NECTEC Annual Conference and Exhibition 2017

Future Perspectives of Smart Technology and Society in Korea

Prof. Junseok Hwang

Seoul National University

Professor, Technology Management, Economics, and Policy Program, (TEMEP)
Director, International IT Policy Program (ITPP)

junhwang@snu.ac.kr

http://itpp.snu.ac.kr

http://gii.kaist.ac.kr

Chapter 0_

Table of Content.

Chapter

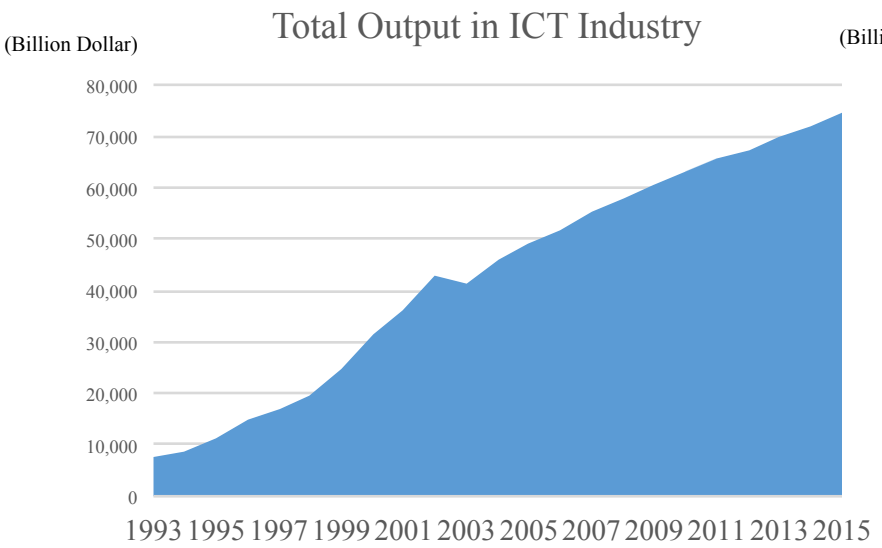
01 History of IT Development in Korea

History of IT Development in Korea

1960 Myeong-dong, Korea

2010 Myeong-dong, Korea

History of IT Development in Korea



Source: Institute for Information & Communications Technology Promotion(IITP)

- In 2016, the total ICT exports of Korea was $162.5 billion, making it the world's fourth largest ICT export country
- ICT exports accounted for 32.8% of total industrial exports ($ 495.4 billion), taking a crucial role in domestic industry exports and positive trade balance

History of IT Development in Korea

1988

Korean 1st Time-division electronic switching system, TDX-1

‘Localization’

- Accumulating technology through localization of foreign-dependent IT technology and equipment

1996

Samsung CDMA

‘Technology Independence’

- Rapid growth in the domestic mobile market and domestic firms began to achieve high volume of exports

2000

KT WIBRO

WiBro & DMB

‘Becoming a First-mover’

