Broadband in Korea

"From Fast Follower to First Mover"

October 2011

KOREA COMMUNICATIONS COMMISSION

KAIT
Korea Association for ICT Promotion

http://www.kait.or.kr

Introduction to KAIT

ICT statistics support organization

ICT Statistics Compilation and Provisioning (KAIT)

- ICT statistics compilation and provisioning: The base data used to analyze competitiveness in the ICT industry and policy implementation

  ※ KAIT consistently complies government-approved statistics and data related to ICT, and is obliged to submit social index-related statistics to the OECD and ITU.

- Collection of domestic and overseas ICT statistics and status analysis

  ※ Responds to the statistics submission requests from the OECD and ITU.

  Collects and analyzes statistics from broadcasting and communication committees throughout the world.

- Increases online surveys using the statistical work support system and manages the database efficiently.

  ※ Provides various information and improves utilization of the statistical data, using the statistics portal service.

- Provides statistics related to the international ICT index, analyzes 12 international ICT indices and propose policy idea

  ※ Provides the ICT statistics to the OECD and ITU, analyzes the international ICT index and provides information for policy establishment to the Korea Communications Commission and the Blue House.

- Studies green ICT related policies and performs forum activities.

Contents

I. Need for the ICT Data

Meaning of the Objective Data

- The valuable base data to determine policies, strategies, and development of the economy and society.
  - Uncertainty is one of the biggest factors that disturbs our happiness. The government should set up a policy that increases wealth while reducing uncertainty as much as possible.

Happiness pursuit index announcement by the New Economics Foundation (NEF) in the U.K. in 2009

→ Costa Rica, Dominican Republic, and Jamaica ranked first to third, OECD countries ranked 40th or below.

Rank of the happiness index?

International position of Korea
- **Economic Position: 10th**
- **National Brand: 30th**
- **Information and Communication: Top level**

The class of the country improved by joining the Development Assistance Committee(DAC) in the OECD.
➔ Increases development assistance like ICT policy support.
➔ Continuous growth while recognized as a cultural nation (Korea Premium)

Can we set up a national policy based on the happiness pursuit index?

Roles of ICT in Economy and Society

- ICT causes mega trends in various areas, including the economy and society, and acts as the driving force that changes the national and social system fundamentally.

Promotion of information knowledge

Revolutionary improvement of the information level by building up the world's best level network

Laying a foundation for promoting an information-knowledgeable society and implementing e-Government.
* Ranked top in the IDI index (2011), e-Government development index and e-Participation index (2010)

Settlement of the digital life

Improving convenience of a life by building the network

Expanding online administrative civil services, such as a unified civil service system (G4C) and an integrated national tax service, and improving the e-Business levels such as e-Commerce and Internet banking.

Creation of a new culture

Promoting social changes by activating network utilization

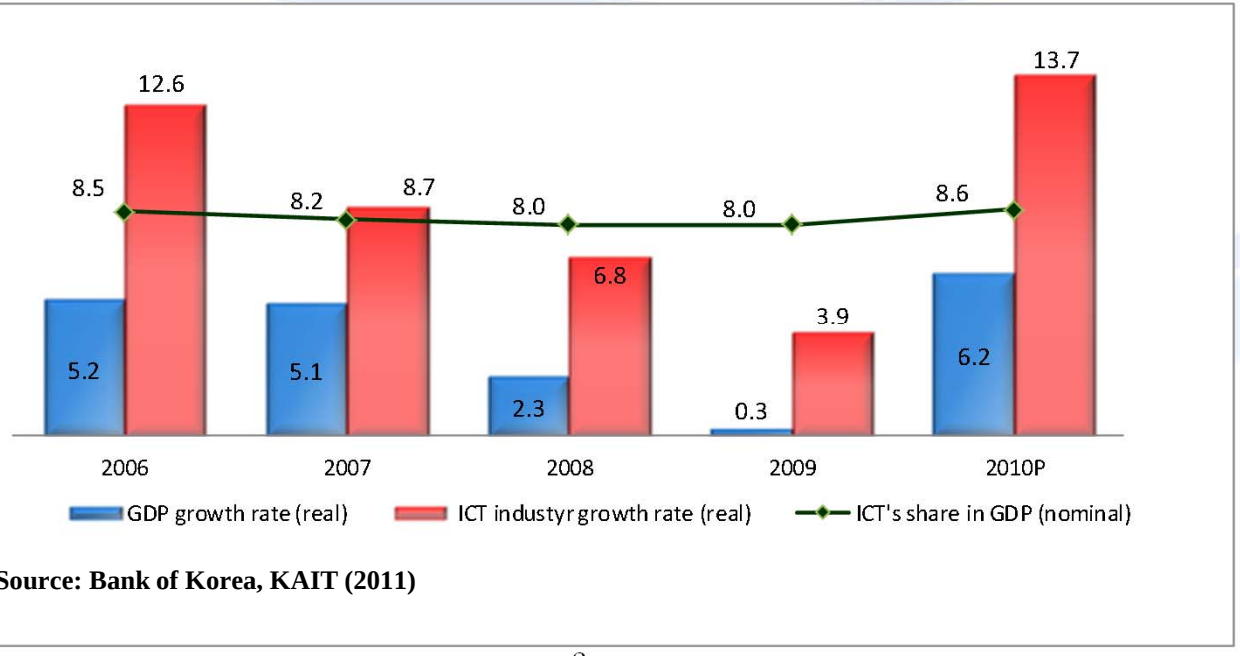
A new cultural trend is created (web 2.0), as UCC (User Created Contents) can be distributed.
A new digital culture is created, as the Internet-based community is formed, such as mini-home pages, blogs, and cafés.

Contribution of the ICT Industry to the National Economy

- ICT became the core tool to proactively cope with future uncertainty and crises.
  * ICT made the greatest contribution in overcoming the IMF crisis in 1998 and the world financial crisis in 2008.
- The ICT industry occupied 8.6% of the domestic GDP in 2010.
  * The ICT industry achieved a 9.1% annual average growth rate since 2006, which was far above the GDP growth rate of the same period (3.8%).

Trend of the ICT industry growth rate

(unit : %)

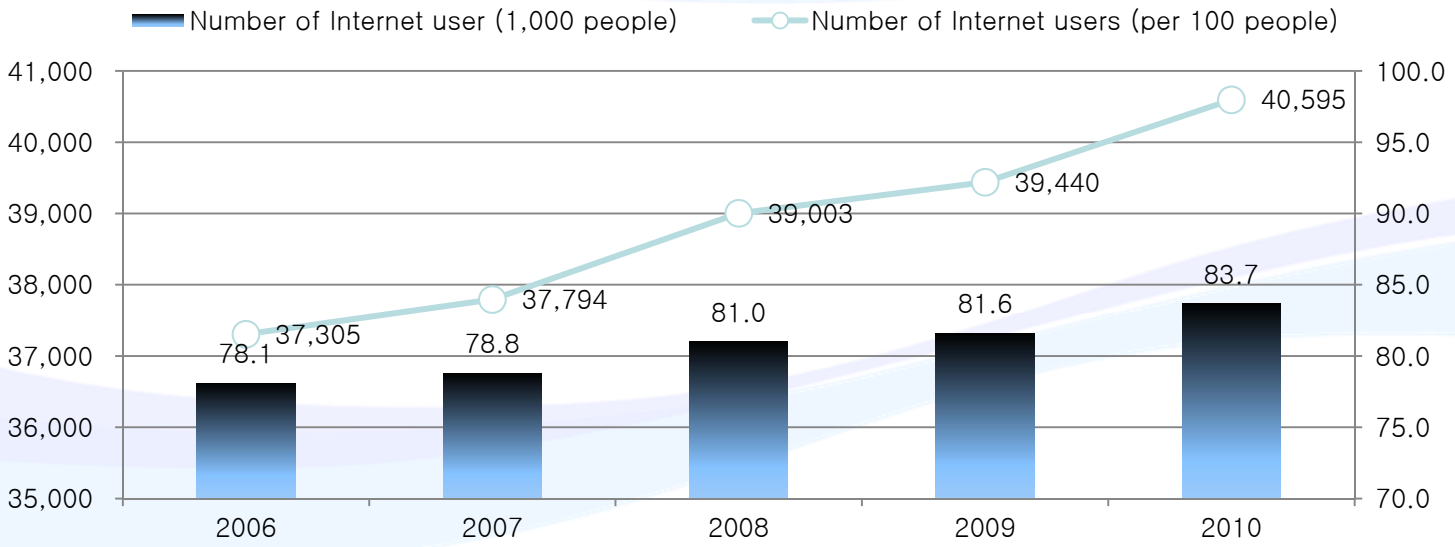


Source: Bank of Korea, KAIT (2011)

Internet Use Status in Korea

- The number of Internet users per 100 persons was approximately 83.7 in 2010, and the total number of Internet users was 40,595,000. The total number is increasing every year.
  ※ Shifting from wired Internet connections via desktops and laptops to wireless Internet connections via wireless terminals like mobile phones.

