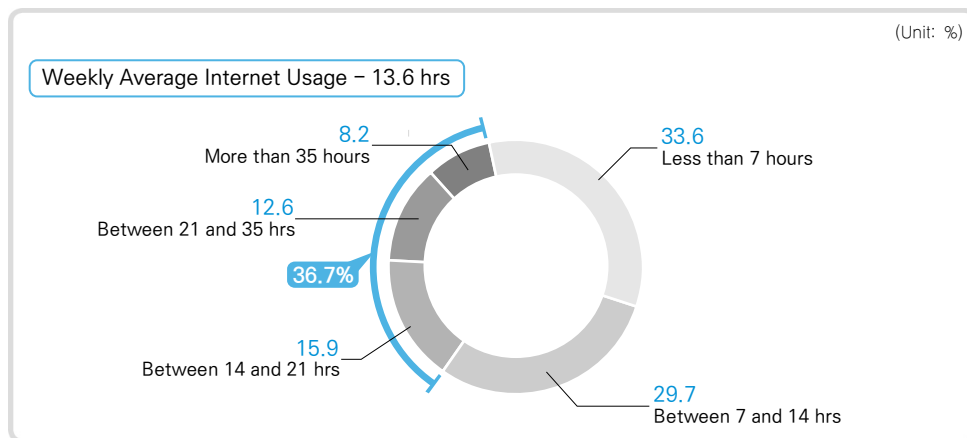
By age group, the Internet usage rates of teenagers (99.9%), people in their 20s (99.9%), those in their 30s (99.8%), and those in their 40s (98.8%) were in the 90% and higher levels, while the Internet usage rate of the people in their 60s (59.6%) has increased by 9.0% from that of the previous year, which was a higher growth rate than those of other age groups.

People in their 40s had the highest number of Internet users with 8.36 million, which was followed by people in their 30s with 7.63 million, those in their 50s with 7.25 million, those in their 20s with 6.80 million, and teenagers with 5.65 million.

It was shown that 36.7% of the users use the Internet for an average of 14 hours or more per week (between 14 and 21 hours: 15.9%, between 21 and 35 hours: 12.6%, 35 hours or more: 8.2%), and the average Internet usage time per week was 13.6 hours (about 2 hours a day on average).

Figure 2-1-4

Weekly Average Internet Usage



※ Users aged 3 years and older

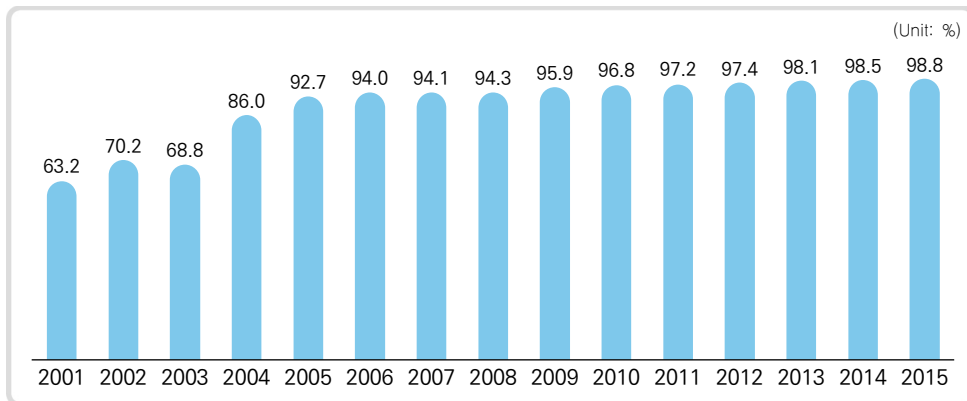
[KISA, 2015 Survey on the Internet Usage, 2015]

The Internet access rate of domestic households in 2015 was 98.8%, which was a 0.3% increase from 2014. To verify the household Internet usage environment, international organizations, such as OECD and ITU, collected the “Households with Internet Access” reports from around the world, and announced the results that were gathered from member countries. According to ITU’s ICT Development Index that was

released in December 2015, the Internet access rate in Korea was in the top spot among 166 member countries.

Figure 2-1-5

Household Internet Access Rate



[KISA, 2015 Survey on Internet Usage, 2015]

In almost all households (99.9%), mobile Internet (2G and higher speed) was available to access the Internet. Other methods for accessing the Internet were wireless LAN (including Wi-Fi and Giga Wi-Fi) (99.8%), optical LAN (including apartment LAN, FTTH) (76%), and xDSL (9.7%). It is estimated that mobile Internet access became possible largely because of the dissemination and utilization of smart devices, such as smartphones.

It was found that 96.7% of the users use the Internet “regardless of place” through smartphones and tablets, and the rate has increased by 1.6% from the previous year. The most popular place for Internet usage was “home” with 92.7%, followed by “workplace” (43.4%), “commercial facilities” (41.8%), and “public facilities” (30.8%).

B. Businesses

According to the results of the “2015 Informatization Statistical Survey” conducted by NIA, the rate of the companies with available Internet access, as of December 2014, was 71% of the entire businesses (approximately 3.7 million), with the number of companies totaling 2,178. It was found that the numbers were similar to those of 2013. By type of business, publication, video, broadcasting communication and information services (99.1%), professional, science, and technical services (98.9%), finance and insurance (98.2%), and real estate and leasing (94.7%) had high Internet access rates. On the other hand, transportation (43.7%), accommodation and restaurants (53%), associations and organizations, repair and other personal services (61.8%) had comparatively lower rates. By organizational type, national/local organizations (100%) had the highest Internet access rate, followed by corporations (98.4%), business subsidiaries (97.8%), non-corporations (86.1%), and private companies (64.6%).

As of December 2014, the Internet access method that was primarily used by companies with Internet access (2.61 million) was optical LAN with a 56.5% rate, followed by cable modem (20.5%) and wireless LAN (6.1%). Compared to the primary Internet access method in 2013, wireless LAN, cable modem, and exclusive line had all increased by 5.3%, 4.2%, and 2.0%, respectively. By type of business, most companies used optical LAN to access the Internet but it was shown that the transportation business used “mobile phone wireless Internet” (41.2%) the most. The businesses that primarily used optical LAN were leasing businesses with 66.1%, followed by wholesale/retail (64.3%) and construction (63.9%).

In 2014, the rate of businesses among the entire ones (3.68 million companies) that purchased or sold products and services through e-commerce was 26.6%, or about 978,000 companies, which was a 1.6% increase from the same time in 2013 (25.0%).

The e-commerce use rates of publication, video, broadcasting communication and information service businesses (57.8%) and finance and insurance businesses (50.1%) were higher than those of other types of businesses, while the rates of transportation (6.1%), accommodation and restaurants (15.4%) and associations and organizations, repair, and other personal service businesses (20.6%) were comparatively lower.

2. Promotion of Internet Utilization

A. Activation of Internet Services

1) Improvement of the Internet Environment

According to the survey by “startcounter.com” in September 2015, the IE browser usage rate in Korea was 67.7%, which was three times higher than the world average of 17.7%, despite the diversification of browsers (Internet Explorer, Chrome, Safari, Firefox, etc.). In order to improve the Internet use environment in Korea, it is necessary to break from the practice of using non-standard technologies, such as ActiveX that only works in IE, and develop and distribute browsers that observe global web standards (HTML5, etc.).

According to the KISA’s “2015 Internet Environment Survey”, the number of ActiveX being used in the top 100 websites in Korea has been reduced from 2014’s 1,644 to 2015’s 621, which was a 62.2% reduction from that of the previous year. The average number of ActiveX used in websites has also dropped from 2014’s 16.4 to 2015’s 6.2, and the number of websites that did not use ActiveX has increased by 12 (2 in 2014 to 16 in 2016).

Moreover, among 621 ActiveX units being used in the top 100 websites in Korea, the number of actual ActiveX programs that eliminated duplication between websites was 286, which was a 21.9% (80) reduction from the previous year. (366 in 2014 → 286 in 2015)

Table 2-2-1

Number of ActiveX Programs

Year	Total	E-Document	Multimedia	Game	PC Control	File Processing	Settlement	Certification	Security	Other
2015	286	58	40	40	38	35	27	24	22	2
2014	366	41	70	77	48	38	22	31	30	9

[KISA, Internet Environment Survey, 2015]

Compared to the practice in foreign countries, the difference in ActiveX usage has decreased from 9.2 times in 2014 to 6.1 times in 2015, showing that the use of ActiveX in Korea is gradually decreasing.

The government established the “next-generation web standards dissemination plan” to establish an Internet environment that is independent of a terminal environment via the use of HTML5 in July 2012. Since the issue of foreigners’ difficulty in accessing domestic websites due to the Accredited Certificate and ActiveX when using e-commerce had been pointed out at the First Ministers’ Meeting on Regulatory Reform (March 2014), the government announced the “global standards-based Internet use environment improvement plan” (May 2014) to enhance national benefit through securing web compatibility and spreading of international standards.

When the reduction of ActiveX usage would not occur despite such effort, the government announced the “ActiveX improvement plan in the private sector” (April 2015), which promoted to replace ActiveX through the provision of various policies, including the development of alternative technology and solutions adoption support.

2) Improvement of Web Accessibility

Since 2004, the government has been steadily pursuing to improve web accessibility through various means such as the enactment of web accessibility-related standards and guidelines, revisions of regulations, surveys, professional training courses, quality certification, seminars, consultations, online support, and the development and distribution of evaluation tools.

The domestic laws related to web accessibility include the 「Act on Welfare of Persons Disability」, the 「Act on the Prohibition of Discrimination of Disabled Persons, Remedy against Infringement of Their Rights, etc.」, and the 「Framework Act on National Informatization」. The 「Act on Welfare of Persons Disability」 that was enacted in 2007 states the prohibition of discrimination against disabled people, and the state and local governments shall pursue efforts to provide disabled people access to information. Moreover, the 「Act on the Prohibition of Discrimination of Disabled Persons, Remedy against Infringement of Their Rights, etc.」 that was enacted in 2008 mandates the provision of legitimate convenience in information communication and in

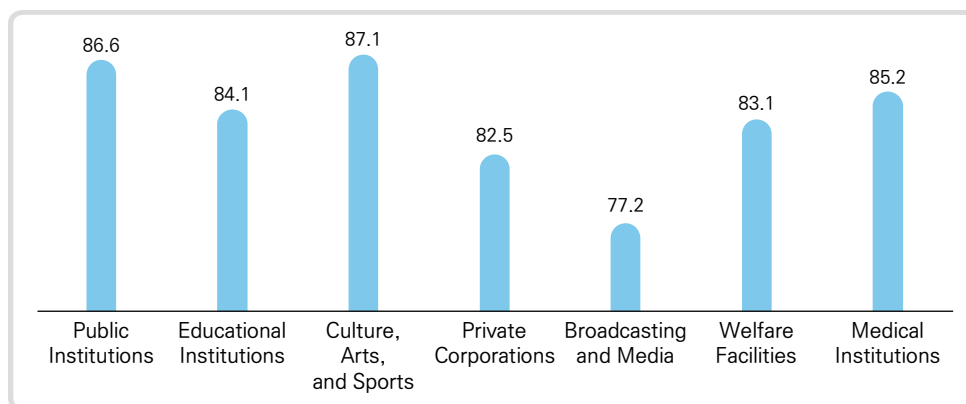
the communication and observation of web accessibility. These acts emphasize adherence by clearly stating the punishment for discriminating against disabled people. The 「Framework Act on National Informatization」 that was enacted in 2009 also mandates the observation of granting disabled people and elderly people web accessibility, and it introduced the national voluntary certification that allows the government to manage quality certification systems to recognize websites for providing excellent web accessibility, and certification agencies through the revision of the 「Framework Act on National Informatization」 in 2013. The web accessibility quality certification business is run by three institutions designated by the MSIP (January 2014), with a total of 2,999 websites certified as of December 2015.

The Korean Web Content Accessibility Guideline was implemented as a national standard in 2005 (revised in 2015), and the Mobile Application Accessibility Guideline (revised in 2015) was established in 2011 to increase accessibility in the area of mobile Internet following the rapid proliferation of smartphones.

According to the 2015 Information Access Survey, culture and art organizations, public institutions, medical institutions, educational institutions, welfare facilities, and private corporations rated in the 80s, but broadcasting and media outlets rated in the 70s, thus needing improvement.

Figure 2-2-1

Average Points for Web Accessibility per Institution Type



[MSIP, 2015 Information Access Survey, 2016]

The businesses that support web accessibility in the private sector include information accessibility diagnosis, consulting and online support for small private agencies, provision of automatic assessment tools for web accessibility (K - WAH), operation of web accessibility websites, and certification systems.

B. Internet Use Culture

1) Bridging the Information Gap

According to the results of the “2015 Information Gap Survey” conducted by the MSIP and the KISA, the PC-based informatization level of underprivileged groups, such as people with disabilities, low income earners, farmers and fishermen, and senior citizens, compared to that of the general public, increased by 2.9%p from 76.6% in 2014 to 79.5% in 2015, which is 34.5%p higher overall than when the survey was first conducted in 2004 (45.0%).

As of 2014, the average Internet usage rate of these underprivileged groups (people with disabilities, low income earners, farmers and fishermen, and senior citizens) was 63.6%, up 8.2% from 2014. This rate is 21.5% lower than that of the general public (85.1%), which decreased by 6.7% from the previous year. This survey showed that the Internet usage rate of underprivileged groups is increasing every year, narrowing the gap with that of the usage rate of the general public.

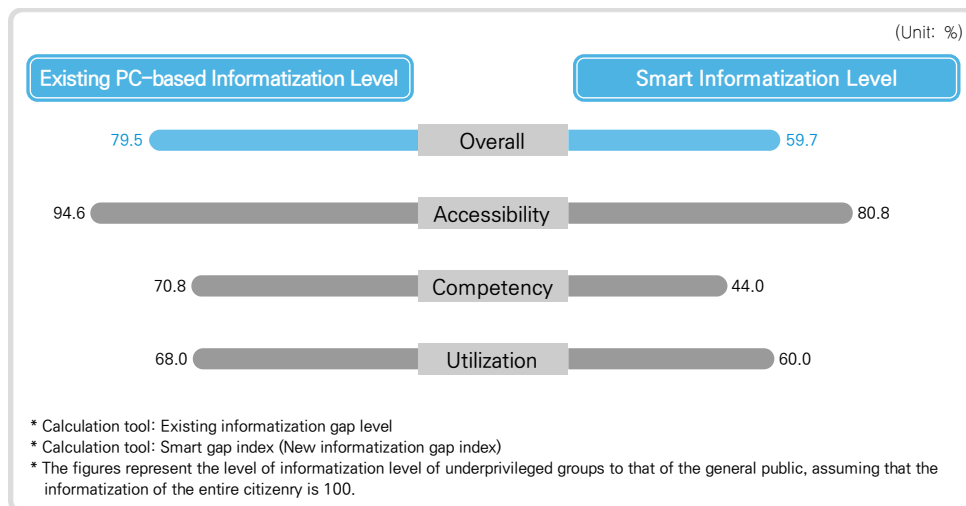
The average computer ownership rate of underprivileged groups was 70.1%, showing a 0.5% decrease from the previous year. The computer ownership rates of underprivileged groups have been annually increasing, narrowing the gap with that of the average computer ownership rate of the general public.

In 2013, the “Smart Gap Index” (New Information Gap Index), which expresses the information gap in the wired and wireless IT environments, was developed and calculated. The Smart Gap Index indicated that the smart informatization level, including the use of both PCs and smart devices in the converged wired/wireless environment, of underprivileged groups was 59.7%, which was a 2.3% increase from

2014's 57.4%. However, it is much lower than their general PC-based, wired Internet informatization level (79.5%).