- Leading international standardization and possessing original technology

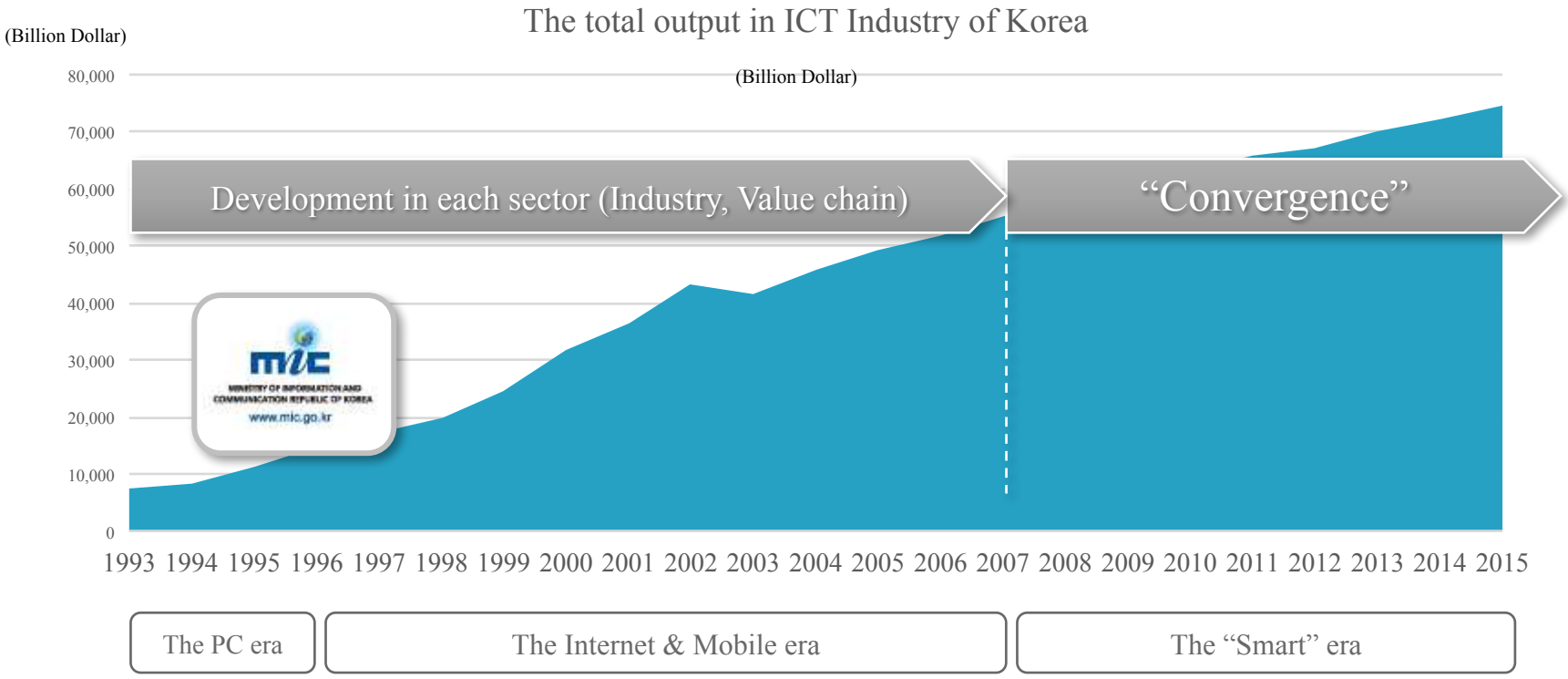
2016

ITU

‘World Best ICT Country’

- Ranked 1st in ITU’s ‘ICT Development Index(IDI)’

History of IT Development in Korea



- Semiconductor
- Hardware

- Broadband Internet Infrastructure (e-Korea Vision 2006 (2002))
- Knowledge Information-oriented Policy

- Diffusion of IT Convergence
- "Intellectual and Information Society"

Source: Institute for Information & Communications Technology Promotion(IITP) & NIPA (2011)

Chapter

02 Smart Technology

Smart Technology

- The term ‘Smart’ originated from “Smartphone”.
- The meaning of ‘Smart’ is an electronic device or system that can be connected to the internet, used interactively, and is to some extent intelligent (SogetiLabs, 2014).

Wirelessly Connected

- Smart TV
- Smart Phone
- Smart watch
- Smart wallet
- Smart motion sensor

Interactive

- Smart board
- Smart table
- Smart fridge
- Smart cooker
- Smart light bulb
- Smart response XE

Predictive

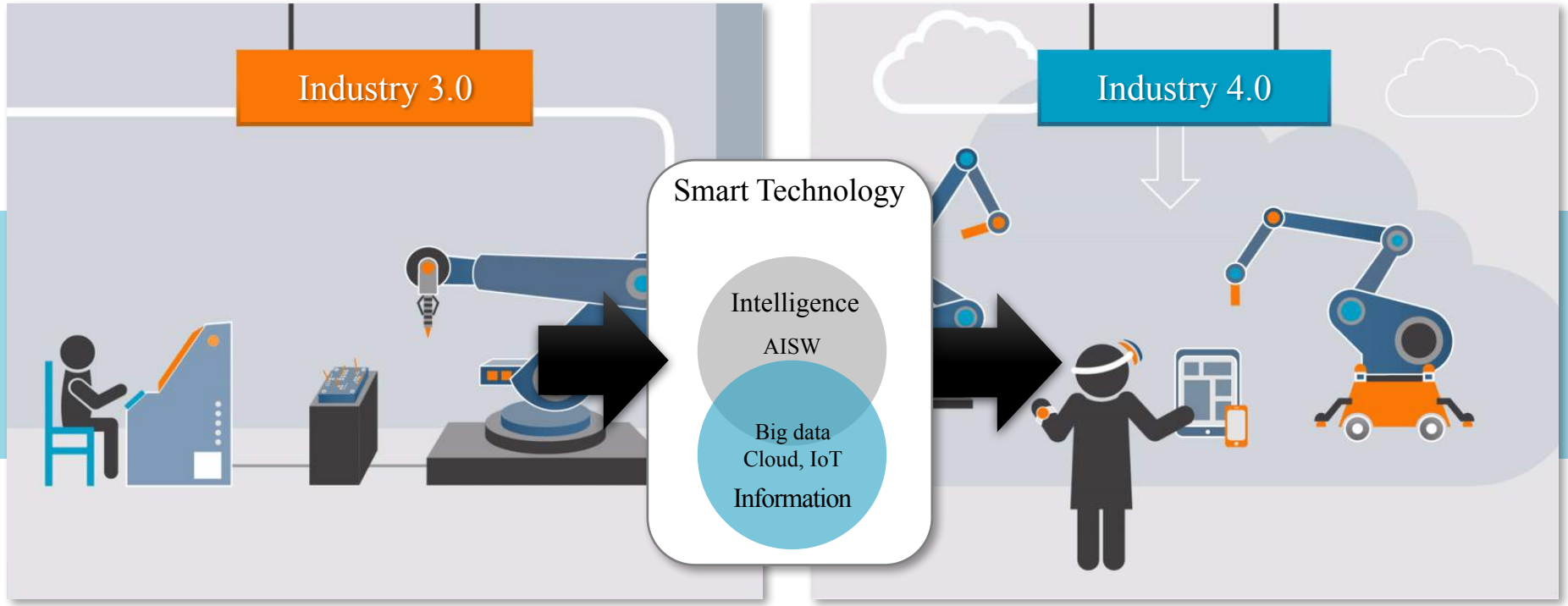
- Smart Grid
- Smart hard drive
- Smart connected vehicles
- Smart farm
- Smart toilet
- Smart wig