Internet use rate and number of users



Source: Fact-finding research of the Internet use in 2010, KISA (2010.12)

Different Criteria of International ICT Indices for the Wired Broadband Internet Tariff

- The reason why Korea's wired broadband internet index dropped significantly in the WEF Networked Readiness Index
- The tariff is based on a 256Kbps or faster, dedicated DSL line, and there is no DSL service in Korea. Instead, 50Mbps KT Light tariff was submitted.
  - On the contrary, countries with less developed broadband networks offer 256Kbps low-speed products, and the tariff is relatively cheaper.

※ The rank is not low if the high-speed broadband internet is compared.

- The criteria of calculating the wired broadband internet tariff is different from other international indices.

- In particular, Korea ranked low in the WEF NRI, as the PPP exchange rate was applied.

Fare index	WEF NRI		ITU ICT development index		IMD's The World Competitiveness Yearbook	
	'11 (2009 statistics)		'10 (2008 statistics)		'10 (2009 statistics)	
Tariff of Wired Broadband Internet	67th position (40)	34.9 PPP$	34th position (7)	304 US$	27th position (17)	25.32 US$
Criteria for the Tariff of Wired Broadband Internet	Monthly base rate (PPP$)		Monthly base rate ÷ Monthly per capita income (US$)		Monthly wired high-speed Internet fare for households (US$)	

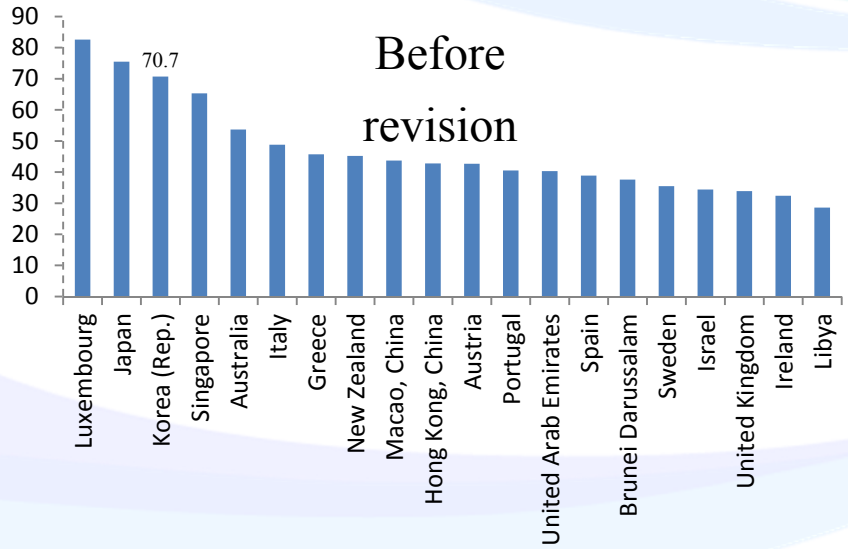
Status of Wireless Broadband Internet Subscriptions

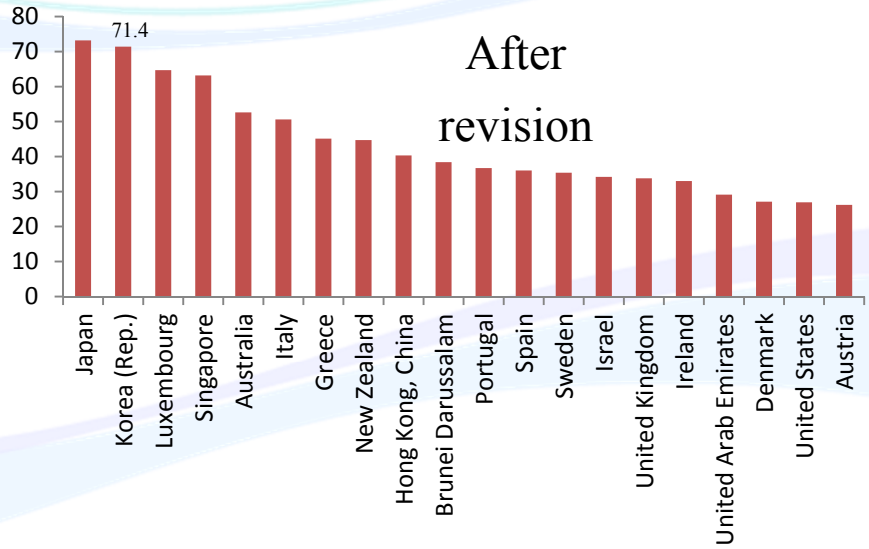
- The number of wireless broadbandInternet subscribers for every 100 people in Korea was 70.7 in 2008, which was the 3rd rank in the world. However, Korea ranked 2nd (71.4 people) and 1st in 2009 and 2010, respectively, according to the revised index.

※ According to the announcement of Measuring the Information Society in 2011, Japan ranked 1st in the number of subscribers (73.2 people) and Luxemburg ranked 3rd (64.7 people).

Mobile broadband subscriptions per 100 inhabitants

(unit : %)





Source: ITU World Telecommunication/ICT Indicators database.(2010, 2011)

The Index of the Digital Economy and Social Change in Korea

- The digital economy and society is growing quickly together with ICT.

※ The number of smart-phone users and mobile banking registration customers increases rapidly these days.

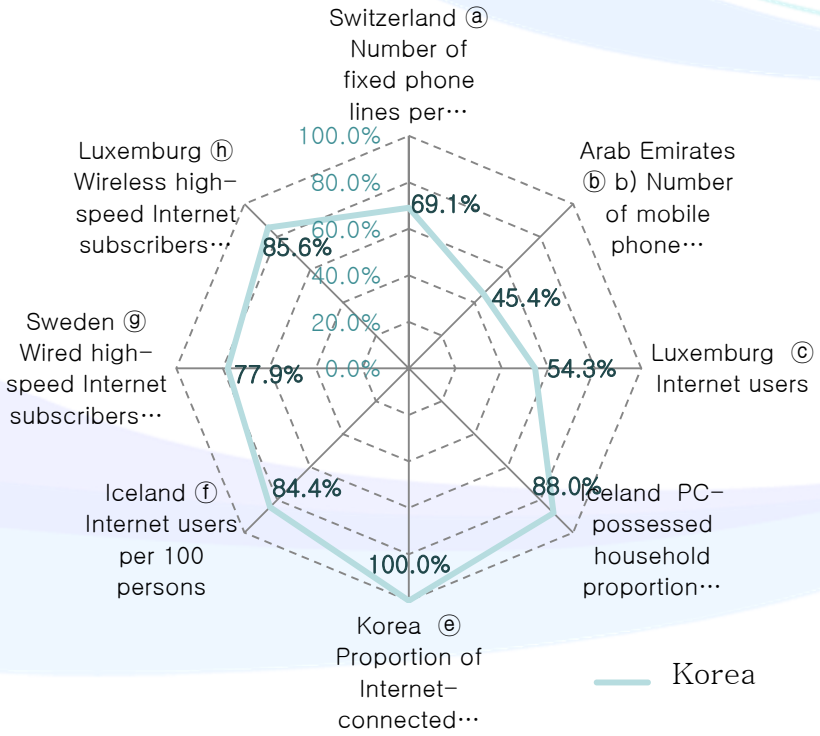
Item	2007	2008	2009	2010	2013F
IT industry production amount (real) (Unit: 10M USD)	825.4	881.7	916.3	1041.7	1314.4
IT's proportion in GDP (nominal) (Unit: %)	8.2	8.0	8.0	8.6	9.0
IT export amount (Unit: 10M USD)	13,010	13,116	12,095	15,394	18,215
Mobile subscribers (Unit: 10,000 persons)	4,350	4,561	4,794	5,077	5,926
Smart-phone users (Unit: 10,000 persons)	**-**	**-**	**81**	**721**	**2,310**
High-speed Internet users (Unit: 10,000 persons)	1,471	1,547	1,635	1,722	2,016
e-Commerce size (Unit: 10M USD)	4,699.5	5,726.7	6,108.5	7,490.2	11,935.2
Mobile banking customers (Unit: 1000 persons)	**5,009**	**8,477**	**11,168**	**15,748**	**39,964**
Revenue from mobile communication services (Unit: 10M USD)	179.0	190.2	199.8	207.7	240.9
Revenue from broadcasting businesses (Unit: 10M USD)		78.4	81.4	87.2	112.9