Figure 2-2-2

Smart Gap Index Calculation Results



* Smart Gap Index (New Informatization Gap Index) = Accessibility Level (0.2) + Competency Level (0.4) + Utilization Level (0.4)

- Accessibility Level: Wired/wireless high-speed Internet access availability and wired/wireless information device (PC and mobile smart device) availability in the household
- Competency Level: Computer literacy, mobile smart device literacy
- Utilization Level: Wired and mobile Internet usability, diversification of Internet service usage, information production/sharing degree, networking level, social and economic activities via the Internet

[NIA, 2015 Informatization Gap Index Survey, 2016]

The government has been carrying out several initiatives to provide underprivileged groups with equal opportunities to access information. The IT assistive devices (74 types, including audio amplifiers) are provided to underprivileged groups with 80% of the cost shouldered by the government. The government subsidies offered are up to 90% of the basic living security expenses of marginalized groups.

The Supply of Green PCs of Love project has been distributing used PCs donated by the government, public institutions, and private companies to information minority groups, including low-income households, since 1997.

Moreover, since November, the government has been offering the telecommunication

relay service for the hearing and speech-impaired when using the telephone.

Also, the government has been providing informatization education to each social group (senior citizens, people with disabilities, foreign marriage immigrants, and North Korean defectors) to enhance the information usage capabilities of information minority groups.

2) Action Toward Cyber Violence

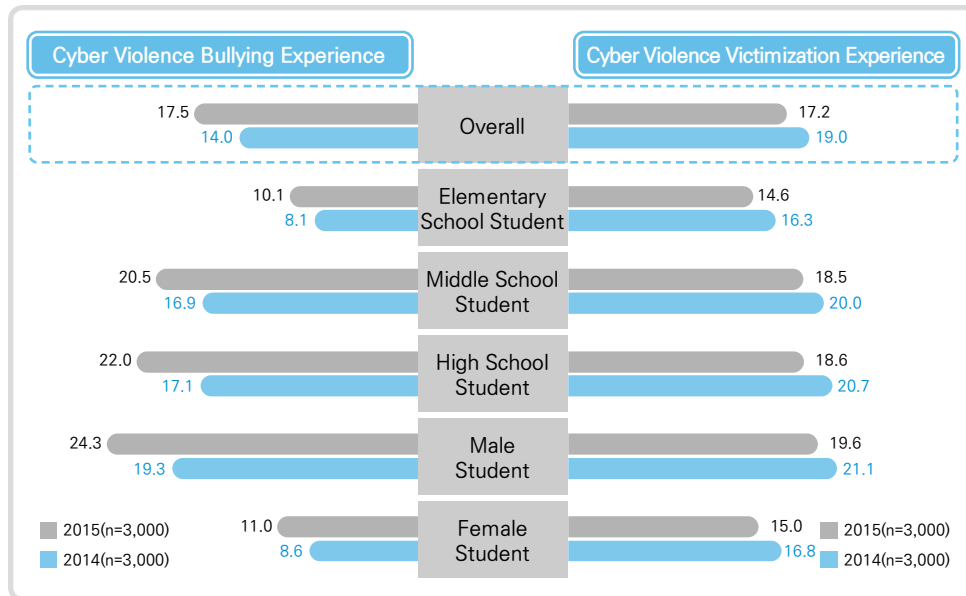
Cyber violence has emerged as a major social problem beyond being a simple Internet issue, triggering social confusion and conflicts by aggravating social discrimination against certain groups and spreading unconfirmed information. Now, efforts must be pursued to raise awareness and find fundamental solutions to solve the problem of cyber violence, and make cyber space pleasant and enjoyable for everyone.

According to the “2015 Cyber Violence Survey” conducted by the KCC and the KISA with the participation of 5,000 respondents consisting of elementary, middle and high school students as well as parents, teachers, and adults, 17.5% of elementary, middle and high school students (from the 4th grade of elementary school to the 3rd grade of high school) have committed acts of cyber violence. In particular, high school students (22.0%) and middle school students (20.5%) committed more acts of cyber violence than elementary school students (10.1%). Moreover, 17.2% of elementary, middle and high school students have personally experienced cyber violence, and high school students (18.6%) and middle school students (18.5%) have suffered more cyber violence than elementary school students (14.6%).

Meanwhile, the bullying (24.3%) and victimization (19.6) experience of male students were higher than those of female students at (11.0%) and (15.0%), respectively.

Figure 2-2-3

Cyber Violence, Bullying and Victimization Experience (Student)



[KISA, 2015 Cyber Violence Survey, 2015]

The reasons for cyber violence among students were “To retaliate against those who committed cyber violence first (43.9%)”, “I do not like the person or I am angry at the person (38.8%)”, and “For fun and to relieve stress (22.8%)”.

The responsive actions against cyber violence included “Block the person or delete or change my ID or email address (39.1%)”, and “I did not take any counter action”, reflecting the victims’ passive responses.

3) Smartphone and Internet Addiction Prevention and Response

‘Internet addiction is, although it is not clearly defined by psychiatry, the “over-use of the Internet, causing physical, mental, and social damage in one’s daily life”. (Framework Act on National Informatization, Article 3) When deprived of the Internet or their smartphones, Internet addicts become extremely anxious. They are so obsessed with their virtual world that they find it difficult to function in the real world. There are diverse types of Internet addiction, including game addiction, SNS addiction,

and pornography addiction. According to the “Internet Addiction Survey” conducted by NIA in 2015, 2.4% of Internet users between the age 3 and 59 were struggling with Internet addiction (high-risk group: showing all symptoms of withdrawal/tolerance/disruption in daily life). The high-risk group distribution by age group showed that children were at 1.7%, youths at 4.0% and adult at 2.1%, revealing youths were more at risk in terms of smartphone addiction.

A troubling area is that the rate of the high-risk group of youths’ smartphone addiction has been steadily increasing since 2011 (2.2% in 2011 → 2.4% in 2013 → 4.0% in 2015).

The ratio of the potential risk group (showing at least 1 symptom of withdrawal/tolerance/disruption in daily life) was 13.8%, composed of 10.7% children, 27.6% youths, and 11.4% adults, which showed that the rate of the potential risk group of youths’ smartphone addiction was more than two times higher than those of other age groups.

The results of the smartphone usage rate analysis showed that general users spent 4.6 hours (275 minutes) on smartphones daily, whereas the high-risk group spent 5.2 hours (315 minutes), and the potential risk group spent 5 hours (299 minutes). Users in the high-risk group answered that they used smartphones for entertainment, such as for fun/stress relief (45.5%), out of habit (25.9%), and for killing time (25.3%), and they used them for music (29.1%), gaming (20.7%), watching movies/TV/videos (20.5%), and reading e-books/webtoons/web novels (14.1%) more than general users.

Moreover, 7 of 10 smartphone users (71.0%) have experienced physical discomfort from smartphone usage, and the most primary symptoms were sleep disorder (45.0%), dry eyes (43.1%), and neck/wrist/back pain (41.3%). More than 6 out of 10 users have experienced mental discomfort from smartphone usage, and the symptoms included anger (42.9%), frustration (40.5%), anxiety (31.6%), and depression (30.5%).

The ratio of the high-risk Internet addiction group that excessively used the wired and wireless Internet was 1.2%, composed of 0.6% children, 2.7% youths, and 1.0% adults. The ratio of the potential risk group was composed of 4.4% children, 10.4% youths, and 4.8% adults, showing that the rate of youths was more than two times higher than other age groups, as that of the high-risk smartphone addiction group.

However, the ratio of the high-risk Internet addiction group and the potential risk group has been showing a downward trend of 0.5% (1.7% in 2006 → 1.5% in 2009 → 1.5% in 2012 → 1.2% in 2015) and 1.9% (7.5% in 2006 → 7.0% in 2009 → 5.7% in 2012 → 5.6% in 2015), respectively, since 2006.

The ratio of the high-risk Internet addiction of youths showed a 0.2% reduction from 2.9% in the previous year. The ratio of the potential risk Internet addiction of youths was 10.4%, which was a 0.8% increase from 2014's 9.6%, showing a steady increase since 2011 (7.5% in 2011 → 8.9% in 2013 → 10.4% in 2015).

4) Promotion of Internet Ethics Awareness

To respond to the adverse effects of the Internet and promote safe Internet use, KCC and the KISA have been conducting the “Create a Beautiful Internet World” campaign for the general public every year since 2010, and a variety of Internet culture activities, including cyber violence prevention education, Internet ethics education, and experiential studies for diverse age groups, including youth and children.

“Korea Internet Dream Star” is a youth group established to train youth leaders who are capable of leading a safe and healthy Internet culture. In 2015, the members of the group participated in various activities, such as training sessions, field trips, and campaigns, and through their participation in the “Dream Star Press Group” and “Dream Star Keeper”, they aimed to expand the positive use of the Internet and prevent Internet-related damages, while focusing on nurturing basic fundamentals. Moreover, they learned about healthy Internet use culture by working on various projects, including school and individual-specific debates, “Dream Star camp”, and Internet ethics poster production. Additionally, the Korea Internet Dream Star teachers' council met three times a year, with participants sharing the best cases from relevant regions and schools and forming networks.

The KISA has been organizing various cultural events every year since 2010. It designated the period from June 1 to 6 of 2015 as the “Week of the Beautiful Internet World”, and promoted the message, “Warm Gaze, Beautiful Internet World”, through different types of media ad campaigns. During the campaign week, Internet ethics experiential centers provided games, 3D animations, and other experiential content

related to the Internet. The KISA also held a street campaign and other offline events in cooperation with private groups in an effort to establish stronger Internet ethics.

The “Internet Ethics Contest” was launched to stimulate the development of creative Internet ethics and cultural content in 2010, and this year’s event was held on November 25, 2015. The event, held under the theme of “Warm Gaze, Beautiful Internet World”, exhibited outstanding UCC works on YouTube, and implemented public advertisement viewing events through the KISA’s SNS channel and Kakao Talk Plus Friend. Moreover, it intensified its online PR activities, such as the execution of the “Beautiful Internet World” campaign by using the banners of major domestic Internet portals.

The government has been implementing information communication ethics education since 2001 to nurture digital citizens with value standards that are appropriate in the digital era, following the development of ICT. In accordance with the further lowering of Internet and smartphone usage age, the government has been expanding information communication ethics education for lower age groups, including children, since 2011.

To promulgate information ethics education effectively, it is essential to develop the content and the teaching methods according to the education target. The government, thus, has been developing different types of content, and has been offering them for free to accomplish its customized information communication ethics education targets since 2002.

1. Internet Infrastructure

A. Backbone Network

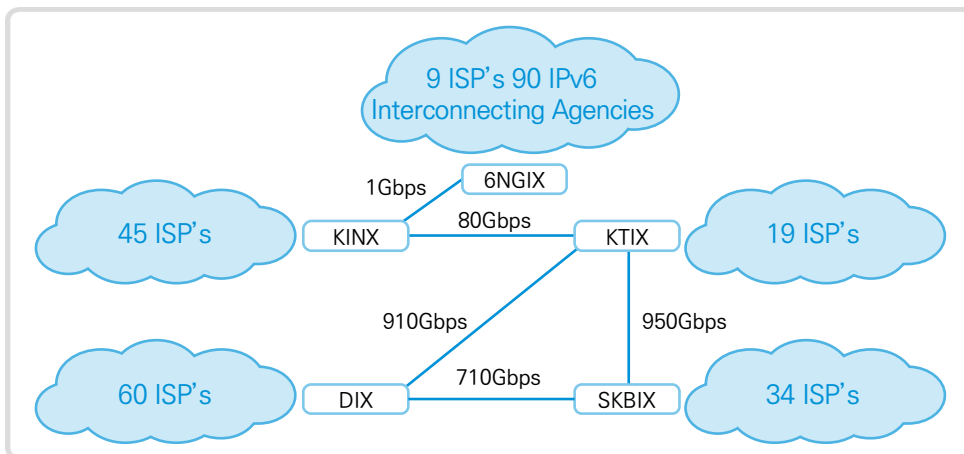
1) Internet eXchange

Following the activation of domestic Internet services, Internet traffic rapidly increased, prompting the establishment of domestic IX (Internet eXchange) in 1995 for efficient traffic use and prevention of unnecessary routing of overseas traffic to domestic Internet traffic.

In Korea, KTX (KT, www.kornet.net), DIX (LG U+, www.uplus.co.kr), SKBIX (SK Broadband, www.skbbroadband.com), and KINX (www.kinx.net) provide IX services, and the next-generation Internet address 6NGIX (KISA, www.vsix.kr), an IPv6-based interconnecting network, is operating as a nonprofit business.

Figure 3-1-1

Interworking Network Line Connection Structure per IX (As of March 2016)



[KISA, 2016]

Looking at the current IX industry in Korea, KTI (KT, www.kornet.net) connects 19 ISPs through three IXs at a connection capacity of 2,343Gbps. DIX connects 60 ISPs with two IXs at a total connection capacity of 3,000Gbps. SKBIX connects 34 ISPs via two IXs at 2,900Gbps. KINX connects 45 ISPs and two IXs at a connection capacity of 735Gbps. Finally, 6NGIX, a non-profit NOC for IPv6-based traffic exchange, connects nine ISPs via 90 IPv6 interconnecting institutions with a total connection capacity of 24.9Gbps.

2) Commercial Internet Networks

A total of 94 commercial ISPs, including KORNET (KT), BORANET (LG U+), B-Net (SK Broadband), Sejongnet (Sejong Telecom), and Dreammax (Dreamline), receive IP addresses from the KISA and provide Internet services, such as leased lines and high-speed connectivity, to institutions and individuals.

KORNET, a domestic Internet network infrastructure established by KT, is a high-speed information network whose name is a shortened form of “KORea-telecom-interNET”. Since June 1994, KORNET has installed 10 to 100Gbps high-speed networks in 50 or so locations across the country, and built approximately 100 international lines around the world, including the 280Gbps line connecting Korea to the U.S., to provide Internet services. In 2008, it launched the nationwide distribution of FTTH (Fiber-To-The-Home), which provides high-speed Internet to the households of individual subscribers. Moreover, it expanded its premium network and added significant backbone capacity to its conventional best-effort network to provide IPTV services.

BORANET is the Internet communication network of LG U+, which launched its business by leasing corporate Internet lines in October 1994, and has expanded its service to SOHO and home users. It also provides high-speed Internet customers with triple-play service (TPS), consisting of VoIP and IPTV services, as well as quadruple-play service (QPS), which combines mobile communication services.

BORANET uses more than 1,000 backbones and subscriber access nodes in a dual-broadband transmission network nationwide to provide high-quality, high-speed Internet access services across the country. In January 2010, it merged with LG Telecom, LG Dacom, and LG Powercom to secure its capability to provide stable,

integrated wired and wireless services.

B-Net is the Internet network of SK Broadband, which launched its commercial services in April 1999, introducing Korea's first IPTV service (Btv) in July 2006, and subsequently releasing Korea's first TPS product (B Set) in January 2007. At present, B-Net features some 167 nodes to accommodate subscriber traffic across the country, and is connected to numerous major foreign and Korean service providers, allowing it to provide high-quality Internet service.

In Korea, there are currently a total of eight domestic submarine cable relay stations (international cable landing stations in Busan, Geoje, and Taean, and domestic relay stations in Jeju, Goheung, Namhae, Hosan, and Ulleung) and, as of 2016, there are nine international submarine cables with a total capacity of about 27Tbps.

The geostationary satellites operated by Korea are the Mugunghwa 5 and 6 satellites and Koreasat 8 (Condosat), which are used for communication and broadcasting. Also, for observation purposes, Korea has a weather and ocean observation and communications satellite (Cheollian) and low earth orbit satellites (Arirang 2 and 3). The country's earth stations are located in Seoul, Yongin, Geumsan, Boeun, Asan, and Yeosu, with satellite control centers in Yongin and Daejeon. These earth stations target satellites such as INTELSAT, INMARSAT, Asiasat, SES, JSAT, and Apstar, among others.

B. Subscriber Networks

1) Wired Networks

A subscriber network is a part of the ICT infrastructure that connects service networks, such as telephone networks and the Internet, through the backbone network, relay network, and then finally to the subscribers which include households, business entities, and schools.

A wired telephone network is a communication network that connects audio signal passed through the switchboard and the transit exchange at a telephone company to

the subscribers, using local exchange and copper cables. Due to the increasing use of the Internet and mobile phones, the ratio of wired telephone subscriber networks has been steadily decreasing.

The Internet subscriber network is a data network connecting the terminal (PC) of the subscriber, through an IP device such as a router, to the Internet via methods like xDSL (xDigital Subscriber Line), LAN (Local Area Network), FTTH, and HFC (Hybrid Fiber Coax), thereby allowing the subscriber to use the Internet through an IDC (Internet Data Center).

Lately, major telecommunications service providers have been using optical cables, which provide the best transmission efficiency and quality and allow the broadband convergence networks (BcN) of 100Mbps or faster, to build FTTH networks in most small, medium, and large cities across the country except in some rural and fishing villages. Moreover, in consideration of the future development of network technology and service demand forecast, these major service providers completed the commercialization of a 1 Giga Internet service, which is up to 10 times faster than BcN, and the number of its subscribers has been rapidly increasing.

Bi-directional Internet using the Mugunghwa satellite and VSAT (Very Small Aperture Terminal) is offered in very remote locations, such as islands, mountains, and farming and fishing villages, where the FTTH-type wired Internet subscriber network cannot be constructed, while subscribers in Korea's islands are connected to the wide-area microwave system or small wireless backhaul systems, using repeater stations or steel towers, to receive wireless Internet services. Furthermore, a trial Internet service based on broadband and wide-area Wi-Fi will be provided.

Table 3-1-1

BcN and Giga Internet Services

Category	Network Speed	Representative Services	Features
BcN	50Mbps~100Mbps	VoIP, IPTV	Broadcasting communication convergence
Giga Internet	100Mbps ~ Up to 1Gbps	UHDTV, tangible communications, Giga Cloud, high-cloud IPTV, smart TV	High-quality, large capacity, smart services

[KISA, Giga Internet Service Base Establishment Strategy, 2015]

2) Wireless Networks

As of December 2015, the number of domestic mobile communication service subscribers was 59.71 million, which was 1.55 million more from that of the same time in the previous year. In 2010, the number of subscribers had exceeded the domestic resident population of approximately 50.50 million, and the number of subscribers exceeded 60.00 million in 2016. With the steady increase in the number of subscribers, the conversion of subscribers who have conventional technology devices to LTE has been rapidly taking place. As of December 2015, the number of LTE and LTE-Advanced subscribers has reached 41.69 million, which was 80% of the entire number of subscribers.

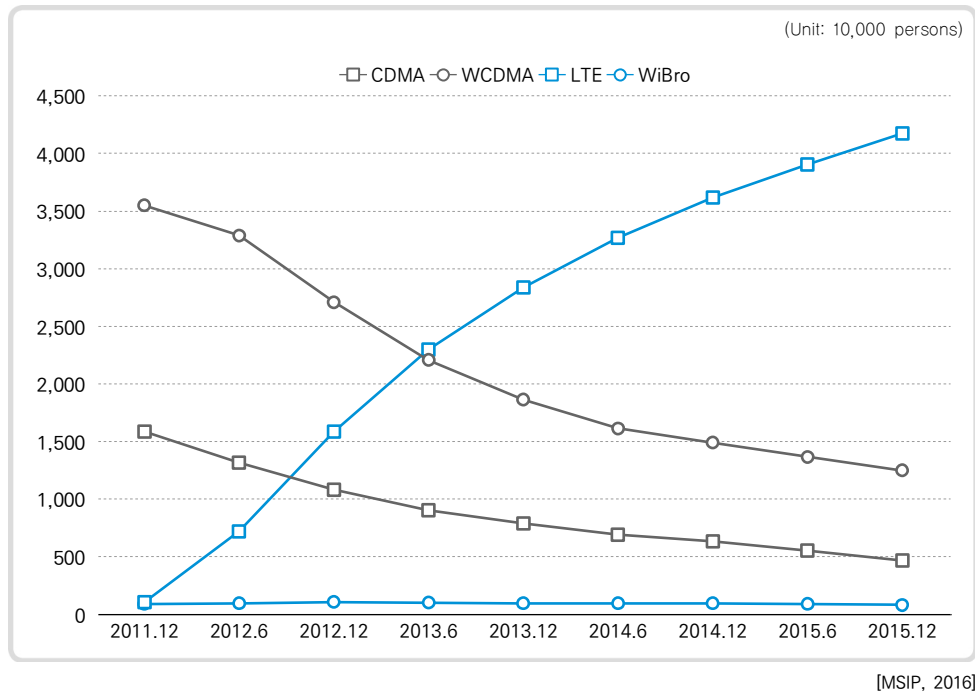
WiBro, a WMAN technology developed in Korea, is already on the decline. The number of subscribers used to exceed 1 million in 2012, but the downturn trend has continued since then, and the number has been reduced to 770,000 subscribers in December 2015. The government also concluded that it was not worthy to maintain WiBRO in 2013, and decided to change the WiBRO frequency range to the LTE-TDD (Time Division Duplex) method.

Since the commercialization of LTE technology, mobile communication carriers have been actively competing for the speed of LTE-based services. As each carrier readily claims that it adopted the new technology earlier than its competitors, “the world’s first” LTE service frequently appeared in the relevant industry in Korea. Moreover, with the introduction of an unlimited data plan for LTE subscribers, there were a few occasions when data traffic via LTE has jumped. As of December 2015, it was tallied that 173,000TB traffic, which is 91.2% of the overall data traffic of 189,600TB in the total wireless networks, came from LTE mobile phone users.

Mobile communication carriers have been proactively responding to the IoT field, whose market is expected to enjoy rapid growth. To dominate the Internet of Small Things (IoST) market, a part of IoT, every carrier has been promoting the means to utilize certain technologies, such as LTE-MTC and LoRa (Low Power Wide Area).

Figure 3-1-2

Domestic WMAN Service Subscribers



C. Research Networks

1) Domestic Networks

To develop the creative economy as well as identify and foster the sources of future national competitiveness, leading countries have been implementing the development of R&D networks and are operating testbeds as national strategic projects, such as Internet2/GENI (Global Environment for Network Innovations) in the US, GEANT/FIRE in Europe, and JGN-X in Japan, among others.

As of April 2016, the KOREN (Korea Advanced Research Network) backbone provides backbone lines between seven local connection points, featuring 10 to 160Gbps transmission speeds and 68 subscriber lines, with 1 to 10Gbps speeds. In

2016, the establishment of broadband, high-quality, leading test networks has been planned by advancing networks after adding Korea's Gangwon PoP and PoPs in Hong Kong and in Singapore, thus enabling the prevention of service interruptions by automatically routing the service to other dualized routes in case of errors in the transmission network.

The main purpose of KOREN is to support ICT R&D and provide the testing infrastructure that colleges, research institutes, and industries need to secure original, cutting-edge ICT technology, and to strengthen Korea's technical competitiveness, in accordance with the government's ICT policy. With the KOREN project, the Korean government is laying the foundation for industrial promotion by creating a virtuous R&D ecosystem that encompasses the "future network-related R&D, test verification, field testing pilot, and commercialization", and effectively linking technology development and industrialization.

KREONET (Korea Research Environment Open Network) is a core research resource that can establish a cyber research environment for national and international research and remote collaboration, thereby playing a major role in securing Korea's scientific and technological competitiveness and improving research productivity. KREONET operates one of the world's most advanced research network infrastructures, featuring speeds of up to 100Gbps and providing leading networking services to about 300 research institutes, colleges, and public institutions, including member institutions and science organizations that use supercomputing services. From 2014 to early 2015, KREONET expanded its up-to-date research network infrastructure to include 17 local network centers, stabilized the operation of three international network centers, strengthened the innovation of the core research infrastructure for a wide region, and expanded Eduroam (Education Roaming), a wireless network service for the security and assurance of advanced networks, to educational institutions. In terms of application, KREONET strives to establish connections and sharing among large national research facilities, to expand its up-to-date research support, and to provide intensive support per quality of the support target. It also developed and built a cyber collaboration research support environment, applying user-defined networking technologies, in which advanced application research can be carried out more efficiently.

2) International Networks

The TEIN (Trans-Eurasia Information Network) project is an ASEM (Asia Europe Meeting) project in which 34 European countries and 23 Asian countries, including Korea, are participating to promote cooperation in joint research. This project was launched based on an agreement signed by Korea and the EU in 2001, and is currently in its fourth phase (April 2012 to November 2016). During the TEIN4 project period, the EC planned the establishment of an Asia-oriented TEIN management center to maintain and manage long-term, sustainable TEIN cooperation projects, and, in 2012, the TEIN Cooperation Center was launched in Korea to oversee business management.

The TEIN4 network interconnects 23 Asian countries, focusing on four TEIN POPs (Points of Presence) in Beijing, Singapore, Hong Kong, and Mumbai, and is connected to GEANT3 in Europe. In 2015, among the TEIN backbone networks, the Pakistan (Singapore-Pakistan) link was upgraded from 155Mbps to 1Gbps, the Vietnam (Hong Kong-Vietnam) link, from 622Mbps to 1Gbps, the Hong Kong link, from 120Mbps to 150Mbps, the Philippines (Hong Kong) link, from 155Mbps to 1Gbps, and the Thailand (Singapore-Thailand) link, from 450Mbps to 600Mbps, and the virtual 100Mbps New Zealand (New Zealand-Singapore) link has been completed. Moreover, the new 10G EU (London)-Singapore link has been established, and, in February 2016, the 2.5Gbps EU (Madrid)-Mumbai-Singapore link has been upgraded to 10Gbps. The network is operated and managed by CERNET (China Education and Research Network) at Tsinghua University in China.

The TEIN Cooperation Center has been preparing for the TEIN5 (2016~2021) project while completing the TEIN4 project, and is currently working on the EC approval process of the relevant project and its budget. The main objectives of the TEIN5 project include: 1) the establishment and operation of new links in Afghanistan, Mongolia, and Myanmar, 2) the development of campus network engineering competency, 3) the installation, operation, and capabilities development of specialized network products, services, and applications, 4) the promotion of the expansion of the pilot and joint research, and the activation of new collaboration, and 5) the bridging of the information gap in developing countries.

The APII (Asia-Pacific Information Infrastructure) testbed is an APEC (Asia-Pacific Economic Cooperation) cooperation project that began in 1998. It is mainly used to build test environments, in connection with future network technologies, measure network performance, and provide telemedicine services. Based on the protocol with Japan's National Institute of Information and Communication Technology (NICT) that was signed in 2011, NIA has established and has been operating a bilateral international line for a 10Gbps-level Korea-Japan APII testbed, and is continuing the APII testbed cooperation by connecting two research networks via Hong Kong since March 2016.

GLORIAD (Global Ring Network for Advanced Application Development), which was launched as part of the NSF (National Science Foundation)'s IRNC (International Research Network Connection) program in 2005, has been providing support to large global collaborative research projects that require large-capacity or real-time data transmission in the high-energy physics, astronomy, biology, weather and climate, nuclear fusion, and medical science areas. GLORIAD is a 10G-class, global network infrastructure and utilization basis that connects leading research networks in the US, China, Russia, Canada, Netherlands, and Korea to the world in a ring shape, and the Korea Institute of Science and Technology Information (KISTI) has been actively participating as a key partner since 2005. The GLORIAD-Taj project was launched in 2010, and added new global partners, including Singapore, India, and Egypt. It has become an international research network both in name and in reality, linking the world from Southeast Asia to Africa.

D. 5G

The government has been cultivating 5G mobile communication services as the key infrastructure for the distribution of knowledge and information that innovates the basis of creative economy, the ICT industry, and the nation's future growth engine. In terms of promoting a successful 5G mobile communication services strategy, the government has formed the "5G Strategy Promotion Committee", which is a high-level

consultative body of private and public sectors participated by the MSIP, industries and research centers, and a control tower to aggregate the competencies of all relevant agencies. The private sector has established the “5G Forum”, composed of three major Korean telecommunications companies and mobile communication services carriers to form a 5G mobile communication service ecosystem.

The plan is implementing a pilot, various scenarios-based 5G mobile communication service at the 2018 Pyeongchang Winter Olympics, based on the key pre-5G service demonstrated at the end of 2015, and providing the world’s first commercial 5G mobile communication service in 2020. To achieve this, the government set a challenging goal of acquiring the world’s top competitiveness in the international standard patent by 2020, and has been accelerating the development of key 5G mobile communication source technology. The primary promotion system includes the 5G integrated project, centering on the Electronics and Telecommunications Research Institute (ETRI) [Table 3-1-2], and the Giga Korea Project, which connects C(Contents)–P(Platform)–N(Network)–D(Device) to provide pilot 5G mobile communication services at the 2018

Table 3-1-2

5G Integrated Project’s Technology-leading and Market-oriented R&D Status

Category	Stage	Period	Key Technology
Technology-leading	1	2014~2015	(Basic 5G mobile communication technologies) Wireless transfer capacity increase, direct communication between devices closed to licensed band, high-efficiency wireless LAN
	2	2016~2017	(Wireless 5G mobile communication technologies) High-efficiency modulation and multiple access technology, low-latency, highly reliable transfer technology, small mobile base station, highly-integrated antenna, millimeter wave mobile communication system
	3	2018~2020	(5G mobile communication transformational technologies) Terahertz band, OAM (Operations, Administration, and Maintenance) technology, device networking
Market-oriented	1	2014~2015	(Commercial Pre-5G mobile communication system) Small base station, RRH (Remote Radio Head), Wi-Fi broadband terminal, and AP
	2	2016~2017	(5G mobile communication evolution system) Wireless backhaul system, enterprise cloud base station and core system
	3	2018~2020	(5G mobile communication transformational technologies) 5G base station and terminal based on less than 6GHZ band and millimeter wave, 5G mobile core system

[Relevant Agencies, Comprehensive Action Plan for Future Growth Engine, 2015]

Pyeongchang Winter Olympics.

The 5G integration project is largely divided into a technology-leading R&D of the development of 5G mobile communication source technologies and a market-oriented R&D for technical commercialization. The 10 existing projects that are individually conducted at ETRI to realize the world's first 5G mobile communication commercialization through securing 5G mobile communication source technology were integrated into one massive single project with an investment of KRW27.2 billion as of 2015.

A pan-governmental program, the Giga Korea Project, with a budget of KRW41.0 billion in 2015, is being carried out to demonstrate various 5G mobile communications services, such as hologram and super multi-view imaging, at the 2018 Pyeongchang Winter Olympics. The government has invested KRW13.2 billion in the 5G mobile communication network field, where R&D on millimeter wave 5G mobile communication terminal and system is being conducted to offer individual Giga-level services.

Moreover, to meet the international 5G mobile communication standards and obtain the initiative in the relevant market, the government has been seeking international cooperation with China and the EU. At present, the government has been promoting a KRW1.6 billion-scale joint research with China over the next two years on a collaborative research and standardization basis establishment for 5G mobile communication's super-high frequency elemental technologies, and is planning to invest a total of KRW3.6 billion for the next two years in the 5G mobile communication network technology development with the EU. In November 2015, ICT 2015 was successfully held to form a consortium between Korea and the EU.

2. Internet Address Resources

A. IP Addresses and AS Numbers

Korea has been striving to secure IP addresses and AS numbers in an effort to provide stable Internet services since early 1990. As of the end of February 2015, Korea has approximately 112.38 million IPv4 addresses, the sixth most IPv4 addresses in the world, and 5,247 (/32) IPv6 addresses, which is the 10th most in the world. Also, with 1,019, Korea ranks 15th in the world in terms of AS numbers.