Policies to Improve the International Index and Indicators

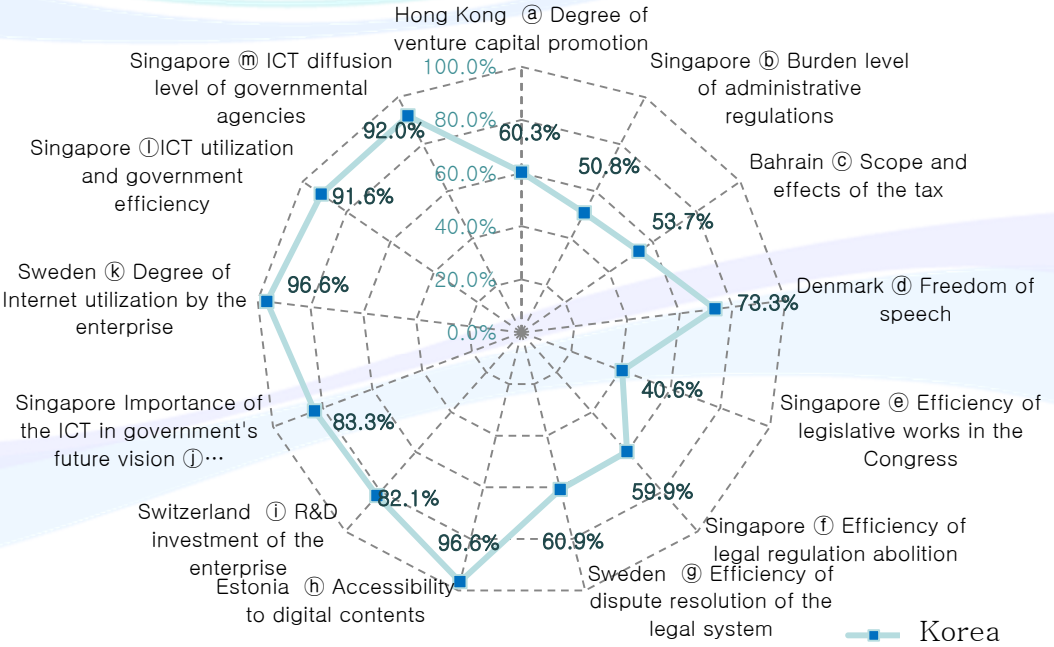
- The relatively low international index, which is an objective evaluation of IT levels, can be the reason for policy improvement.
- The government prepares and presents the policy to increase the number of subscribers and utilization rate.

※ The government is trying to solve digital divide issues (difference in the number of subscribers and utilization rate by age, gender, income level, and region).

Comparing Korea with the top ranker in major quantitative index



Comparing Korea with the top ranker in major qualitative index



IT Statistics Submitted to the ITU

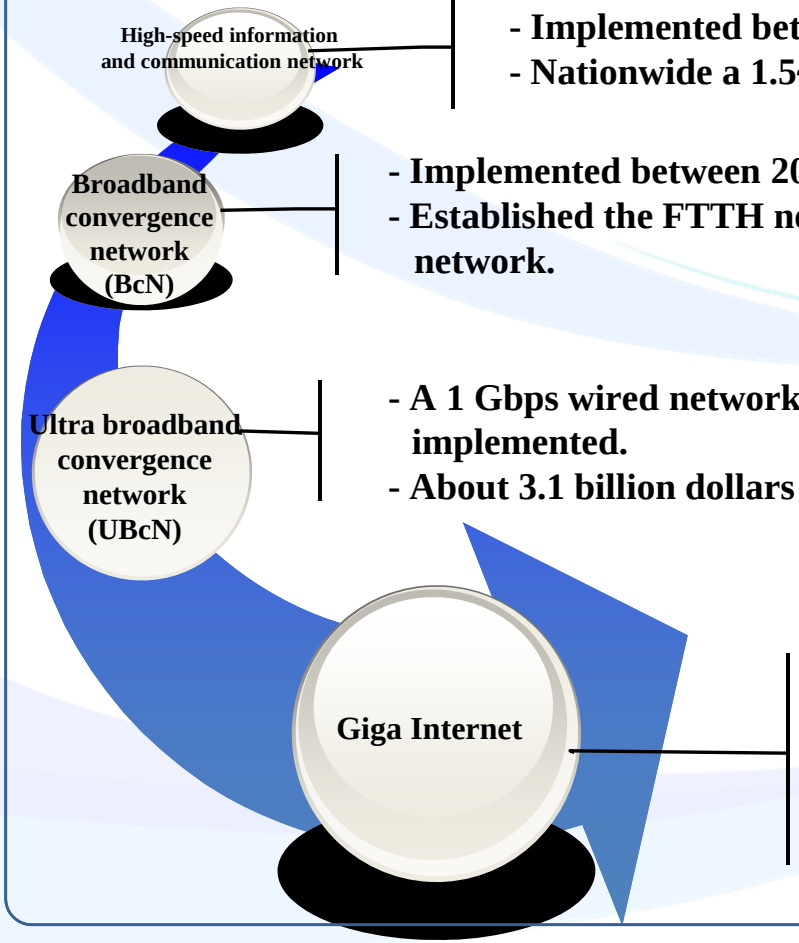
- Currently, 115 IT statistics indices in 14 areas are submitted to the ITU as part of the major IT statistics index.
- Korea provides 78 indices, excluding 37 indices.
  - 63 out of 78 indices are provided by the service providers to the statistical data collection organization (KAIT).

※ Depending on the business area, the statistical organization or related organization collects and submits the data directly. (15 indices)

Type	Remark
FIXED TELEPHONE NETWORK	Service provider → KAIT (8)
MOBILECELLULAR NETWORK	Service provider → KAIT (11)
INTERNET	New (1), service provider → KAIT (14), agency (5)
QUALITY OF SERVICE	Service provider → KAIT (3)
TRAFFIC	Service provider → KAIT (8)
STAFF	Service provider → KAIT (1), KAIT (1)
REVENUE(in millions local currency at current prices)	Service provider → KAIT (16)
CAPITALEXPENDITURE (in millions local currency at current prices)	Service provider → KAIT(1), KAIT(2)
BROADCASTING	Service provider (4)
INFORMATION TECHNOLOGY	Service provider (1)
INTERNATIONAL TELEPHONE TRAFFIC	Service provider → KAIT (2)

Results of the Infrastructure Policy

From Fast Follower to First Mover



- Implemented between 1999~2008.
- Nationwide a 1.5~2Mbps network was installed.