Table 3-2-1

Number of Internet Addresses per Country (as of February 2016)

IPv4 Addresses per Country			IPv6 Addresses per Country			AS Numbers per Country		
Ranking	Country	Addresses (No.)	Ranking	Country	Addresses (/32)	Ranking	Country	Addresses (No.)
1	USA	1,614,179,072	1	USA	42,082	1	USA	24,254
2	China	336,912,128	2	China	20,602	2	Russia	5,573
3	Japan	202,985,216	3	Germany	14,649	3	Brazil	3,810
4	UK	122,706,968	4	France	10,589	4	Poland	2,185
5	Germany	118,736,256	5	Japan	9,644	5	UK	2,162
6	Korea	112,384,000	6	Australia	8,778	6	Germany	1,973
7	Brazil	82,076,416	7	Italy	6,540	7	Ukraine	1,965
8	France	79,719,472	8	EU	6,335	8	Australia	1,897
9	Canada	72,425,472	9	UK	5,583	9	Canada	1,815
10	Italy	53,760,576	10	Korea	5,247	10	India	1,409
11	Australia	48,571,648	11	Republic of South Africa	4,610	11	Romania	1,313
12	Netherlands	46,176,224	12	Argentina	4,465	12	China	1,258
13	Russia	45,276,160	13	Egypt	4,105	13	France	1,146
14	India	37,886,720	14	Netherlands	3,631	14	Japan	1,090
15	Taiwan	35,494,912	15	Poland	3,439	15	Korea	1,019

[KISA, 2016]

Countries around the world are developing and implementing various policies to introduce and disseminate IPv6 addresses in line with their Internet industry structures and resource status.

The government has also been providing support for the activation of IPv6 through the revision of the 「Framework Act on National Informatization」. It also revised the 「Enforcement Regulation for the Restriction of Special Taxation Act」 to reduce the income or corporate taxes of businesses by three to seven percent of the purchase cost of IPv6 equipment (routers and switches) bought from March 2014 to December 2017 as incentives to companies because profit creation in investing on IPv6 equipment may take time. Moreover, the government added a Section that imposes duty on efforts of the government agencies to convert to IPv6 in the 「Framework Act on National Informatization」 (enforced in December 2015), while the MSIP introduced IPv6 addresses on its official website on a pilot basis.

Moreover, the government stably operates Korea's only national IPv6 neutral network (6NGIX) located at the KISA, and provides it as a foothold for the product testing and commercial services of companies. It has been working toward the introduction of fast and reliable IPv6 in the domestic industries by implementing a whole range of projects, including leading IPv6 technical research and the promotion for IPv6 recognition.

B. Domain Names

There are two types of ccTLD(country code top-level domain) in Korea: “.kr” and “.한국”. The “.kr” domain was first introduced in 1986, using a three-step English system (e.g. kisa.or.kr). Later, a two-step Korean system, such as “Korean.kr” (e.g. 한국인터넷진흥원.kr) and a two-step English system (e.g. kisa.kr) were introduced in 2003 and 2006, respectively. The introduction of the “.한국” domain enabled the use of Korean business names, brand names, and names in websites, increasing the Internet accessibility of people who are not familiar with the use of English, and, by extension, it contributed to the enhancement of domain usage benefits.

As of January 2016, there are 1,080,382 registered national domains in Korea, and the number of domain registrations per “english.kr”, “korean.kr” and “korean.한국” is as follows.

Table 3-2-2

Number of Registered National Domains (as of February 2016)

(Unit: Case)

Category	2-step System			3-step System
	English.kr	Korean.kr	Korean.한국	
No. of Registrations	258,394	63,109	42,711	716,168
Total	364,214			

[KISA, 2016]

The domains operate according to international standards, and both ccTLDs and gTLDs (generic top-level domain) can be used identically across the world. Korea’s ccTLDs, including “.kr” and “.한국”, can be registered through 25 registration agents designated by the KISA, and most ccTLD registration agents also register gTLDs.

In Korea, a total of five domains have been registered as new gTLDs: “.삼성”, “.samsung”, “.doosan”, “.kia”, and “.hyundai”.

C. Domain Name System (DNS)

Domain Name System (DNS) is a system that changes the domain name (kisa.or.kr) that the user accesses on the Internet to an IP address (121.156.115.59) that computers recognize.

The DNS for Korea’s ccTLDs (krDNS) was designated as the major information and communications infrastructure (2003) and a key national facility (2015), which are managed and operated by the KISA’s Internet Address Resource Department. As of 2016, it is being utilized as a system that provides services for 1.08 million national domains, indispensable public goods offering Internet services in the finance, broadcasting and communication, and e-commerce fields, and the core infrastructure of Korea’s Internet services.

The krDNS is distributed and operated among 15 sites (nine in Korea, and five in other countries) to ensure stable Internet service, and, since 2010, it has been deploying an anti-DDoS system in an effort to strengthen security against DDoS attacks, with a total of five sites currently operating the system.

The root DNS is a DNS system that is the foundation of DNS, encompassing all from ccTLDs (.kr, .한국, etc.) to gTLDs (.com, .net, etc.). ICANN's Internet Assigned Numbers Authority (IANA) manages and operates it, and is distributed and located around the world to accommodate global DNS traffic and improve safety. As of February 2016, there is a total of 574 servers, composed of 13 original servers (USA, Sweden, Netherlands, and Japan), and 561 replicated servers (mirror sites). Since the occurrence of the 1.25 Internet Security Incident (2013), four replicated servers were introduced (KISA, KT, SKB, and KINX) to secure Internet stability.

In the case of Korea's krDNS, DNSSEC (DNS Security Extensions) was introduced in June 2011 for the government domain "go.kr", and its application was completed in September 2012 for entire ccTLDs. The DNSSEC application was completed for ccTLDs, amid a gradual expansion and application to the general DNS operated by a domain registrant and cache DNS operated by ISP. The KISA has been making a steady effort for the stable management and operation of krDNS by improving its monitoring and DDoS-response system against various cyber attacks, and by introducing and operating DNSSEC in collaboration with domestic and overseas agencies.

3. Internet Technologies

A. Standardization Trends

In 2012, the Big Data Forum was established as a major gathering of professionals who were working to achieve productive application, standardization, and promotion of big data, develop related industries, and strengthen competitiveness. In 2014, the Korea Telecommunications Technology Association (TTA) formed the Special Technical Committee (STC) to develop the standard for cloud computing and big data, and created the Big Data Project Group (SPG22).

Following the organization of the JTC1 WG9, and the launch of the development of ISO/IEC 20546 and 20547 in April 2014, the JTC1 WG9 Council was organized to respond to the development. The ITU-TSG13 approved the Y.3600 (Big data-cloud computing base requirements and capabilities) standards, and additional follow-up standards are being developed based on the approved standards. ITU-T SG13 has been working under the Korea ITU Research Committee in support of such initiatives.

Cloud computing standardization activities in Korea can be largely divided into organizational standardization through the TTA, private sector-led standardization through the Cloud Computing Standardization Forum, and domestic committee activities in support of the international standardization programs. The TTA created the Cloud/Big Data Special Committee (STC2) in 2014 to strengthen the standardization activities, and re-assigned the existing Cloud Computing Project Group (PG420) as a project group (SPG21) under the STC2. Moreover, the Cloud Computing Standardization Forum formed the Standard Development Committee, which is tasked with developing a private market demand-based standard. Other organizations supporting international standardization include the ITU-T SG13 Study Group under the Korea ITU Research Committee and supported by the TTA, and the SC38 Advisory Committee under the

Korea Agency for Technology and Standards (KATS).

In November 2013, the TTA formed the IoT Special Technical Committee and three project groups (IoT Convergence Service Project Group, IoT Networking Project Group, and OneM2M Project Group) to standardize IoT/M2M (machine-to-machine) technology. In April 2014, the existing RFID (Radio Frequency Identification)/USN (Ubiquitous Sensor Network) Convergence Forum and M2M/IoT Forum were merged to form the IoT Forum, while the domestic industry-led Standard Subcommittee of the IoT Forum focused on standards development. Domestic standardization in IoT is noted for its efforts to mediate the positions of domestic industries and business entities, and create a suitable ecosystem, instead of focusing on standardization to satisfy the interests of an individual industry or business entity. In May 2014, the MSIP announced

Table 3-3-1

Major Activities of the Internet-related ICT Standardization Forum

Forum	Key Activities	Website
SDN/NFV Forum	- Held with the goal of preparing the foundation for the vitalization of next-generation network SDN/NFV technologies. - Establish SDN/NFV industry development strategies and action plan - Develop SDN/NFV standard framework to lead open infrastructure vitalization - Share research results and products, and verify SDN/NFV-based services for market expansion	sdnnfv.org
HTML5 Convergence Technology Forum	- Korean forum held in response to the W3C, the main international standardization organization for the Internet - Incorporate Korean standard technologies into the international standards of the W3C and vice-versa - Propagate W3C international standards regarding support for the domestic development of HTML5 convergence projects - Use private sector-centered standardization cooperation to lead the vitalization of the HTML5 convergence industry	html5forum.or.kr
IETF Mirror Forum	- Korean forum (mirror) held in response to the IETF, an organization working in the area of international standardization - Accept the needs of industries and support national and international standardization activities - Analyze discussions of the latest standards at the IETF and provide related information - Analyze discussions of associated conditions with the contribution activities and patents at the individual proposal stage	ietf.or.kr

[KISA, 2014]

the Basic Plan for IoT, and released the IoT R&D Strategic Report as a follow-up in December 2014.

The IPv6 Project Group (PG210) and Internet Address Resource Project Group (PG211) of the TTA worked on IPv6 address issues and IAR (Internet Address Resource) issues, respectively, but they were merged to form the IPv6 Address/IAR (PG222), which has been working on the standardization of IPv6 address conversion technology and DNS technology, and providing policy support under the leadership of the ETRI and the KISA since 2014. With SK Telecom recently formalizing the commercialization of pure IPv6 addresses under LTE technology, the development of domestic standards, such as those for IPv6 address conversion technology, DNS security technology, and guidelines for IPv6 address distribution, is well underway.

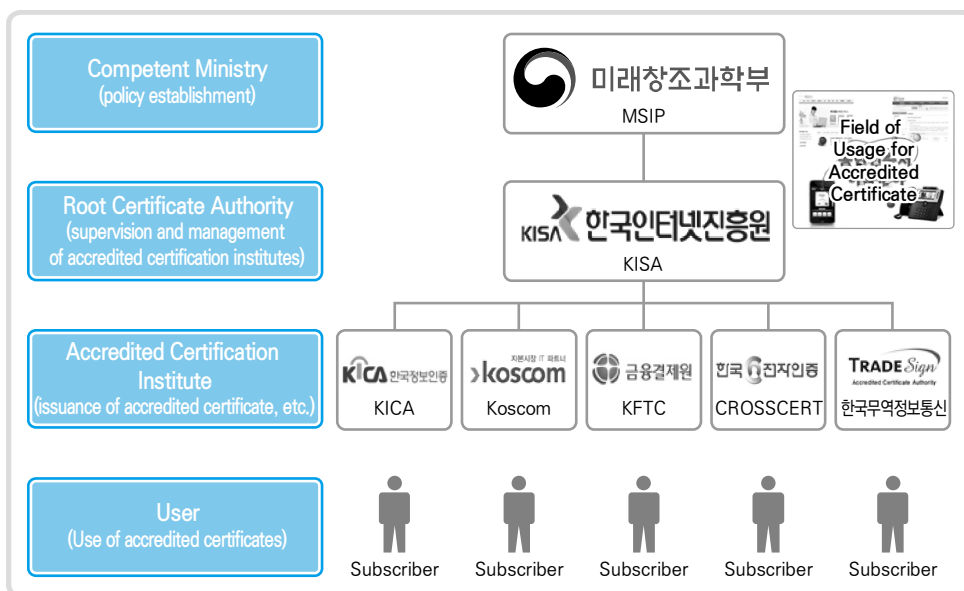
National standardization activities are carried out by the TTA and ICT standards forums. The Internet-related ICT standardization forums include the SDN/NFV Forum, HTML5 Convergence Technology Forum, and IETF Mirror Forum, among others.

B. Electronic Signature

The Accredited Electronic Signature Certification System was established by designating the KISA as the root certificate authority, in accordance with the 「Digital Signature Act」 enacted in February 1999. As of March 2016, there are five accredited certification institutes operating in Korea since the first designation of the first institute in 2000. They are the Korea Information Certificate Authority (KICA), Koscom, the Korea Financial Telecommunications and Clearing Institute (KFTC), the Korea Electronic Certification Authority (CROSSCERT), and the Korea Trade Network (KTNET).

Figure 3-1-3

Accredited Electronic Signature Certification System



[2016 National Information Protection White Paper, 2016]

Compared to the traditional identification method of using the ID and password, Accredited Certificate offers excellent personal information protection function, and is equipped with the non-repudiation function for e-commerce. Thus, the application of the accredited certificate system has become compulsory in e-banking (September 2012), and online stock trading (March 2003). In the early stage, it was mainly used in the electronic financial transaction area, such as e-banking and online stock trading, but, lately, its applications have been expanding to various areas, including e-apartment application, e-civil service, year-end tax adjustment and income report, e-procurement, and military enlistment application.

As of the end of 2015, a total of 33.99 million Accredited Certificates have been issued. The number of certificates issued to individuals is 30.11 million, which is 110% of the domestic economically active population (27.13 million). Moreover, a device authentication system is used to enhance the safety of the ICT environment, and the

identification, certification, and encryption of the communication of various telecommunications devices, including home devices, network cameras (CCTV), and Internet telephones.

To resolve the problems generated during the enforcement of the 「Digital Signature Act」, a steady effort is being exerted to maintain the related legislation.

In August 2014, the government revised 「The Detailed Regulation on Supervision of Electronic Finance」, and removed the compulsory usage of the Accredited Certificate during the credit card payment process in e-commerce.

In 2014, 「The Enforcement Decree of the Digital Signature Act」 was revised to secure the digital signature technology using various technologies, such as bio-data in addition to PKI (Public Key Infrastructure), and a procedure was established to examine whether or not the relevant technologies meet the requirements for accredited electronic signature. In 2015, 「The Enforcement Decree of the Digital Signature Act」 was revised to ease the capital securing standards under the financial ability category among the accredited certification institute designation criteria and to relax the establishment regulations of accredited certification institutes.

C. Certified e-Document Center and Certified Electronic Address

The term “electronic document” means information, prepared, transmitted, received or stored in an electronic form by an information processing system. The government revised the 「Framework Act on Electronic Document and Transactions」 in 2012 to increase the safety and reliability of the production, distribution, and storage of electronic documents. It also introduced a system that generates a legal effect that the document has not been forged or falsified if the document is stored at the Certified e-Document Center. The Certified e-Document Center is a credible institute appointed by the government that safely stores e-documents for other parties, and handles various electronic document-related businesses, including the issuance of

non-alternation certification of e-documents.

The stored documents are divided into two types: original e-document from the start and paper documents that are converted to e-document through the electronization process such as scanning. In the case of scanned documents, in accordance with the 「Regulations on the Composition Procedure and Methods of Electronized Document」, if the document is stored at the Certified e-Document Center, it is recognized as the original document is stored even if the original paper document is destroyed. Thus, the Certified e-Document Center can lessen the burden of storing paper documents.

Due to the demand for safe storage of e-documents, the storage volume of the entire e-document at the Certified e-Document Center has been steadily increasing every year. Major e-documents stored in the center include various certificates and financial e-documents, and the types of stored documents are gradually becoming diversified.

Table 3-3-2

Volume of e-Documents at the Certified e-Document Center

(Unit: TB)

Volume	2011	2012	2013	2014	2015
Stored Volume	75	124	154	177	215

[KISA, 2016]

The term “certified electronic address” is an address comprised of letters and numbers to identify a person who sends or receives an electronic document, and an address registered in accordance with the [Framework Act on Electronic Document and Transactions]. The system of the certified electronic address (e.g. npost#kisa.co) is similar to email address (e.g. npost@kisa.or.kr).

The address is composed of “account (ID) + separator (#) + registered name and property values”. The account must be 2 to 20 Korean characters (2 to 40 if English characters are included) long, and the registered name must be 3 to 20 Korean characters (3 to 40 if English characters are included) long. The property value is divided into four categories: government, corporation, business, and individual. The

address can be freely chosen by the applicant, and be registered and used in the form of “Honggildong.Internetsysteminnovation#MSIP.go”, “Honggildong#KISA.co” or “fruits#seoulsupermarket.bz”. The KISA is in charge of the registration and management of the Certified Electronic Address, and applicants can register their addresses at the website (www.npost.kr) through the identification process.

D. Alternative Means for Resident Registration Number

The i-PIN Service was introduced in 2005 to minimize the use of the Resident Registration Number (RRN), which is difficult to reissue even if it is leaked along with the user’s personal information, to prevent the user’s duplicate registration and adult verification on private online services. The public i-PIN service was introduced in 2008 for use in public online services.

Following the continuous occurrences of personal information leaks and the issue regarding the usage of RRN, which is difficult to change even after the leak incident, the 「Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc.」 was revised in 2012, as well as the 「Personal Information Protection Act」 in 2013 to discourage the use of RRN, except for the collection and use of RRN as approved by the relevant decree. With the introduction of the restriction on RRN usage in the 「Personal Information Protection Act」, an alternative means for RRN became necessary in offline transactions. Thus, the Ministry of Government Administration and Home Affairs (MOI), created My-PIN, which enables the user to verify one’s identity offline, in cooperation with the existing i-PIN agency.

KCC has recognized (in 2012) publicly utilized mobile phones and Accredited Certificates as an alternative means for RRN so users can conveniently use the identity verification service online.

In 2015, the authentication process of the i-PIN had been reinforced by mandatorily applying one of the secondary PW or OPT process, in addition to ID/PW input, to prevent the illegal distribution and use of the i-PIN ID and PW.

In accordance with the 「Act on the Promotion of Information and Communications

Network Utilization and Information Protection, etc.」 Article 23, Section 3, KCC can designate an identity verification agency that offers an alternative means to RRN. KCC, thus, designated the i-PIN (National Information and Credit Evaluation: NICE, Seoul Credit Rating and Information: SCI, Korea Credit Bureau: KCB) and the mobile phone (SK Telecom, KT, LG U+) as the identity verification agencies after examining the contender agencies and companies' capabilities for identity verification services, and established the basis for acknowledging the accredited certificate agencies as identity verification agencies. The MOI has consigned the operation of the public i-PIN center to the Korea Local Information Research and Development Institute (KLID), in accordance with the 「Personal Information Protection Act」, and established (in December 2015) a basis for the consignment of the business to the KISA and other corporations, agencies, and organizations assigned by the Minister of Government Administration and Home Affairs.

Table 3-3-3

Distribution of Alternative Means for RRN

Type	Providing Agency	Content	The Ministry and Office Concerned
i-PIN	Private	NICE, SCI, KCB	KCC
	Public	KLID	MOI
Accredited Certificate	Koscom, KICA, CROSSCERT and KFTC, KTNET	Identity verification using the user's Accredited Certificate	MSIP
Mobile Phone	SK Telecom, KT, LG U ⁺	Identity verification using the SMS certification of a mobile device registered in the user's name	KCC

4. Internet Legal Systems in Korea

The following laws [Table 3-4-1] were revised from 2015 to 2016 to provide the foundation for the activation of the Internet industry and services, and reinforce action against the violation of the user's rights. The most representative changes include the establishment and enactment of the 「Act on the Development of Cloud Computing and the Protection of Users」 that provides measures to promote various policies to activate the cloud computing industry and the 「Act on the Promotion of the Information Security Industry」 for the comprehensive and systematic promotion and vitalization of the domestic information security industry against increasing cyber threats.

Moreover, the 「Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc.」 has been revised to introduce a punitive damage system to strengthen the substantial compensation for damages to the user and the responsibility of the operator, and to increase penalties against the violation of the management and the law on handling personal information. Furthermore, the information security system, such as the inclusion of the non-profit organization in the compulsory subject of the Information Security Management System (ISMS) certification that handles large-scale information, will take effect soon.

Table 3-4-1

Enactment and Revision of Internet-related Laws (January 2015~March 2016)

Acts	Date of Establishment or Revision	Key Contents
「Act on the Development of Cloud Computing and the Protection of Users」	Enacted (2015.3.27), Enforced (2015.9.28)	• Formulation of the master and implementation plans for the promotion of cloud computing usage (Article 5) • Fostering and providing assistance to small and medium enterprises (Article 11) • The government shall consider the introduction of cloud computing when forming a budget for the promotion of national informatization policies or businesses (Articles 12 and 20)

Acts	Date of Establishment or Revision	Key Contents
「Act on the Development of Cloud Computing and the Protection of Users」		• Submission and disclosure of business demand for cloud computing projects by government agencies (Article 13) • Creation and designation of cloud computing industrial complexes (Article 17) • In the case of defining electronic facilities with licensing condition, etc., in other legislation, it will be regarded that the cloud computing service is included in the relevant electronic facilities (Article 21) • Announcement and recommendation for the quality/performance and information security standards of cloud computing services (Article 23) • Enactment and recommendation for the cloud computing service-related standard contract form (Article 24) • Cloud computing service provider notifying the user in the case of information breach incident, user information leakage and service interruption, and the MSIP in the case of user information leakage (Article 25) • Prohibition on providing user information to the third party and using it other than the purpose of service and the obligation to return or destroy user information upon termination of business (Article 27, Sections 3-6 and Article 37)
「Act on the Promotion of the Information Security Industry」	Enacted (2015.6.22.), Enforced (2015.12.23.)	• Formulation of the master and implementation plans for the promotion of the information security industry (Article 5) • Submission of purchase demand information on information security products and services (Article 6) • Convergence promotion business between the information security industry and other industries (Article 11) • Implementation of information security readiness evaluation and establishment of government-support basis (Article 12) • Information security status disclosure system (Article 13) • Development, investment attraction, and standardization promotion business of information security technologies (Article 14) • Establishment and implementation of information security expert cultivation policies, and establishment of promotion basis for the discovery and fostering of future and outstanding overseas talents and credited intern system (Article 15) • Implementation of information security and product performance assessment (Article 17) • Designation and support for outstanding information security technology and provider (Articles 18-22) • Designation and management of information security service companies (Article 23) • Establishment of the basis for the Korea Information security Industry Association (Article 24) • Installation of the Information security Industry Dispute Mediation Committee (Articles 25-33)

Acts	Date of Establishment or Revision	Key Contents
「Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc.」	Partially revised, enacted (2015.1.20) Enforced (2015.4.21)	Punishment for a person who commits Fraud in Mobile Financial services, and advertises for the services (Article 72, Section 1, Number 4)
	Partially revised, enacted, and enforced (2015.3.27)	Punishment by imprisonment with prison labor for not more than 3 years or by a fine not exceeding KRW30 million for a person who transmits commercial information for illegal acts by taking advantage of major disaster situations (Article 72, Section 1, Clause 2-2 newly inserted)
	Partially revised, enacted (2015.6.22) Enforced (2015.12.23)	- Deletion of regulations proven to be dead, including e-document intermediaries system (Articles 18-21, Article 76) - Deletion of businesses that are closed for more than one year among the reasons for the deregistration of telecommunications billing services (Article 55) - Increased fines imposed on a person who refuses to provide necessary services if a user does not agree with the provision of one's personal information to a third party (Article 76)
	Partially revised, enacted (2015.12.1), Enforced (2016.6.2) ※ Some were enforced on the day of enactment	- The obligatory destruction period of personal information shall be 1 year; however, it will not be applicable to other legislation or the user's request, which requires the preservation of the personal information. (Article 29) - Non-profit information communication service provider shall be included in the ISMS certification targets. (Article 47, Section 2) - In the case of obtaining an international standardized information security certification or information security measure, part of the ISMS certification assessment can be omitted. (Article 47, Section 3) - Establishment of the basis for a clear definition of the ISMS and the designation of an exclusive agency for assessment tasks (Article 47, Sections 6 and 7) - In the case of obtaining the ISMS certification or management rating through false or unlawful means, the cancellation shall be mandatorily provided (Article 47, Section 10 and Article 47-5, Section 4) - Hearing shall be held for the cancellation of the designation of certification agency (Article 64-4) - Fines imposed on a person who did not receive the ISMS certification were increased (Article 76)

Acts	Date of Establishment or Revision	Key Contents
「Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc.」	Enacted (2016.3.22) Enforced (2016.9.23)	• User options for smartphone application program access privileges were enhanced (Article 22-2, Section 1 and 2 newly inserted) • Terms unified in accordance with the 「Personal Information Protection Act」 (Article 24-2, Section 3) • Management enhancement, such as making consignees' training obligatory and restricting reconsignment (Article 25, Sections 4~7) • Clarify the obligations, such as improvement in designating a personal responsible for the protection of personal information (Article 24, Section 4 newly inserted) • Request for deletion and blocking of personal information exposed via information communication networks (Article 32-3 and Article 76, Section 1, Clause 12) • Statement of personal information transaction content that violates the legislation within the range of illegal information (Article 44-7, Section 1, Clause 6-2 newly inserted) • Establishment of a basis for the measures of notifying the user in identifying the infringement activities, such as the collection of personal information through deception (Article 49-2, Section 3, Clauses 3 and 4 newly inserted) • Telemarketing without explicit consent from the receiver is possible only if the telephone seller notifies the receiver of the source of personal information collection (Article 50, Section 1, Clause 2) • Fines imposed if personal information is transferred overseas without the consent and the specification of the type of overseas transfer (Article 63, Section 2 and Article 64-3, Section 1, Clause 8 newly inserted) • Introduction of compensation for punitive damages and the confiscation and collection for restitution of profits generated from personal information crimes (Article 32, Sections 2 and 3 and Article 75-2 newly inserted) • Establishment of disciplinary recommendation rights on KCC executives (Article 69-2, Section 2 newly inserted) • Reinforcement of punishment on a person who spreads and distributes malware without just cause and the invasion of an information communication network that exceeds the approved accessibility or without just cause (Article 70-2 and Article 71, Section 8, Clause 2 newly inserted) • Fines not exceeding KRW30 million imposed for non-compliance of corrective measures command (Article 76, Section 1, Clause 12) • Establishment of the basis for the expenses for business implementation by the KISA (Article 52, Section 4)

Acts	Date of Establishment or Revision	Key Contents
「Act on the Protection, Use, etc. of Location Information」	Partially revised, enacted (2015.2.3) Enforced (2015.8.4)	• Mitigation of the entry regulation for location information business and location-based service business (Article 5, Section 1, Article 9, Section 1 and Article 38-3 newly inserted) • Introduction of the principle permit regulatory framework for location information business permit, etc. (Article 5, Section 8, Article 7, Section 3 and Article 8, Section 3) • Mitigation of the notification method for the provision of personal location information to a third party (Article 19, Sections 3 and 4 newly inserted) • Improvement of the emergency rescue system (Article 30-2 newly inserted) • Closing of the Location Information Inquiry Commission (Current Article 36 deleted) • Introduction of the request for data submission and inspection on entry and exit (Article 36 newly inserted)
	Partially revised, enacted (2015.12.1) Enforced (2016.6.2)	• Adding an employee with an access to location information can be grounds for disqualification of the location information business (Article 6)
「Act on the Protection of Information and Communications Infrastructure」	Partially revised, enacted (2015.1.20) Enforced (2015.7.21)	• Inclusion of the establishment and recovery of a backup system on managed information in the management measures for safe management and recovery of the data related to information invasion incident (Article 5, Section 1 and Article 6, Section 3, Clause 2)
	Partially revised, enacted and enforced (2015.12.22)	• Deletion of the regulation on the notification of personal information of the employees working in the information sharing and analysis agency, and establishment of a basis for the government's financial support (Article 16)
「Telecommunications Business Act」	Partially revised, enacted (2015.1.20) Enforced (2015.7.21)	• Imposing of fines for non-compliance with the duty of notice for exceeding rates' limit, etc. (Article 104, Section 5, Clause 4-4 newly inserted)
	Partially revised, enacted (2015.12.1) Enforced (2015.6.2)	• Modification of the content overlapping with the details on the prohibition of personal information usage, such as the user's personal information, which is defined in Article 24 of the 「Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc.」 (Article 43)

Acts	Date of Establishment or Revision	Key Contents
「Telecommunications Business Act」	Partially revised, enacted, and enforced (2016.1.27) ※ Some were enforced on July 28, 2016	- Termination of the usage of telephone numbers used in electronic communication financial fraud and illegal advertisement (Article 32-3) - Granting of the prohibition of the sale of electronic communication numbers and the order of the shutdown or publication restriction of the service with its sale information published in information networks (Article 32-3)
「Framework Act on Electronic Documents and Transactions」	Partially revised, enacted (2015.6.22) Enforced (2015.12.23)	- The MSIP shall designate the agency dedicated to the promotion of e-documents and e-transactions. (Article 22, Section 1) - The adjustment issued by the e-document and e-transaction dispute mediation board shall include the necessary measures for the damage relief, such as recovery and indemnity (Article 33-2 newly inserted) - In the case of the e-document and e-transaction dispute mediation board mediating disputes, if the board determines the matter as violating the ordinance, it shall notify the relevant agency of the violation and request for appropriate measures. (Article 33-2 newly inserted)
	Partially revised, enacted, and enforced (2015.12.22)	Improvement of the grounds for disqualification of the designation of the certified e-document relay center and certified e-document broker (Article 31-3)
	Partially revised, enacted (2016.1.19) Enforced (2016.2.4)	Revised for the case of the e-document guarantee agreement containing the guarantor's intention for one's own business, the relevant e-document shall be considered as a written contract to recognize the efficacy of the guarantee within the boundary of 「Civil Law」 (Article 4)

[Ministry of Government Legislation (Reconstructed), 2015]

Part 4. International Cooperation

- 1. Internet Governance
- 2. Global Internet Status

1. Internet Governance

Whereas the governance of the Internet means the coordination of the Internet address-related policies such as IP (Internet Protocol) and domain names, the governance on the Internet represents all affairs regarding the Internet, such as Internet access costs, SPAM, network security, content, e-commerce, privacy, and human rights.

Active discussions on Internet governance are also taking place in Korea. In September 2013, the Asia-Pacific Region Internet Governance Forum (APrIGF) was held in Incheon. In October of the same year, the 3rd Seoul Conference on Cyberspace was held in Seoul, which serve for Korea to lead discussions in the area of cyberspace.

Moreover, in April 2014, an open seminar on Internet governance was held, in which there was information exchange and a collection of opinions. At the seminar held ahead of NETmundial, there was an exchange of relevant information and discussions on healthy global Internet ecosystems. The Korea Internet Governance Alliance (KIGA) was founded in April 2012, and it was expanded and reorganized to become the “Multistakehold Korea Internet Governance Alliance” in November 2014 to include various Internet-related issues, and encourage more participation.

Korea has submitted the Internet governance principles to the NETmundial meeting held in Sao Paulo, Brazil, in April 2014. The principles supported an open and safe global Internet based on the participation of many stakeholders through accessibility, multistakeholderism, flexibility, engagement (decision-making based on global participation), security, and balance, which are essential to the discussion on Internet governance. Furthermore, it mentioned the need for seeking various solutions that are optimized per area and per issue, while supporting the multistakehold-based based Internet governance system.

At the 50th ICANN meeting held in London in June 2014, Korea proposed four

standards of the comprehensive participation of marginalized countries, the transition of the IANA management authority based on sufficient discussion, the improvement of the GAC role, and the arrangement for the procedure of establishing ICANN responsibility for a successful Internet governance system.

To respond to the international discussion that began after the announcement of the US government on the transition of the international Internet address management rights in March 2014, Korea has formed IANA WG, a working group for IANA transition under KIGA in October 2014. KIGA submitted the Korean Internet community statement to ICANN five times, on December 2014, and in May, September and December 2015. Korea has provided the main principles in forming key positions in the new system, including ensuring geographic diversity, ensuring the independence of the new organization that would be responsible for managing IANA, and placing measures to strengthening ICANN's responsibilities. The majority of the submitted principles were reflected in the final version of the IANA transition sent to the US government on March 10, 2016.

After signing the agreement with ICANN in 2013, Korea has been operating the ICANN Seoul office and working on cooperation projects. The opening of the ICANN Seoul office served as a window for domestic Internet users to directly communicate with international organizations, and to participate in the decision-making process of major international policies related to the Internet. The vernacular project conducted by the KISA and ICANN from 2014 to 2015 is the first project deployed in Korea as part of ICANN's globalization strategy, and, currently, its Korean model-based content has been shared to the world. Moreover, the KISA and ICANN agreed on the promotion of the Asia-Pacific Internet Governance Academy for the 2016~2017 project. The Internet Governance Academy is a governance competency enhancement program targeting the youth population, such as university and graduate school students in the Asia Pacific region, which aims to discover and cultivate global next-generation leaders and to give them opportunities to participate and to work in international organizations through debate classes with the executives of international organizations, and experience sharing with peers in the Asia Pacific region.