- Implemented between 2004 and 2010.
- Established the FTTH network to provide a 10Mbps service to the subscriber's network.

- A 1 Gbps wired network and average 10 Mbps wireless network will be implemented.
- About 3.1 billion dollars will be invested by 2013.

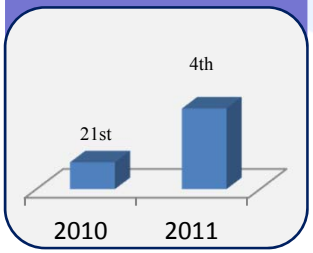
- Targets to commercialize Giga Internet after 2012.
- KT consortium and CJ Hello Vision consortium are selected as model service providers.

Results of the Information Policy in Korea

- Korea secured the world's best ICT foundation with a concentrated investment in the information infrastructure.

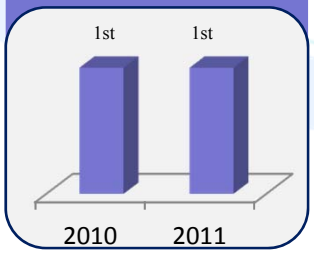
※ Korea enhanced its global position by establishing a high-speed information and communication network early, a broadband convergence network, and improving the national ICT competitiveness (wired phone, Internet, and mobile phone).

Number of fixed phone lines



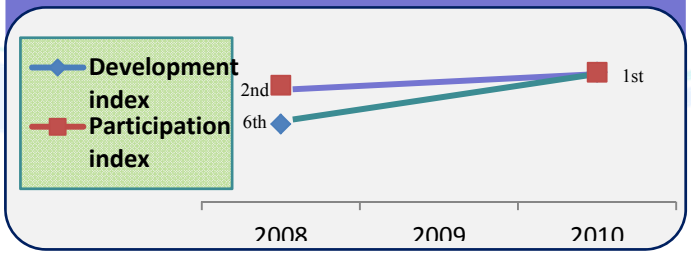
4th in the world

Proportion of Internet connected households



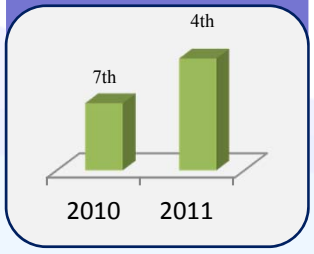
1st in the world

UN e-Government index



1st in the world

Number of wired high-speed Internet subscriptions

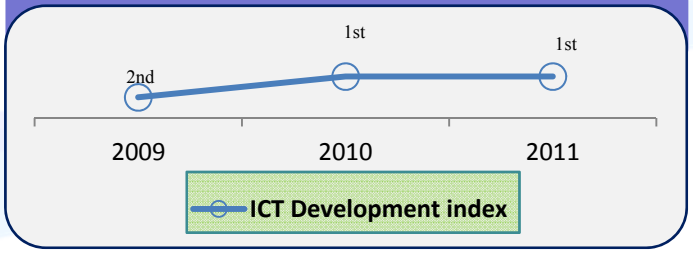


4th in the world

Number of wireless high-speed Internet subscriptions

1st in the world

ITU ICT development index



1st in the world

- 1st in IT national competitiveness index (Ministry of Internal Affairs and Communications, Japan August 2011)
- 1st in mobile broadband diffusion rate (OECD, June 2011)
- 1st in digital reading capability of the youth (OECD, June 2011)
- 1st in Internet speed (Fortune, January 2011)

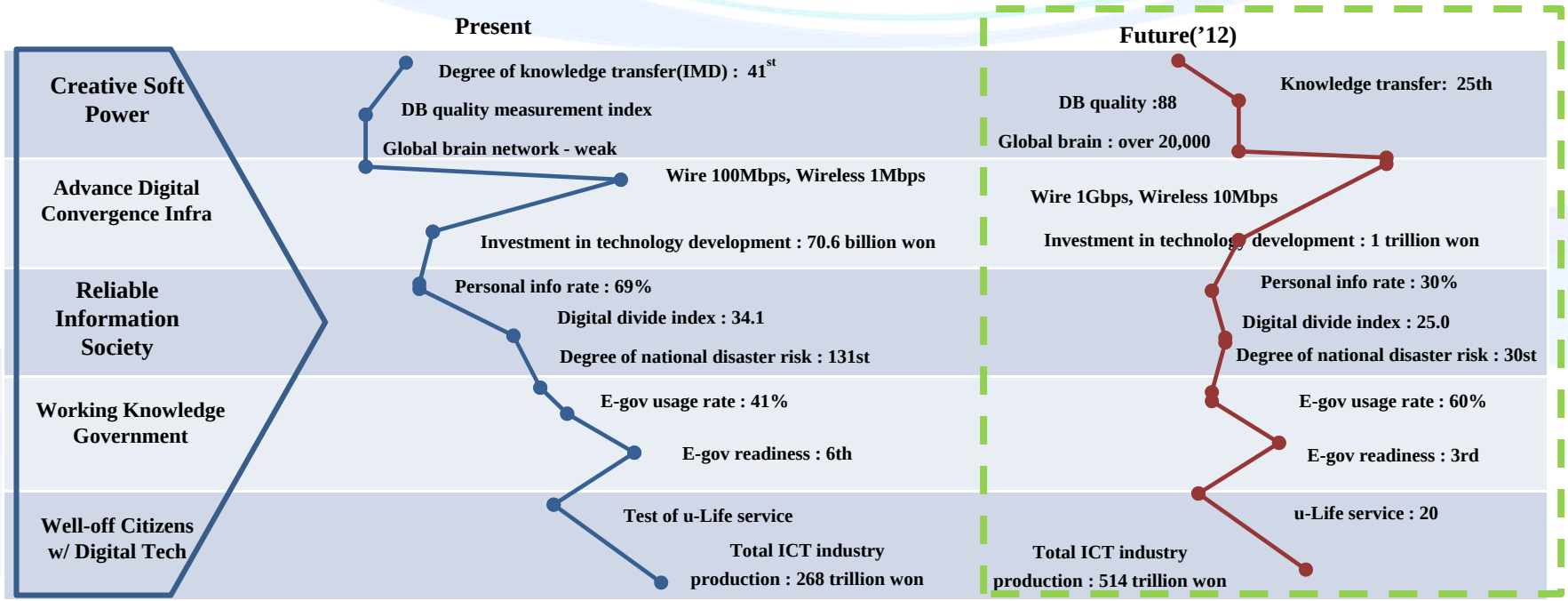
Basic National Informatization Plan

- Three areas will be advanced by increasing ICT utilization throughout the society (public sector, economy, society), based on two engines called soft power and convergence infrastructure.

※ (2 engines) Knowledge will be created throughout the society with open and flexible soft power, and the virtuous value cycles of social changes and national growth will be completed by innovating the utilization system and utilizing the infrastructure suitable for the digital convergence era.

※ (3 areas) Contributions will be made to realize a more advanced Korea by creating new values and resolving current social issues – Working knowledge government, well-off citizens with digital technologies, and reliable information for society.