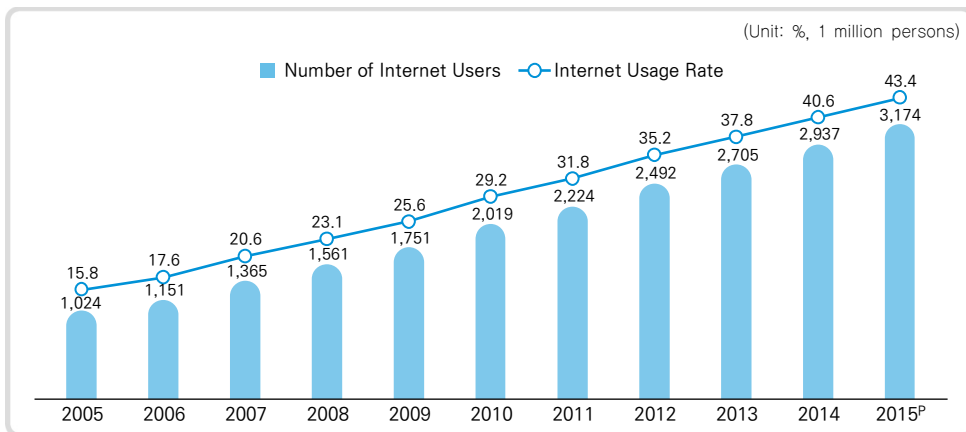
2. Global Internet Status

A. Internet Usage

The number of Internet users and usage rate around the world have steadily increased between 2005 and 2015. According to ITU, the number of Internet users in the world in 2015 was 3,174 million, up by 237 million from the previous year, and the Internet usage rates have increased by 2.8%p to 43.4%.

Figure 4-2-1

Number of Internet Users and Internet Usage Rates in the World



* p: estimate

[ITU, ITU Statistics, 2015]

The Internet usage rates in developing countries are worth noting. The rate from mere 7.8% in 2005, has reached 35.3% in 2015, which increased by about 4.5 times in 10 years. While the Internet usage rate in developed countries has reached 82.2% in 2015, the rate in the African region remained at 20.7%, showing the need for efforts to improve the Internet usage environment in developing countries.

2. Global Internet Status

Table 4-2-1

Internet Usage Rates and High-speed Internet Subscription Rates

(Unit: %)

Year	Internet Usage Rate			Subscription Rate of Wired High-speed Internet			Subscription Rate of Wireless High-speed Internet		
	Developed Countries	Developing Countries	World	Developed Countries	Developing Countries	World	Developed Countries	Developing Countries	World
2005	50.9	7.8	15.8	12.3	1.3	3.4	–	–	–
2006	53.5	9.4	17.6	15.5	1.8	4.3	–	–	–
2007	59.0	11.9	20.6	18.0	2.3	5.2	18.5	0.8	4.0
2008	61.3	14.6	23.1	20.4	2.9	6.1	27.5	1.6	6.3
2009	62.9	17.4	25.6	22.0	3.5	6.9	36.6	3.0	9.0
2010	66.5	21.1	29.2	23.5	4.2	7.6	44.7	4.5	11.5
2011	67.7	24.1	31.8	24.6	4.9	8.4	56.8	8.3	16.7
2012	73.8	27.0	35.2	25.7	5.4	9.0	66.4	12.4	21.7
2013	76.9	29.5	37.8	27.5	6.2	9.9	74.0	17.4	27.3
2014	79.5	32.4	40.6	28.3	6.6	10.3	81.8	27.9	37.2
2015 ^p	82.2	35.3	43.4	29.0	7.1	10.8	86.7	39.1	47.2

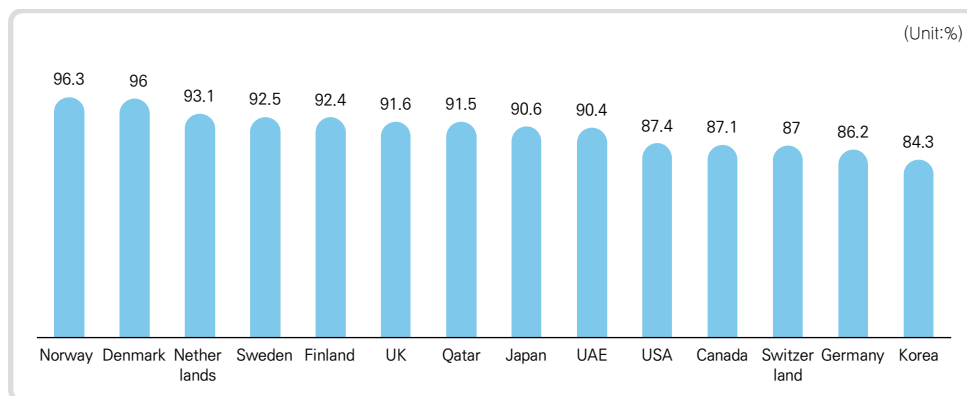
* p: estimate

[ITU, ITU Statistics, 2015]

As of 2014, the country-specific Internet usage rates showed that Norway was ranked first with 96.3%, followed by Denmark (96.0%) and Netherlands (93.1%). Korea's rate was 84.3%.

Figure 4-2-2

Internet Usage Rate per Country



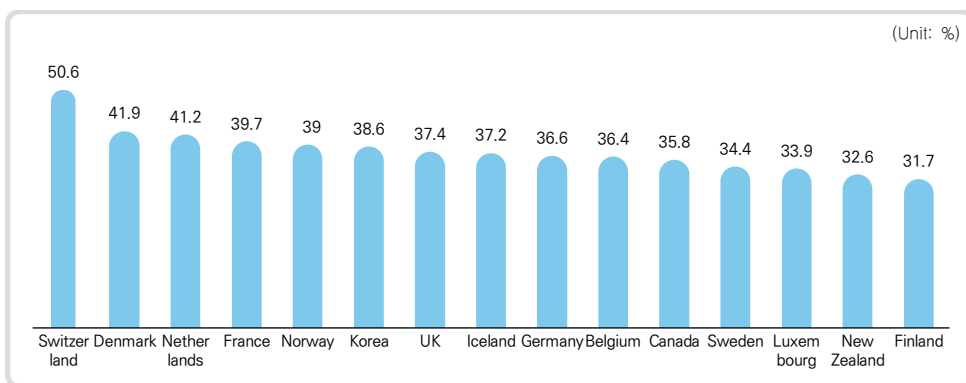
*City-states with less than 1 million population were excluded

[ITU, ITU Statistics, 2015]

The rates of wired high-speed Internet subscribers per 100 people in the major OECD member countries were ranked in the following order: Switzerland (50.6%), Denmark (41.9%), Netherlands (41.2%), France (39.7%), Norway (39%), Korea (38.6%), and the UK (37.4%).

Figure 4-2-3

Rates of Wired High-speed Internet Subscribers per 100 people in the Major OECD Countries (as of June 2015)

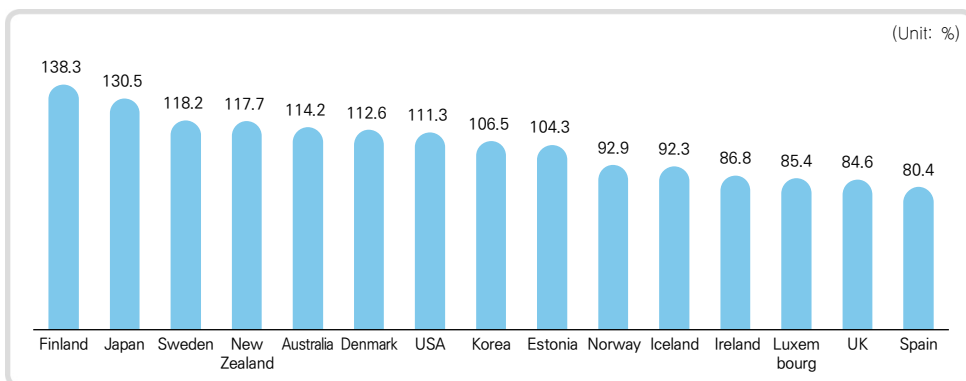


[OECD, <https://data.oecd.org/broadband/fixed-broadband-subscriptions.htm#indicator-chart>, 2016]

The rates of wireless high-speed Internet subscribers per 100 people in the major OECD member countries showed Finland on top with 138.3%, followed by Japan (130.5%), Sweden (118.2%), and Korea (106.5%).

Figure 4-2-4

Rates of Wireless High-speed Internet Subscribers per 100 people in the Major OECD Countries (as of June 2015)



[OECD, <https://data.oecd.org/broadband/wireless-mobile-broadband-subscriptions.htm>, 2016]

B. International Index Status

Korea is ranked higher in the ICT-related international indexes released by international organizations, such as UN and ITU, and the private organizations, such as IMD (International Institute for Management Development).

Table 4-2-2

Korea's Ranking in ICT-related International Indexes

Organization	Index Title	Korea's Ranking										Note
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
UN	e-Government Development Index	-	-	6	-	1	-	1	-	1	-	Australia, No. 2 Singapore No. 3
ITU	ICT Development Index	1	1	-	2	1	1	1	1	2	1	Denmark, No. 2 Iceland, No. 3
WEF	Network Preparation Index	14	19	9	11	15	10	12	11	10	12	Singapore, No. 1 Finland, No. 2
	Global Competitiveness Index - Technical Readiness Category	12	7	13	15	19	18	18	22	26	-	Switzerland, No. 1 Singapore, No. 2
IMD	World Competitiveness Index - Technical Infrastructure Category	6	6	14	14	18	14	14	11	8	13	Hong Kong, No. 1 Singapore, No. 2

[KISA]

Korea has occupied the top ranking in the ITU ICT Development Index consecutively from 2010 to 2013. In 2014, Korea placed second, but regained first place in 2015.

ICT Development Index is an index for comparing and analyzing the ICT development degree of ITU member countries, which aims to assess the ICT development direction, digital gap, and the growth potential of the countries. The index results are based on 11 ICT indicators grouped in three clusters: accessibility, usage, and skills on the ICT development degree and competitiveness.

Table 4-2-3

Ranking of Major ICT Development Index (based on the year of publication)

Ranking	Country (Index)	
	2015	2014
1	Korea (8.93)	Denmark (8.86)
2	Denmark (8.88)	Korea (8.85)
3	Iceland (8.86)	Sweden (8.67)
4	UK (8.75)	Iceland (8.64)
5	Sweden (8.67)	UK (8.50)
6	Luxembourg (8.59)	Norway (8.39)
7	Switzerland (8.56)	Netherlands (8.38)

Ranking	Country (Index)	
	2015	2014
8	Netherlands (8.53)	Finland (8.31)
9	Hong Kong (8.52)	Hong Kong (8.28)
10	Norway (8.49)	Luxembourg (8.26)
11	Japan (8.47)	Japan (8.22)
12	Finland (8.36)	Australia (8.18)
13	Australia (8.29)	USA (8.02)
14	Germany (8.22)	China (4.64)

[ITU, Measuring the Information Society 2015, 2015]



List of major Internet-related organizations

■ Government ministries and related organizations

	Organization	Org(Abbr)	Address	URL
1	Ministry of Science, ICT and Future Planning	MSIP	Government Complex-Gwacheon, 47, Gwanmun-ro, Gwacheon-si, Gyeonggi-do	www.msip.go.kr
2	Ministry of Government Administration and Home Affairs	MOI	209, Sejong-daero(Sejong-ro), Jongno-gu, Seoul	www.moi.go.kr
3	Statistics Korea	KOSTAT	Government Complex-Daejeon, 189 Cheongsu-ro, Seo-gu, Daejeon	www.kostat.go.kr
4	Korea Internet & Security Agency	KISA	IT Venture Tower, Garak-dong 78, Songpa-gu, Seoul	www.kisa.or.kr
5	Electronics and Telecommunications Research Institute	ETRI	218 Gajeong-ro, Yuseong-gu, Daejeon	www.etri.re.kr
6	Korea Information Society Development Institute	KISDI	18, Jeongtong-ro, Deoksan-myeon, Jincheon-gun, Chungcheongbuk-do	www.kisdi.re.kr
7	National Information Society Agency	NIA	53, Cheomdan-ro, Dong-gu, Daegu	www.nia.or.kr
8	National IT industry Promotion Agency	NIPA	10, Jeongtong-ro, Deoksan-myeon, Jincheon-gun, Chungcheongbuk-do	www.nipa.kr
9	Korea Communications Agency	KCA	760, Bitgaram-ro, Naju-si, Jeollanam-do	www.kca.kr
10	Korea Creative Content Agency	KOCCA	35 Gyoyuk gil, Naju-si, Jeollanam-do	www.kocca.kr
11	Korea Institute of Science and Technology Information	KISTI	245 Daehak-ro, Yuseong-gu, Daejeon	www.kisti.re.kr

■ Associations, organizations, and others

	Organization	Org(Abbr)	Address	URL
1	Korea IoT Association	KIOT	10F, Hyundai Bldg, Olympic-ro, Songpa-gu, Seoul	www.kiot.or.kr
2	CONsortium of CERT's	CONCERT	111, Seocho-Jungang-ro 8, Seocho-gu, Seoul	www.concert.or.kr
3	Startup Alliance	-	423, Teheran-ro, Gangnam-gu, Seoul	www.startupall.kr
4	The Korean Council on the Protection of Personal Information	KCPPI	127, Mapo-daero, Mapo-gu, Seoul	www.kcppi.or.kr
5	Korea Internet Service Promotion Association	KISPA	3104 Nambusunhwan-ro, Gangnam-gu, Seoul	www.kispa.or.kr