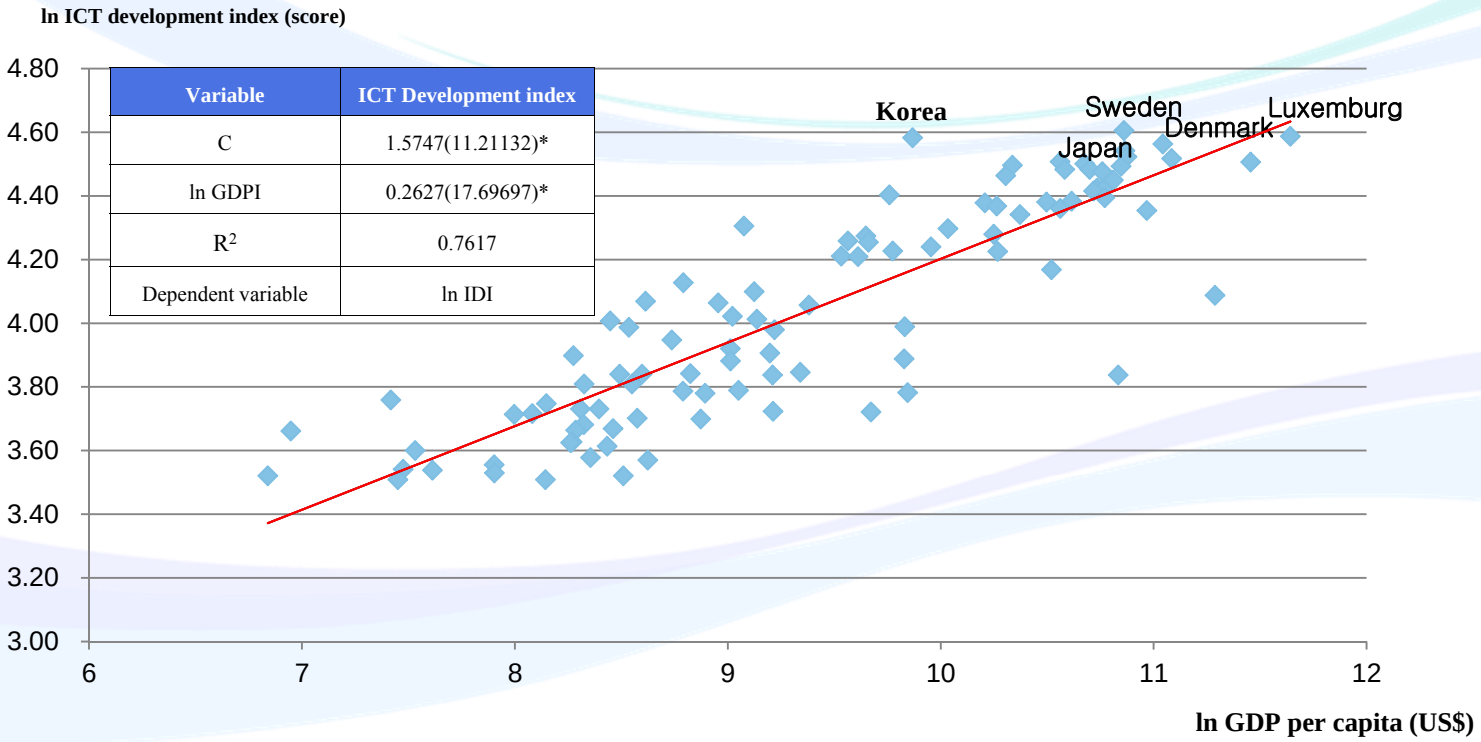
Major objectives by area



GDP per capita and ICT Development Index

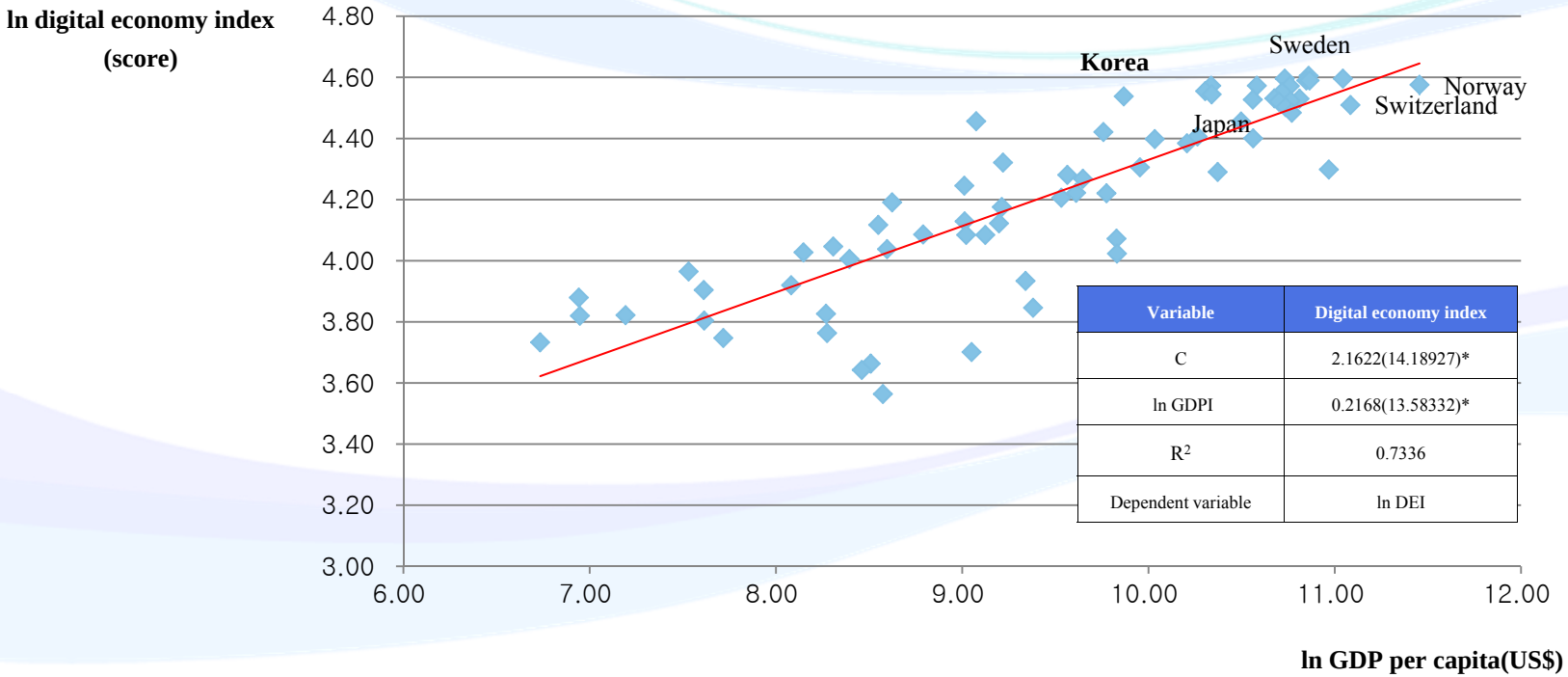
- Shows the relationship between GDP per capita and the ICT development index of the top 100 countries.
- It was found that the GDP per capita can explain about 76% of the ICT development index through regression analysis.

Variable	ICT Development index
C	1.5747(11.21132)*
ln GDPI	0.2627(17.69697)*
R^2	0.7617
Dependent variable	ln IDI