List of major Internet-related organizations

	Organization	Org(Abbr)	Address	URL
6	Internet Address Dispute Resolution Committee	IDRC	398 Seocho-ro , Seocho-gu, Seoul	www.idrc.or.kr
7	Personal Information Dispute Mediation Committee	PICO	209 Sejong-ro, Jongno-gu, Seoul	www.kopico.go.kr
8	Personal Information Protection Commission	PIPC	209 Sejong-ro, Jongno-gu, Seoul	www.pipc.go.kr
9	Korea Council of Chief Information Security Officers	CISO Korea	25 Mapo-ro, Mapo-gu, Seoul	www.cisokorea.org
10	National Association of Hacking & Security	NAHS	199 Baekbum-ro, Mapo-gu, Seoul	www.nahs.or.kr
11	Korea Internet Governance Alliance	KIGA	17F, IT Venture Tower, Garak-dong 78, Songpa-gu, Seoul	www.kiga.or.kr
12	Korea Information Security Industry Association	KISIA	9F, IT Venture Tower, Garak-dong 78, Songpa-gu, Seoul	www.kisia.or.kr
13	Korea Internet Corporations Association	KICA	143-37 Samsung-ro, Teheran-ro, Gangnam-gu, Seoul	www.kinternet.org
14	Korea Onlinead Association	KOA	7-11 Sincheon-dong, Songpa-gu, Seoul	www.onlinead.or.kr
15	The Ethics Council on Internet	-	1002, 10F, 314-1, Hangangno2-ga, Yongsan-gu, Seoul	www.iecoin.or.kr
16	Korea Society of Internet Ethics	KSIE	SBA convention center3F, 3104, Nambusunhwan-ro, Gangnam-gu, Seoul	www.ksie.kr
17	Korea Association for Telecommunications Policies	KATP	18, Jeongtong-ro, Deoksan-myeon, Jincheon-gun, Chungcheongbuk-do	www.katp.or.kr
18	Korea Institute of Information Security and Cryptology	KIISC	SeongjiHeights3, 507, Nonhyeon-ro, Gangnam-gu, Seoul	www.kiisc.or.kr
19	Korea Local Information Research&Development Institute	KLID	18F, 85, Cheonggyecheon-ro, Jongno-gu, Seoul	www.klid.or.kr
20	Korea Association of Smart Home	KASH	1101, 108, Gasandigital2-ro, Geumcheon-gu, Seoul	www.kashi.or.kr
21	KoreaCableTelevisionAssociation	KCTA	5F, Chungjeong Tower, 21, Seosomun-ro, Seodaemun-gu, Seoul	www.kcta.or.kr
22	Korea IPTV Broadcasting Association	KIBA	15F, ChungjeongTower,21 ,Seosomun-ro, Seodaemun-gu, Seoul	www.kiptv.or.kr
23	Telecommunications Tehnology Association	TTA	47, Bundang-ro, Bundang-gu, Seongnam-si, Gyeonggi-do	www.tta.or.kr
24	Korean Bar Associaton	-	18F, 124, Teheran-ro, Gangnam-gu, Seoul	www.koreanbar.or.kr
25	Korea Association for ICT Promotion	KAIT	2F, 350, Seocho-daero,Seocho-gu,Seoul	www.kait.or.kr
26	Korea Online Privacy Association	OPA	16, Teheran-ro8-gil, Gangnam-gu, Seoul	www.opa.or.kr
27	Korea Mobile Internet Business Association	MOIBA	4F, 18, Apgujeong-ro36-gil, Gangnam-gu, Seoul	www.moiba.or.kr
28	Korea Onlinead Association	KOA	10F, 137, Olympic-ro35-gil, Songpa-gu, Seoul	www.onlinead.or.kr
29	The Korea Internet Corporations Association	Kinternet	7F, 423, Teheran-ro, Gangnam-gu, Seoul	www.kinternet.org
30	Korea Digital CCTV Research Association	KDCA	501, 58, Pangyo-ro255beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do	www.digitalcctv.org
31	National Association of Hacking&Security	NAHS	1107, 199, Baekbeom-ro, Mapo-gu, Seoul	www.nahs.or.kr
32	Korea Chief Privacy Officers' Forum	KoreaCPO Forum	5F, 111, Seocho Jungang-ro 8-gil, Seocho-gu, Seoul	www.cpoforum.or.kr

List of Domestic ISPs (as of March 2016)

No	Name	English Service Name	Address	Telephone No.	URL
1	Gyeonggi Techno Park	GTP	426 - #901 (Sa-dong, Gyeonggi Techno Park), 705 Haeon-ro 426, Sangnok-gu, Ansan-si, Gyeonggi-do	031-500-3009	www.gtp.or.kr
2	Korea Education and Research Information Service	EDUNET	64 Dongnae-ro (Dongnae-dong), Dong-gu, Daegu	053-714-0564	www.keris.or.kr
3	KCTV Jeju	CABLENET	2 Ayeong-ro (Yeon-dong), Jeju-si, Juju-do	064-741-7745	www.kctvjeju.com
4	Gabia	GABIA-IP	1B U-space #401 (Sampyeong-dong), 660 Daewangpangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do	02-829-3883	www.gabia.com
5	Daou Technology	DAOU	81 Digital Valley-ro (Jukjeon-dong, Digital Square 6th Floor), Suji-gu, Yongin-si, Gyeonggi-do	070-8795-0790	www.daouidc.com
6	Shinsegae I&C	SSEN	10F (Hoehyeondong 2-ga, Prime Tower), 48 Sogong-ro, Jung-gu, Seoul	02-3397-1665	www.shinsegae-inc.com
7	Shinsegae I&C	SINC	10F (Hoehyeondong 2-ga, Prime Tower), 48 Sogong-ro, Jung-gu, Seoul	02-3397-1202	www.sinc.co.kr
8	CMB Chungcheong Media Broadcasting	CMBMUTINET	125, Bonghwang-ro (Gyo-dong), Gongju-si, Chungcheongnam-do	070-8110-7917	www.cmbtv.com
9	Afreeca TV	AFREECATV	2- #901, 15 Pangyo-ro (Sampyeong-dong, Pangyo 7 Venture Valley Complex 1), 228beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do	031-622-8457	corp.afreecatv.com/
10	LG U+	BORANET	LG U+, Hangang-ro 3-ga, 32 Hangang-daero, Yongsan-gu, Seoul	02-2089-0535	www.uplus.co.kr
11	LG U+	Xpeed	LG U+, Hangang-ro 3-ga, 32 Hangang-daero, Yongsan-gu, Seoul	02-2089-0535	www.uplus.co.kr/
12	LG U+	KIDC	616 Eonju-ro (Nonhyun-dong), Gangnam-gu, Seoul	02-2086-2924	www.kidc.net
13	LG U+	PUBNETPLUS	LG U+, Hangang-ro 3-ga, 32 Hangang-daero, Yongsan-gu, Seoul	02-2089-0535	www.pubnetplus.ne.kr
14	LG U+	LGTELECOM	LG U+ Data Network Technical Team, 416 World Cup Buk-ro (Sangam-dong), Mapo-gu, Seoul	010-8080-4220	www.lguplus.com
15	Ehost Internet Data Center	EHOSTIDC	STXV Tower #1509, 128 Gasan Digital 1-ro (Gasan-dong), Geumcheon-gu, Seoul	070-7600-5528	www.ehostidc.co.kr
16	Purplestones	HCLC	#602, 273 Digital-ro (Guro-dong, Ace Twin Tower 2-cha) Guro-gu, Seoul	02-831-0510	www.purplestones.co.kr
17	Flexnet	FLEXNET	#805, 61 Digital-ro 31 gil (Guro-dong, Shinsegae I&C Digital Center), Guro-gu, Seoul	02-6022-4022	www.flexnet.co.kr
18	Korea Data Telecommunications	KDTIDC	56 Hannae-ro (Doksan-dong, KT Corporation 2F), Geumcheon-gu, Seoul	02-2062-7671	www.kdtidc.com

No	Name	English Service Name	Address	Telephone No.	URL
19	Korea Trade Network	KTNET	511 Yeongdong-daero (Samsung-dong, COEX 4F), Gangnam-gu, Seoul	02-6000-2715	www.ktnet.co.kr
20	Seo Daegu CATV Station	SEODAEGU CLEANNET	3F, 23 Waryong-ro 84-gil (Ahyun-dong), Seo-gu, Daegu	053-567-6000	www.scstv.co.kr
21	Joyful Communication Network	JCN	76 Sinjeong-ro (Dal-dong), Nam-gu, Ulsan	070-8121-9547	www.jcntv.co.kr
22	Keumkang Cable Network	KCNNET	569 Iksan-daero (Sinyong-dong), Iksan-si, Jeollabuk-do	063-850-8575	www.kcn.tv
23	Nam-Incheon Broadcasting (NIB)	NIBDIGITAL	14 Juanseo-ro (Juan-dong), Nam-gu, Incheon	032-882-9660	www.nibtv.co.kr
24	Naver Business Platform (NBP)	NHN-NET	Green Factory, 6 Buljeong-ro (Jeongja-dong), Bundang-gu, Seongnam-si, Gyeonggi-do	031-600-6075	www.nhncorp.com/
25	Nuri Link System	KOREAONLINE	Jisan IT Venture Center 7F, 15 Beotkkot-ro 12-gil (Doksan-dong), Geumcheon-gu, Seoul	02-2039-7750	www.kol.net
26	Duzon Bizon	DUZON	130 Beodeul 1-gil, Chuncheon-si, Gangwon-do	02-6233-5393	www.duzon.com
27	Duruan	DURUAN	#202 EnC Venture Dream Tower 2-cha, 55 Digital-ro 33-gil (Guron-dong), Guro-gu, Seoul	02-6330-8044	www.duruan.co.kr
28	Dream Line	DREAMX	IT Venture Tower East Bldg. 9F, 135 Jungdae-ro (Garak-dong), Songpa-gu, Seoul	02-6007-6009	www.dreamline.co.kr
29	Lotte Data Communication	LDCC-SAFEGUARD	Lotte Data Communication, 179 Gasan Digital 2-ro (Gasan-dong), Geumcheon-gu, Seoul	02-2626-3920	www.ldcc.co.kr
30	Viaweb	VIAWEB	SK Broadband 1F, 6 Beobwon-ro 1-gil (Seocho-dong), Seocho-gu, Seoul	070-7010-9111	viaweb.co.kr
31	Samsung SDS	SAMSUNGSDS	Samsung SDS, 125 Olympic-ro 35-gil, Songpa-gu, Seoul	02-509-0429	www.sds.samsung.co.kr
32	Samjung Data Service	DIRECT-HOSTING	#6303, 3F, 110 Digital-ro 26-gil (Guro-dong, Dongil Techno Town 6-cha), Guro-gu, Seoul	02-2029-0342	www.sds.co.kr
33	Sejong Telecom Corporation	SHINBIRO	36 Sangil-ro 10-gil (Sangil-dong), Gangdong-gu, Seoul	02-1688-7380	www.sejongtelecom.net
34	SimpleX Internet	SIMPLEXINTERNET	Specialty Contractor Financial Bldg., 15 Boramae-ro 5-gil (Sindaebang-dong), Dongjak-gu, Seoul	02-6276-1572	www.simplexi.com
35	CD Networks	CDNETWORKS	7F Handong Bldg., 37 Teheran-ro 8-gil (Yeoksam-dong), Gangnam-gu, Seoul	02-3441-0491	www.cdnetworks.co.kr
36	CMB Daegu Dongbu Broadcasting	CMBDONGBU	15 Hwarang-ro (Sincheon-dong), Dong-gu, Daegu	070-8110-7535	cmbtg.tv
37	CMB Daegu Susung Broadcasting	CMBSUSUNG	15 Hwarang-ro (Sincheon-dong), Dong-gu, Daegu	070-8110-7535	cmbtg.tv
38	iLink Korea	ILINKKOREA	#11206 Gasan Digital 1-ro (Gasan-dong, The Rubens Valley), Geumcheon-gu, Seoul	02-1566-5670	www.ilinkkorea.co.kr
39	SK Broadband	broadNnet	SK Namsan Green Bldg., 24 Toegy-e-ro (Namdaemun-ro 5-ga), Jung-gu, Seoul	02-6266-2183	www.skbroadband.com
40	SK C&C	SK-NET	9 Seongnam-daero 343 beon-gil (Jeongja-dong, SK u-Tower), Bundang-gu, Seongnam-si, Gyeonggi-do	02-6400-4297	www.sk-net.com
41	SK Telecom	SK-TELECOM-NET	SKT Tower, 65 Eulji-ro (Euljiro 2-ga), Jung-gu, Seoul	02-6100-2292	www.sktelecom.com



No	Name	English Service Name	Address	Telephone No.	URL
42	SK Telink	SKTelink	SK Namsan Green Bldg. 16F, 24 Toegye-ro (Namdaemun-ro 5-ga), Jung-gu, Seoul	070-7400-1716	www.sktelink.net
43	NHN Entertainment	TOAST-NET	NHN Entertainment, 16 Daewang Pangyo-ro 645 beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do	031-8038-3852	www.nhent.com
44	NTT Korea	GIN	Two IFC 28F, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul	02-2156-9046	www.kr.ntt.com
45	UL Networks	ULNETWORKS	4F, 24-6 Ganho-daero 3-gil (Hongje-dong), Seodaemun-gu, Seoul	02-396-0100	www.ul-net.co.kr
46	Incheon International Airport	IIAC	Incheon International Airport, 47 Gonghang-ro 424 beon-gil (Unseo-dong), Jung-gu, Incheon	032-741-2913	www.airport.kr
47	Netropy	Netropy	#602 Halla Sigma Valley, 545 Dunchon-daero (Sangdaewon-dong), Jungwon-gu, Seongnam-si, Gyeonggi-do	070-7432-2345	www.netropy.co.kr
48	Nexinno	NEXINNO	233-5 Mokdongdong-ro (Mok-dong), Yangcheon-gu, Seoul	02-2061-2001	www.nexinno.co.kr
49	Dotname Korea	DOTNAME	Samik Rabidol Bldg., 234 Teheran-ro (Yeoksam-dong), Gangnam-gu, Seoul	070-7090-0834	www.dotname.co.kr
50	Vtopia	VTOPIA	#505 Apec Center, 18 Ahasan-ro 7 na-gil (Seongsudong 2-ga), Seongdong-gu, Seoul	02-563-2245	www.vtopia.co.kr
51	Seogyong Broadcasting	SCSNET	532 Jinyangho-ro (Dongseong-dong), Jinju-si, Gyeongsangnam-do	055-740-3121	www.iscs.co.kr
52	Smile Serv	SMILESERV	KT Dongpangyo Bldg. 3F, 86 Daewangpangyo-ro 644 beon-gil (Sampyeong-dong), Bundang-gu, Seongnam-si, Gyeonggi-do	02-1688-4879	www.cloudv.kr
53	C&M	CNM	Jeil Bldg. 4F, 6F & 7F, 9 Teheran-ro 103-gil (Samseong-dong), Gangnam-gu, Seoul	070-7410-4703	www.cnm.co.kr
54	CMB Kwangju Broadcasting	CMBKWANGJUNET	13 Sangmujujang-ro 104 beon-gil (Chipyeong-dong), Seo-gu, Gwangju	070-8110-7734	www.cmbkj.tv
55	CMB Daejeon Broadcasting	CMBI-NETDJ	CMB Bldg., 20 Daejong-ro 584 beon-gil (Seonhwa-dong), Jung-gu, Daejeon	070-8110-7395	www.cmbdj.co.kr
56	CMB Dongseo Broadcasting	CMBPLUSONE	Geumseong Bldg. 3F, 91 Wangsan-ro (Jegi-dong), Dongdaemun-gu, Seoul	070-8110-7223	cmbds.tv
57	CMB Hangang Cable TV	CMBI-NETHK	CMB Bldg., 22 Yangpyeong-ro 17-gil (Yangpyeongdong 4-ga), Yeongdeungpo-gu, Seoul	070-8110-7143	www.cmbhk.tv
58	CJ Hello Vision	CJ-HELLOVISION	13F, 159-1 Mokdongseo-ro (Mok-dong) Yangcheon-gu, Seoul	070-8130-2137	cjyc.net
59	Areum Broadcasting Network (ABN)	DITIZONE	14 Seongnam-daero 343beon-gil (Jeongja-dong), Bundang-gu, Seongnam-si, Gyeonggi-do	070-8145-1031	www.abn.co.kr
60	I-net	KPIN	KT Banpo Bldg. 2F, 73 Sapyeong-daero, Seocho-gu, Seoul	02-2273-9744	www.kpin.net
61	I-net Hosting	INET	40 Nambusunhwan-ro 337ga-gil (Seocho-dong), Seocho-gu, Seoul	02-2103-7500	www.inet.co.kr
62	INT management	INTCOMPANY	LG U+ Bldg. 14F, 416 World Cup Buk-ro, Mapo-gu, Seoul	070-4888-5793	www.intcompany.co.kr

List of Domestic ISPs

No	Name	English Service Name	Address	Telephone No.	URL
63	IP4 Networks	IP4NET	Jinil Bldg. 3F, 13 Eonju-ro 81-gil (Yeoksam-dong), Gangnam-gu, Seoul	070-7001-0982	www.ip4.co.kr
64	Elim Net	ELIMNET	Elim Net Bldg., 15 Gyeonggi-daero (Chungjeongno 3-ga), Seodaemun-gu, Seoul	02-3149-4835	www.elim.net
65	LX Networks	LXN	#1401 & #1402 JNK Digital Tower, 111 Digital-ro 26-gil, Guro-gu, Seoul	02-851-0111	www.lxn.co.kr
66	LG CNS	LG-NET	FKI Tower, 24 Yeoui-daero, Yeongdeungpo-gu, Seoul	02-2099-5877	www.lgcns.com
67	Withsystem	WITHSYSTEMS	KT-ICC 12F, 233-5 Mokdongdong-ro, Yangcheon-gu, Seoul	02-1899-8189	www.withsystems.co.kr
68	eGLOS	eGLOSNET	Sampoong Bldg. 6F, 158 Eulji-ro (Euljiro 4-ga), Jung-gu, Seoul	02-2116-8035	www.egios.com
69	JND Communication	JNDINFO	5F, 21 Gyeongsu-daero 338 beon-gil (Gwonseon-dong), Gwonseon-gu, Suwon-si, Gyeonggi-do	031-226-9399	www.jndinfo.com
70	Ray Net	RayNet	#106 Gwangmyeong Techno Park Building E, 60 Haan-ro (Soha-dong), Gwangmyeong-si, Gyeonggi-do	02-6112-2000	www.raynet.co.kr
71	KINX	KINXINC	Daelim Acrovill 5F, 13 Eonju-ro 30-gil (Dogok-dong), Gangnam-gu, Seoul	02-526-0939	www.kinx.net
72	KT	PUBNET	90 Buljeong-ro (Jeongja-dong), Bundang-gu, Seongnam-si, Gyeonggi-do	02-3674-5890	www.pubnet.ne.kr
73	KT	KORNET	90 Buljeong-ro (Jeongja-dong), Bundang-gu, Seongnam-si, Gyeonggi-do	02-500-6630	www.olleh.com
74	Koreacenter.com	KOREACENTER	#1401 Woorim Lions Valley A, 168 Gasan Digital 1-ro (Gasan-dong), Geumcheon-gu, Seoul	02-6903-9656	koreacenter.com
75	KOSCOM	KOINS	76 Yeouinaru-ro (Yeouido-dong), Yeongdeungpo-gu, Seoul	02-767-7148	www.kosocm.co.kr
76	T-broad Suwon	TBROAD	336 Worldcup-ro (Uman-dong), Paldal-gu, Suwon-si, Gyeonggi-do	070-8188-1086	www.tbroad.com
77	Hilineisp	HINETWORKS	Sehwa Bldg. 3F, 48 Teheran-ro 25-gil (Yeoksam-dong), Gangnam-gu, Seoul	02-1544-4450	www.hilineisp.net
78	Hyundai HCN	HCN	HCN Bldg., 19 Banpo-daero (Seocho-dong), Seocho-gu, Seoul	070-8109-1657	www.hcn.co.kr
79	GDSYS	GDSYS	#213-2 Byuksan Digital Valley 6-cha, 219 Gasan digital 1-ro (Gasan-dong), Geumcheon-gu, Seoul	070-7337-7355	www.gdsys.co.kr
80	KDDI Korea	TELEHOUSE-SEOUL	Finance Center 8F, 136 Sejong-daero (Mugyo-dong), Jung-gu, Seoul	02-310-0418	www.kddi.co.kr
81	Cross On Net	CROSSONNET	#601 Korea Business Center, 309 Gangnam Daero (Seocho-dong), Seocho-gu, Seoul	02-6207-6208	www.crsn.net
82	Pine Asset Service	PAS	49 Supyo-ro, Jung-gu, Seoul	02-6031-0067	-
83	Piranha Systems	PIRANHA	C-2513, Smart Valley Knowledge Industry Center, 30 Songdomirae-ro (Songdo-dong), Yeonsu-gu, Incheon	02-1644-7568	www.piranha.co.kr
84	Haion Net	HAIONNET	#705 EnC Venture Dream Tower 3-cha, 38-21 Digital-ro 31-gil (Guro-dong), Guro-gu, Seoul	02-3281-3456	www.haion.net

No	Name	English Service Name	Address	Telephone No.	URL
85	Korea Institute of Science and Technology Information (KISTI)	KREONet	245 Daehak-ro (Eoeun-dong), Yuseong-gu, Daejeon	042-869-0707	www.kreonet.re.kr
86	Korea Education Network	KREN	Seoul National University Computer Center, 1 Gwanak-ro (Sillim-dong), Gwanak-gu, Seoul	02-880-5364	www.kren.ne.kr
87	Korea Data	KDATA	#325 Hyundai Hyel, 438 Gyeongsu-daero (Ingye-dong), Paldal-gu, Suwon-si, Gyeonggi-do	031-234-0445	-
88	Korea Information Certificate Authority (KICA)	SIGNGATE	Pangyo Digital Center C 5F, 242 Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do	02-360-3226	www.signgate.com
89	National Information Society Agency	NIA/KOREN	NIA Bldg., 53 Cheomdan-ro (Sinseo-dong), Dong-gu, Daegu	053-230-1470	nia.or.kr
90	Korea CATV Gwangju	KCTVNET	Namhwa Bldg., 146 Geumnam-ro (Numun-dong), Buk-gu, Gwangju	062-417-6070	www.kctv.co.kr
91	Korea CATV Green Cable Television Station	GCS	1611Dalgubeol-daero (Gamsam-dong), Dalseo-gu, Daegu	070-8145-6142	www.gcs.co.kr
92	Hansol NexG	VAAN	Business Tower 16F, 386 Worldcupbuk-ro (Sangsam-dong), Mapo-gu, Seoul	02-561-0218	www.hansolnexus.com
93	Host Way IDC	HOSTWAY	2F, 36 Jangmi-ro (Yatap-dong), Bundang-gu, Seongnam-si, Gyeonggi-do	070-8630-1530	www.hostway.co.kr
94	Hyosung ITX	HYOSUNGCDN	Ire Bldg. 16F, 57 Seonyudong 2-ro, Yeongdeungpo-gu, Seoul	02-6288-6508	www.hyosungitx.com

Abbreviations

3D	3 Dimension
5G	5th Generation
6NGIX	IPv6 Neutral Generic Internet Exchange

A

ACI	Application Centric Infrastructure
ADSL	Asymmetric Digital Subscriber Line
AoC	Affirmation of Commitments
AON	Active Optical Network
AP	Access Point
API	Application Programming Interface
APII	Asia-Pacific Information Infrastructure
ARPANET	Advanced Research Projects Agency NETWORK
AS	Autonomous System

B

BcN	Broadband convergence Network
BGP	Border Gateway Protocol

C

C&C	Command and Control
CA	Carrier Aggregation
ccTLD	country code Top Level Domain
CDMA	Code Division Multiple Access
CES	Consumer Electronics Show
CoMP	Coordinated Multipoint
COREEN	Collaborative Research Environment
CPS	Cyber Physical Systems
CSB	Cloud Service Brokerage

D

D2D	Device-to-Device
DaaS	Data as a Service
DDoS	Distributed Denial of Service
DOI	Deutschland Online Infrastructure
DMC	Digital Media City
DNS	Domain Name System
DNSSEC	DNS Security Extensions
DSP	Demand Side Platform

E

EBPP	Electronic Bill Presentation and Payment
EDI	Electronic Data Interchange
Eduroam	Education Roaming
EFT	Electronic Funds Transfer
ENUM	tElephone NUMber Mapping
EoC	Ethernet of Coax
EoS	Ethernet over SONET
ETL	Extraction, Transformation, Loading
e-VLBI	electronic Very Long Baseline Interferometry

F

FTA	Free Trade Agreement
FTTH	Fiber To The Home

G

G2B	Government to Business
G4B	Government for Business
GA4GH	Global Alliance for Genomics and Health

GE	Gigabit Ethernet
GEANT	Grand European Academic Network
GGE	Group of Governmental Experts
GLORIAD	Global Ring Network for Advanced Applications Development
GPaaS	Game Platform as a Service
GPKI	Government Public Key Infrastructure
GPS	Global Positioning System
GRI	Global Reporting Initiative
GSM	Global System for Mobile communication
gTLD	generic Top Level Domain

H

HetNet	Heterogeneous Network
HDMI	High Definition Multimedia Interface
HFC	Hybrid Fiber Coax
HMD	Head Mounted Display
HSDPA	High Speed Downlink Packet Access
HSPA	High Speed Packet Access
HTML	Hyper Text Markup Language

I

IaaS	Infrastructure as a Service
IAR	Internet Address Resource
ICT	Information and Communications Technology
IE	Internet Explorer
IoE	Internet of Everything
IoT	Internet of Things
IP	Internet Protocol
i-PIN	internet Personal Identification Number
IPTV	Internet Protocol TV
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IRNC	International Research Network Connection
ISDN	Integrated Service Digital Network
ISP	Internet Service Provider
ITR	International Telecommunication Regulations
IX	Internet eXchange

J

JIS	Japanese Industrial Standards
JTC1	Joint Technical Committee1

K

KAP	Knowledge Attitude Practice
KOCW	Korea Open Course Ware
KOREN	KOrea advanced REsearch Network
K-PION	Korea Patent Information Online Network
KREONET	Korea Research Environment Open NETwork
KSTAR	Korea Superconducting Tokamak Advanced Research
KWCAG	Korean Web Content Accessibility Guidelines

L

LAN	Local Area Network
LBS	Location Based Service
LHCOPN	LHC Optical Private Network
LTE	Long Term Evolution

M

M2M	Machine to Machine
MCN	Multi Channel Network
MIM	Mobile Instant Messenger
MIMO	Multi User Multiple Input Multiple Output
MOOC	Massive Open Online Course
MTC	Machine-Type Communications
mVoIP	mobile Voice over Internet Protocol
MW	Microwave
MWC	Mobile World Congress

N

NCS	National Competency Standards
NFC	Near Field Communication
NFV	Network Function Virtualization

NII National Information Infrastructure
 NLP Natural Language Processing
 NPKI National Public Key Infrastructure
 NOC Network Operations Center

O

O2O Online to Offline
 ONOS Open Network Operating System
 OTT Over The Top
 OTP One Time Password

P

P2P Peer To Peer
 PaaS Platform as a Service
 PKI Public Key Infrastructure
 PON Passive Optical Network
 PP Program Provider
 PSTN Public Switched Telephone Network

Q

QC Query Count
 QPS Quadruple Play Service

R

RFC Request For Comment
 RFID Radio Frequency IDentification
 ROADM Reconfigurable Optical Add-Drop Multiplexer
 RPG Role Playing Game
 RTT Round-Trip delay Time

S

SaaS Software as a Service
 SAFE SDN-Assisted Firewall Environment
 SDN Software Defined Network
 SGCC Study Group on Cloud Computing
 SINET Science and Information Network
 SLA Service Level Agreement

SLD Second Level Domain
 SMF Single Mode Fiber
 SMS Short Message Service
 SNMP Simple Network Management Protocol
 SNS Social Networking Service
 SON Self Optimizing Networks
 SQL Structured Query Language
 SSL Secure Sockets Layer
 SSP Supply Side Platform
 STB Set Top Box
 SWG5 Special Working Group 5

T

TaaS Testbed as a Service
 TCP/IP Transmission Control Protocol/Internet Protocol
 TDM Time Division Multiplexing
 TEIN Trans Eurasia Information Network
 TLD Top Level Domain
 TPS Triple Play Service
 TWDM Time and Wavelength Division Multiplexing

U

UFB Ultra-Fast Broadband initiative
 UHD Ultra High Definition
 USN Ubiquitous Sensor Network

V

V2X Vehicle to Everything
 VOD Video On Demand
 VoIP Voice over Internet Protocol
 VR Virtual Reality
 VSAT Very Small Aperture Terminal

W

WAC Wholesale App Community
 WAN Wide Area Network
 WCAG Web Content Accessibility Guidelines

WDM	Wavelength Division Multiplexing
WiMAX	Worldwide Interoperability for Microwave Access
WLAN	Wireless Local Area Network
WPAN	Wireless Personal Area Network
WWAN	Wireless Wide Area Network
WWW	World Wide Web

X

xDSL	xDigital Subscriber Line
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Organization Abbreviations

3GPP 3rd Generation Partnership Project

A

AfriNIC Africa Network Information Center
 APCERT Asia-Pacific Computer Emergency Response Team
 APEC Asia-Pacific Economic Cooperation
 APNIC Asia-Pacific Network Information Center
 ARIN American Registry for Internet Numbers
 ASEM Asia-Europe Meeting

C

ccNSO Country Code Names Supporting Organization
 CERN The European Organization for Nuclear Research
 CWG Council Working Group on Internet Public Policy Related Issues

D

DARPA Defense Advanced Research Projects Agency

E

ERCIM European Research Consortium for Informatics and Mathematics
 EC European Commission
 ETRI Electronics and Telecommunications Research Institute
 ETSI European Telecommunications Standards Institute

F

FIRST Forum of Incident Response and Security Teams



G

GAC	Governmental Advisory Committee
GCI	Global Commission on Internet Governance
GIST	Gwangju Institute of Science and Technology
GLIF	Global Lambda Integrated Facility
GLORIAD	Global Ring Network for Advanced Applications Development

I

IANA	Internet Assigned Numbers Authority
ICANN	Internet Corporation for Assigned Names and Numbers
ICG	IANA Stewardship Transition Coordination Group
IDC	Internet Data Center
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IERC	IoT European Research Cluster
IETF	Internet Engineering Task Force
IGF	Internet Governance Forum
IMD	International Institute for Management Development
ISO	International Organization for Standardization
ISOC	Internet Society
ITU	International Telecommunication Union

K

KAIST	Korea Advanced Institute of Science and Technology
KIGA	Korea Internet Governance Alliance
KISA	Korea Internet & Security Agency
KISDI	Korea Information Society Development Institute
KISTI	Korea Institute of Science and Technology Information
KLID	Korea Local Information Research & Development Institute
KRNIC	Korea Network Information Center
KOTRA	Korea Trade-Investment Promotion Agency
KCC	Korea Communication Commission
KCA	Korea Communications Agency

L

LACNIC	Latin American and Caribbean Internet Address Registry
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M

MSIP	Ministry of Science, ICT and Future Planning
MOI	Ministry of Government Administration and Home Affairs

N

NIPA	National IT industry Promotion Agency
NIA	National Information Society Agency
NIC	National Intelligence Council
NICT	National Institute of Information and Communications Technology
NIR	National Internet Registry
NSA	National Security Agency
NSF	National Science Foundation
NTIA	National Telecommunications and Information Administration

O

OASIS	Organization for the Advancement of Structured Information Standards
OECD	Organization for Economic Cooperation and Development

R

RIPE NCC	Réseaux IP Européens Network Coordination Center
RIR	Regional Internet Registry

S

STC	Special Technical Committee
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T

TTA	Korea Telecommunications Technology Association
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W

W3C	World Wide Web Consortium
WAI	Web Accessibility Initiative
WCIT	World Conference on International Telecommunications
WEF	World Economic Forum
WSIS	World Summit on the Information Society
WTPF	World Telecommunication/ICT Policy Forum
WTSA	World Telecommunication Standardization Assembly

About the KISA

Korea Internet & Security Agency



The KISA has set 'Internet promotion for the future' and 'information security for our safety' as its two primary tasks, and is focusing on enhancing the information security capacity of Korea's ICT industry and expanding global cooperative partnerships based on the K-ICT Security Development Strategy, to ensure that these two pillars will serve as the core competencies of the future Korea in an equal and harmonious manner.

Protecting the industry from the risk of cyber attacks and preventing privacy infringement

- Operation of the Korea Internet Security Center and KrCERT/CC
 - Monitoring of cyber threats such as DDoS attacks and distribution of malicious codes on a 24/7/365 basis.
 - Operation of the DDoS Response System (DDoS Cyber Shelter Service).
 - Detection of and response to Websites hosting malicious codes.
 - * The KISA has searched the 2.5 million Korean domains to protect local Internet users from infection with malicious codes by accessing web pages that host them.
- Research & Development of Information Security Technology
- Information Security Management System (ISMS) Certification
- Education of elite cyber security experts (KISA ACADEMY)
- Operation of the Personal Infringement Report Center and the Illegal Spam Response Center

Promoting the Internet and Information Security Industries

- Evaluation and certification system for information security products (CCRA)
- Support Center for the IPv6
- Korea Domain Name System (KrDNS)
- Korea National Biometric Test Center
- Regional information security bases
- IoT Innovation Center

Expanding International Cooperation and Business Overseas

- Global cooperation network with ITU, OECD, World Bank, FIRST, APCERT, ICANN, APNIC, etc.
- Initiation of a new global cooperation platform named CAMP
 - * CAMP : Cybersecurity Alliance for Mutual Progress
- A total of 33 MoUs signed with foreign counterparts (as of June)

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