GDP per capita and Digital Economy Index

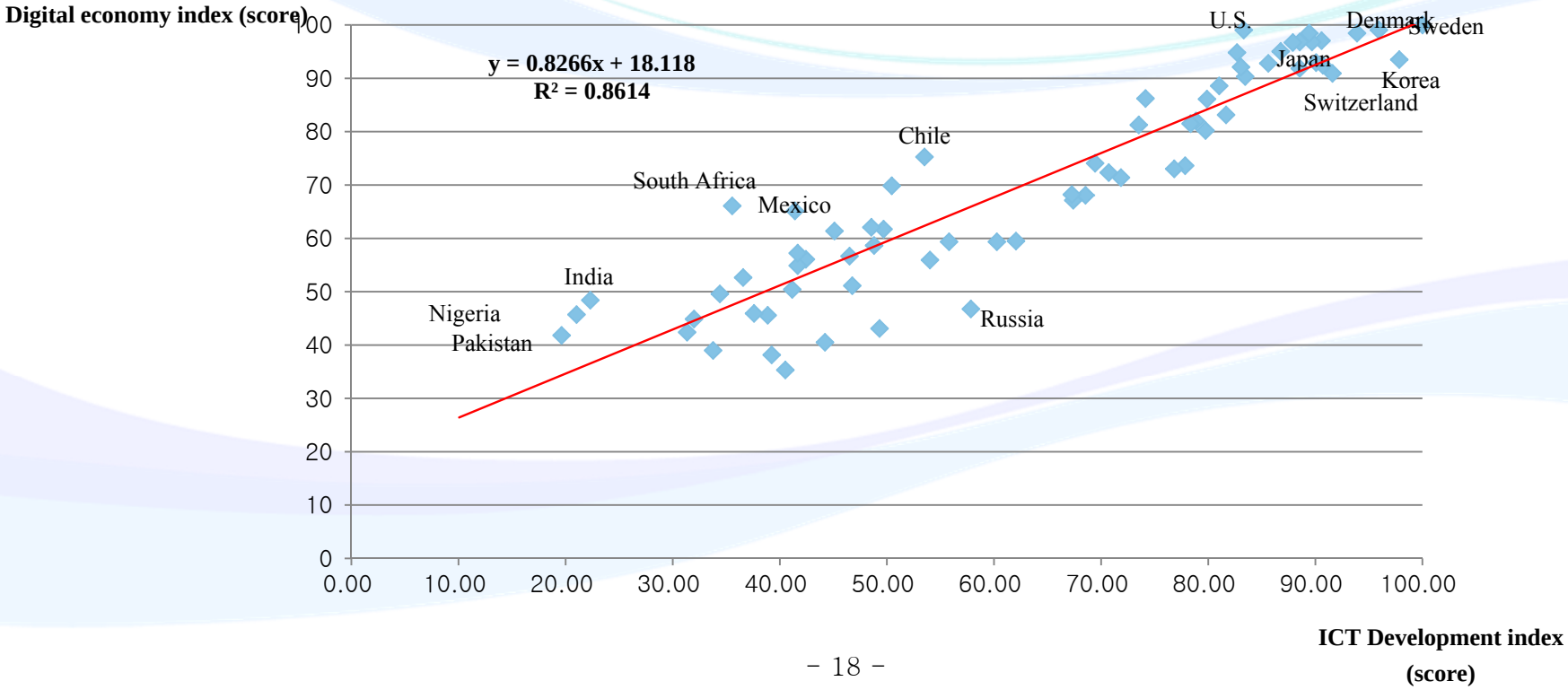
- GDP per capita of the top 69 countries can explain or forecast 73% of the trend of the EIU's digital economy index.
  - According to the analysis results, the economic power of a particular country is highly related to the level of the digital economy environment.



Variable	Digital economy index
C	2.1622(14.18927)*
ln GDPI	0.2168(13.58332)*
R^2	0.7336
Dependent variable	ln DEI

ICT Development Index and Digital Economy Index

- The result of analyzing the relationship between the ICT development index and the digital economy index shows that the ICT development index explains 86% of the digital economy index.
  - The analysis results show that economic indices of the ICT development index affect the level of the digital economy environment significantly. And, existence of the qualitative index like the “business environment” of the digital economy index is the factor that makes a difference.




Thank You!

Number of Internet Users in Korea (based on the criteria of the international organization)

- The ITU (International Telecommunications Union) calculates and provides the “Internet users per 100 persons” data, in order to understand the size of Internet users in each country.

※ The “Internet users per 100 persons” data reflects the ”Internet use rate” or ” Internet users per 100 persons” officially published by each country without any modification, and the ”number of Internet users” is calculated again using the ”Internet users per 100 persons” data.

※ The “Internet users per 100 persons” in Korea reflecs the rate of ”Internet users within the recent one year”, according to the ITU Recommendation. (Population aged over three)

※ The domestic Internet use rate is announced by reflecting the “”Internet users within the recent one year”.

Internet use rate by Internet use period in Korea, 2010

	Within 1 week	Within 1 month	Within 3 months	Within 1 year	Internet experienced people
Internet use rate	**73.7**	**77.8**	**83.1**	**83.7**	**85.9**

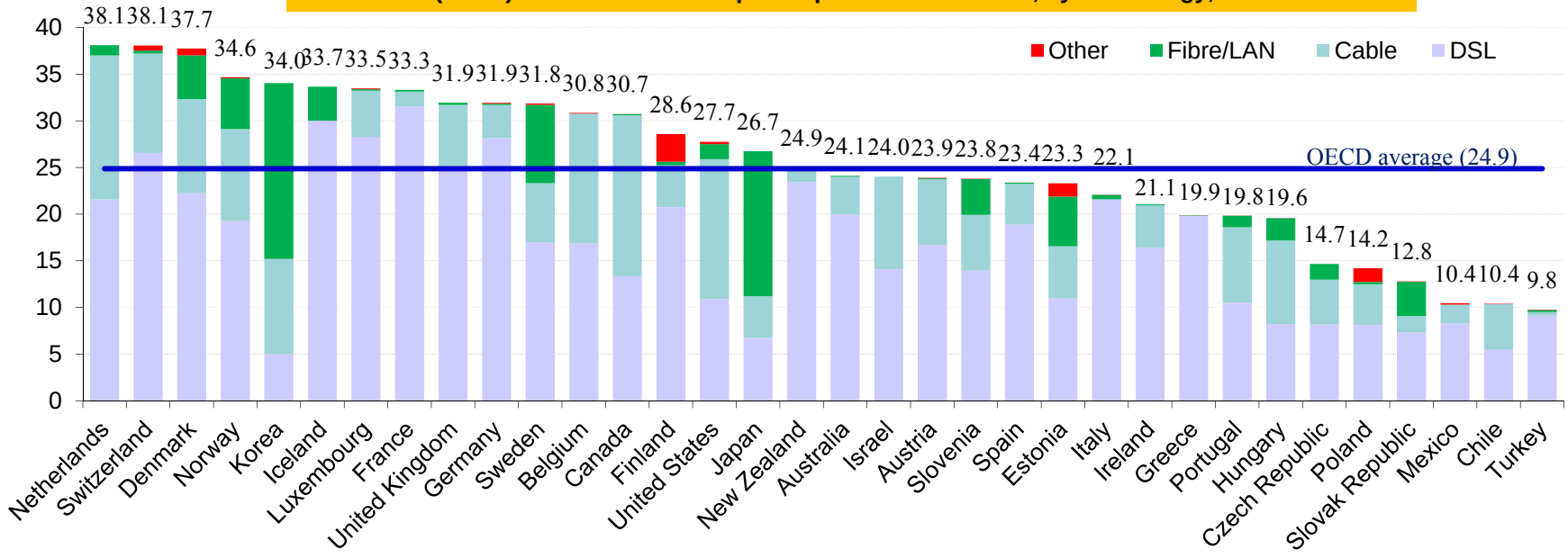
Status of Broadband wired Internet Diffusion

- The number of the wired broadband subscribers in Korea amounted to 11,790,000 users at the end of 2010. (34% diffusion rate) (OECD broadband statistics in July 2011)

※ As more mobile broadband networks are diffused, the wired Internet diffusion rate is relatively low due to a "replacement effect".

OECD Fixed (wired) broadband subscriptions per 100 inhabitants, by technology, December 2010

(unit : %)



Source: OECD broadband statistics(2011.7)

The Criteria of Calculating the number of Wireless Broadband Internet Subscription is changed

- The previous year's rank was changed retroactively, as the ITU statistics index criteria were changed.
- As the statistical criteria of the "number of wireless high-speed Internet subscription", a sub-index of "ICT utilization rate", is changed on June 2010, the previous years rank was changed from the 3rd to the 2nd position.

※ The "number of terrestrial mobile subscription" is applied to IDI calculation, as the wireless high-speed Internet index is diversified. (Previously, it was a single index.)

Comparison of "wireless high-speed Internet" index before and after revision

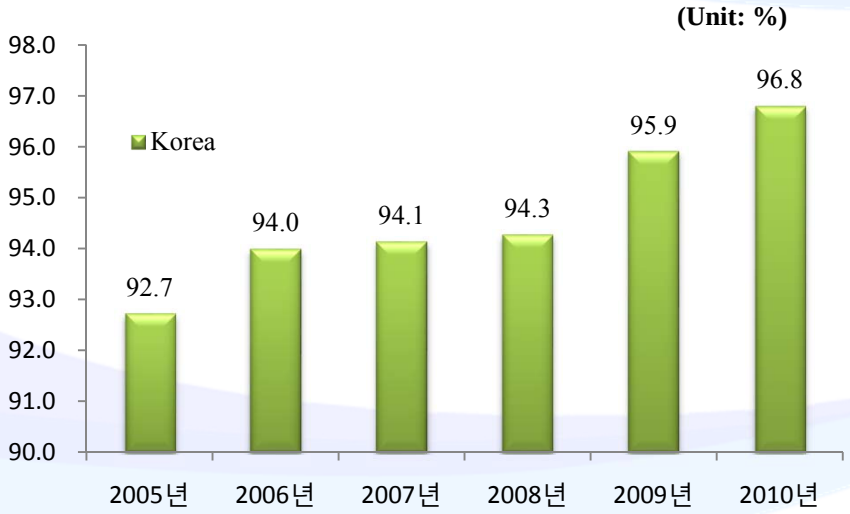
Before revision		After revision	Remark
Number of wireless high-speed Internet subscription **(single index)**	⇒	1. Number of satellite subscription	
		2. Number of terrestrial fixed wireless subscription	
		3. Number of terrestrial fixed wireless subscription 3.1 Number of standard mobile subscription 3.2 Number of dedicated data subscription (including the pre-paid data card)	**ITU IDI was applied in 2011**

Internet Connected Household Rate

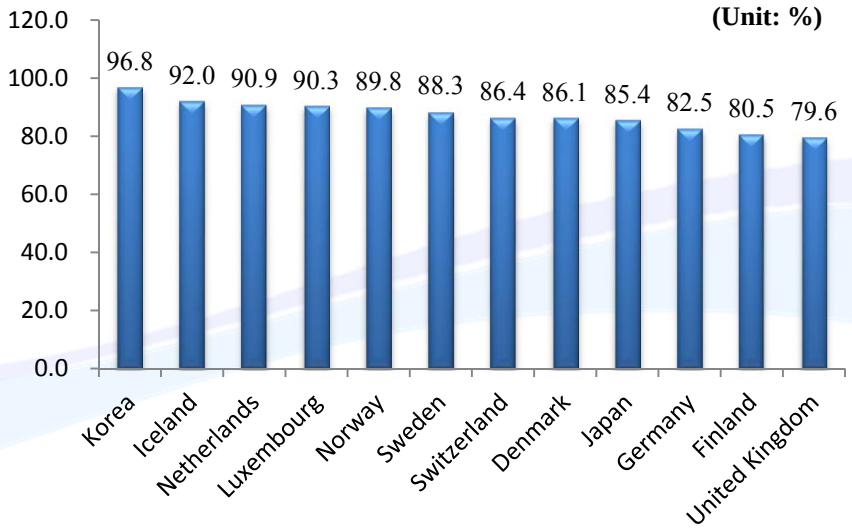
- The Internet connected household rate in Korea was 96.8%, which is the top among 34 countries (ITU WTI statistics, June 2011)

※ Iceland, Netherlands, and Luxemburg followed Korea in the Internet connected household rate .

Trend of the internet connected household rate in Korea



Internet connected household rate of major countries in 2010



Source: ITU WTI (2011. 6)

IT statistics submitted to the ITU

- Currently, 115 IT statistics indices in 14 areas are submitted to the ITU as the major IT statistics index. Korea provides 78 indices, excluding 37 indices.
  - The index that is not provided is unrealistic in Korea, or cannot be collected practically in Korea.
    ※ Service quality (number of fixed line phone failure (per year, 100 lines), and proportion of failed line repair (within one day)

Item	Details	Item	Items not provided
Fixed phone network	8 ea. Including fixed phone line, public phones, etc.	8 ea.	0 ea.
Mobile phone network	19 ea. Including mobile phone subscribers (prepaid + deferred payment), etc.	11 ea.	8 ea. (prepaid card connection cost, etc.)
Internet	25 ea. Including the total number of (wired) Internet subscribers, etc.	20 ea.	5 ea. (telephone network Internet fare, etc.)
Service quality	3 ea. Including the number of persons waiting for wired phone connection, etc.	3 ea.	0 ea.
Traffic	8 ea. Including local call traffic.	7 ea.	1 ea. (VoIP network)
Rate system	6 ea. Including home fixed phone installation cost, etc.	0 ea.	6 ea. deleted (based on 2008)
Personnel	7 ea. Including the number of permanent telecommunication employees, etc.	1 ea.	6 ea. (number of female telecommunication employees)
Revenue	16 ea. Including total revenue of the telecommunication service	16 ea.	0 ea.
Capital expenditure	4 ea. Including the investment in the telecommunication area	3 ea.	1 ea. (overseas investment)
Broadcasting	10 ea. Including the number of terrestrial multi-channel TV subscribers, etc.	4 ea.	6 ea. (number of radio receivers, etc.)
Information technology	3 ea. Including the number of PC.	1 ea.	2 ea. (number of annual PC sales, etc.)
Local community connection index	2 ea. Including the rate of the place providing public Internet access, etc.	0 ea.	2 ea.
Overseas call traffic	2 ea. Including overseas outgoing traffic (minutes), etc.	2 ea.	0 ea.
Overseas call fare	2 ea. Including the local call charge per 3 minutes (peak time zone), etc.	2 ea.	0 ea.
Total	115	78 ea.	37 ea.

Broadband & Infra Statistics

- There are 13 broadband and infrastructure statistics indices in OECD Outlook.

No.	Index	Definition and calculation criteria	Number of included countries
1	Internet subscribers to fixed networks	Per 100 inhabitants	2000~2005 30 country comparison
2	Broadband access	Broadband access (DSL, cable, Other)	2000~2005 30 country comparison
		Broadband access per 100 inhabitants	2000~2005 30 country comparison
3	Mobile internet	Mobile internet : i-mode subscribers	1999~2006
4	Mobile phone-based internet subscribers in Japan	Mobile phone-based internet subscribers in Japan	1999~2006-mid
5	Internet hosts by domain	Internet hosts by domain	1998~2006
6	Domain name registrations	Domain name registrations under top level domains	2000~1006
7		Domain name registrations	ccTLD, com, net, org, info, biz, Other, eu
8	Web servers by domain	Web servers by domain	2000~2006
9	Secure servers in OECD countries	Secure servers in OECD countries	1998~2006
10	Routed autonomous system country	Routed autonomous system country	1997~2005 30 countries
11	Routed IPv4 addresses by country	Routed IPv4 addresses by country	1997~2005 30 countries
12	Average routed IPv4 addresses per AS by country	Average routed IPv4 addresses per AS by country	1997~2005 30 countries
13	Top 10 networks defined by number of peers	Top 10 networks defined by number of peers	2004~2006

Purpose and Method of Compilation

- OECD Communication Outlook is the OECD's country statistics related to broadcasting and communication (or information and communication) that is compiled biennially.
- Statistics provides the objective information on the investment in the next-generation broadcasting and communication area, as well as the information on the structural change in the broadcasting and communication area.
- In particular, statistics provides the information needed for benchmarking and establishment of the policy related to the business, by comparing the consumer-based price and profit of the service provider among OECD countries.

※ The ITU data and Netcraft's Internet related data are used as the supplementary information. For the data related to the price, the data provided by Teligen is used, and the HICP calculation method is used.

Scope of Compilation

- Size of communication equipment, scope and development of the communication network, broadband and Internet infrastructure, broadcasting, price, communication equipment export/import, etc.

Problems of Statistics Compilation by Organizations

- The data provided by the profit-seeking company Teligen is used to compile communication service fee statistics, instead of the official data.
- On the contrary, the OECD use the HICP method when compiling the statistical data related to communication service fees.

※ If the new product is not included in the criteria basket, comparison cannot be made. For subsidiary payment, HICP's price index is distorted.

Implications

- Mutual cooperation system with the OECD is needed for active statistical data review.
- The leading statistical theory needs to be provided and reflected in the communication and broadcasting statistics of the OECD.

Implementation Plan in the Infrastructure Area

- The backbone development plan and mid-to-long term infrastructure development plan are needed to minimize the duplicated investment.
  - There is no additional plan in the backbone network development plan, except replacing 60% of the wired phone network with the IP network by 2012 in the mid-to-long term broadcasting and communication network.
  - Wired, wireless, and object communication subscriber network will be implemented separately, according to technical characteristics.
  - The wire/wireless integrated infrastructure development plan is required to improve the effect of utilizing the wire/wireless infrastructure, by combining wire/wireless service providers.

Implementation Plan in the Service Area

- Emphasis should be put on utilization promotion of mobile Internet, cloud, wireless Internet, Smart Work, and geographical information, which can be the basis of the future service.
  - Plans should be established from the perspective of service link, instead of a single service.
  - Plans are needed to utilize the services to be implemented by the government and set up the policy, according to the progressive

8 Promoting Plans of the KCC

Implementation plan	Objective
id-to-long term broadcasting and munication network plan (January 30, 2009)	To set up the ultra broadband convergence network to provide the world's best broadcasting and communication convergence service.
Mobile Internet promotion plan (March 11, 2009)	To be an advanced mobile Internet country by creating an user-oriented service environment.
sic plan for object communication astructure establishment (October 14, 2009)	To establish the world's best object communication infrastructure by 2012.
n-governmental cloud computing omotion plan (December 30, 2009)	To be a world's best strong cloud computing country.
Wireless Internet promotion plan (April 21, 2010)	To realize strong smart mobile country.
Geographical information use promotion plan (June 10, 2010)	To form a world's best geographic information use environment.
Smart Work infrastructure dvancement and private sector promotion plan (July 19, 2010)	To diffuse the Korean style smart work model throughout the entire industry.
ernet development plan to prepare for the future (June 29, 2011)	To become a strong Internet country from the strong network country.

Implementation Plan in the Infrastructure and Service Area

- The backbone development plan and mid-to-long term infrastructure development plan are needed to minimize the duplicated investment.
  - There is no additional plan in the backbone network development plan, except replacing 60% of the wired phone network with the IP network by 2012 in the mid-to-long term broadcasting and communication network.
- Emphasis should be put on utilization promotion of mobile Internet, cloud, wireless Internet, Smart Work, and geographical information, which can be the basis of the future service. Plans should be established from the perspective of service link, instead of a single service.
  - Plans are needed to utilize the services to be implemented by the government and set up the policy, according to the progressive forecast of the future service.

8 Promoting Plans of the KCC

Implementation plan
Mid-to-long term broadcasting and communication network plan (January 30, 2009)
Mobile Internet promotion plan (March 11, 2009)
Basic plan for object communication infrastructure establishment (October 14, 2009)
Pan-governmental cloud computing promotion plan (December 30, 2009)
Wireless Internet promotion plan (April 21, 2010)
Geographical information use promotion plan (June 10, 2010)
Smart Work infrastructure advancement and private sector promotion plan (July 19, 2010)
Internet development plan to prepare

Korea's Informatization Policy

The mid-to-long term plan to resolve digital divide will be established and implemented.

Digital divide resolution policies are implemented actively, such as enactment of the "Law Regarding Digital Divide Resolution" (January 2001)", "Pan-governmental comprehensive digital divide resolution plan (2001 ~ 2005)", and annual implementation plan establishment and implementation.

History of informatization policy implementation

Foundation preparation (93-97): Laid the foundation of national computerization and policy basis	Advancement (98-02): Established the high-speed information and communication network, and propagated Internet access.	Promotion by area (03-07): Informatization promotion by area and e-Government implementation
Provided the computing network and developed major information databases. Established the informatization implementation system.	Established the high-speed information and communication network. Emerged as the major growth industry of the ICT industry.	Promoted informatization throughout the country. Promoted participation of the citizen via ICT.

Influence of the Internet on the Economy

- McKinsey published an analysis report on the "Influence of the Internet on the economy" targeting 13 countries including 8G. (McKinsey & Company, May, 2011)

- 13 countries including G8 countries, Korea, Brazil, China, India, Sweden were analyzed, using various analysis methodologies (macro and micro economic approach, and econometric approach)
- There are 2 billion Internet users in the world.
- According to the analysis of 13 countries, the Internet contributes to GDP by 3.4% on average.

  ※ 13 countries including G8 countries, Korea, Brazil, China, India, and Sweden.
- The weighted value of the Internet regarding GDP varies, depending on the country.

  ※ 6% for advanced countries like Sweden and U.K., and under 4% for 9 countries among 13 countries that need more Internet development.
- The Internet contributed GDP by 21% over the last 5 years (matured countries)

  ※ The Internet contributed GDP by 10% over the last 15 years.
- Internet maturity has a correlation with the improvement of quality of life.

  ※ It was analyzed that increased Internet growth in advanced countries caused 500 dollar real GDP increase per capita over the last 15 years.
- The Internet was a strong catalyst for job creation.

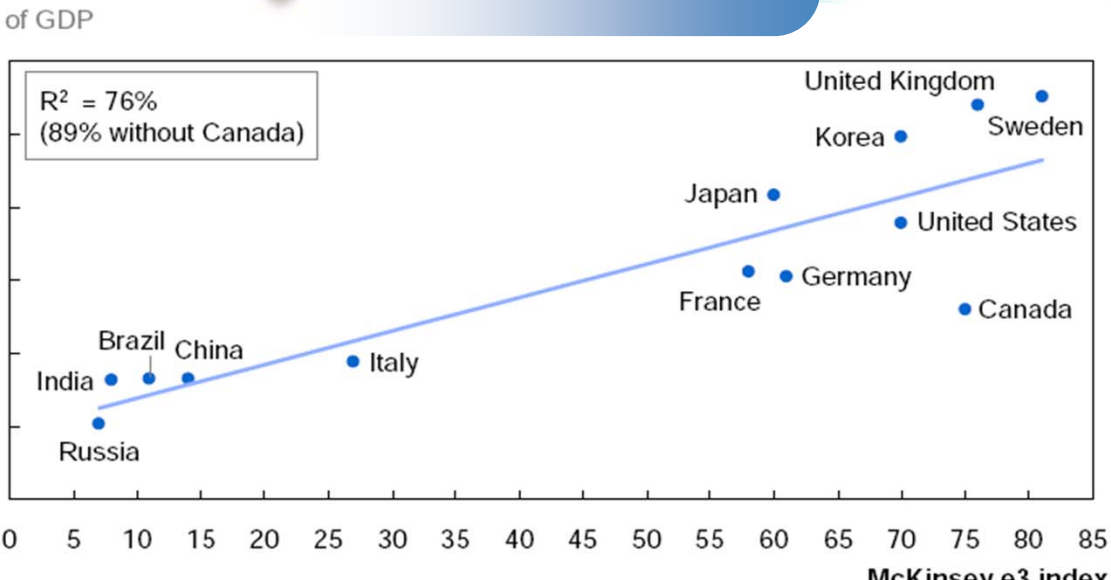
  ※ According to McKinsey's global SME survey result, one lost job creates 2.6 new jobs.
- About 75% of the Internet influence is created in the traditional industry that is not related to the Internet directly.

Implications

- When the influence of the Internet on the national economy is understood correctly, leaders of the government and industry should search the method of maximizing participation in the global Internet eco-system proactively.

- Encouraging the usage is the inevitable first step in public expenditure.
- Leaders of the government and industry should concentrate on supplying human resources, financial capital, infrastructure, and business environment.

Contribution of the Internet to GDP



< 4 analysis indices>

- e3 index and iGDP indicator that correspond to the input and output index centered around expenditure and consumption.
- McKinsey Internet supply leadership index (MISL index) and i4F index that corresponds to the input and output index centered around the supply side.