Innovative Ideas

- Smart Wi-fi
- Smart service
- Smart glass
- Smart restart
- Smart vacuum cleaner
- Smart travel card

Source: SogetiLabs (2014), What does SMART technology actually mean? [Access at: http://labs.sogeti.com/wat-smart-technology-actually-mean/]

Smart Technology



One-to-one Connected Society

Internet, PC, Mobile

- ICT convergence with manufacturing sector

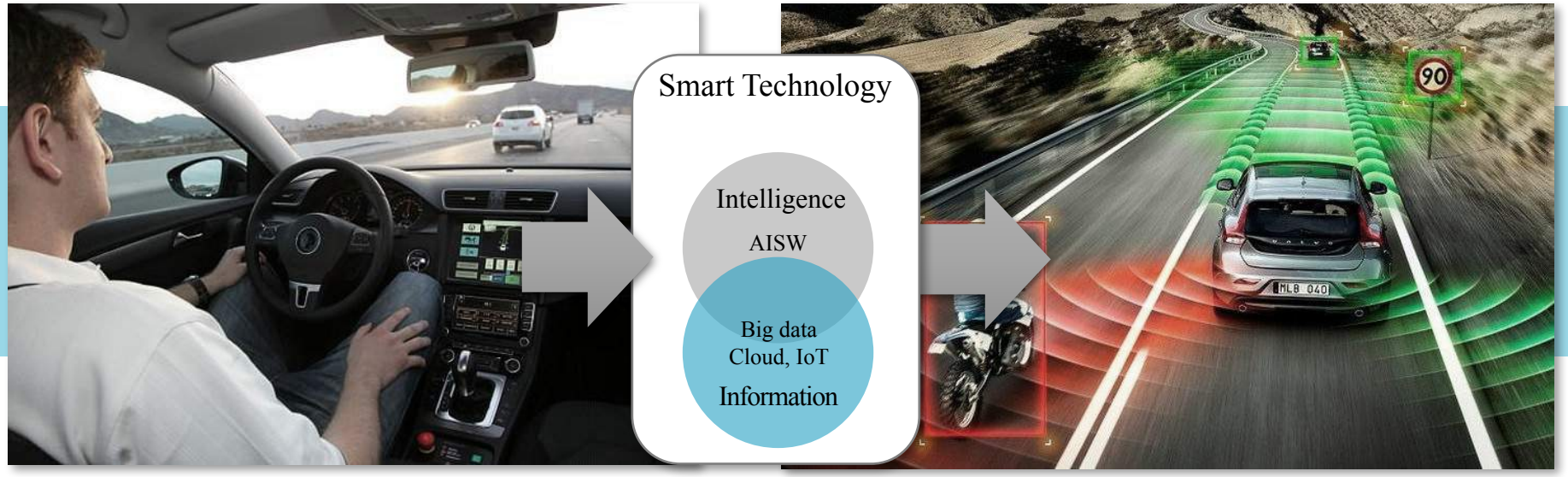
Hyper-Connected Society

Everything

- ICT convergence with service sector
- ICT convergence with knowledge-information sector

Intelligent Information Technology in Industry 4.0

- Cruise driving Technology
- Unmanned car Technology



One-to-one Connected Society

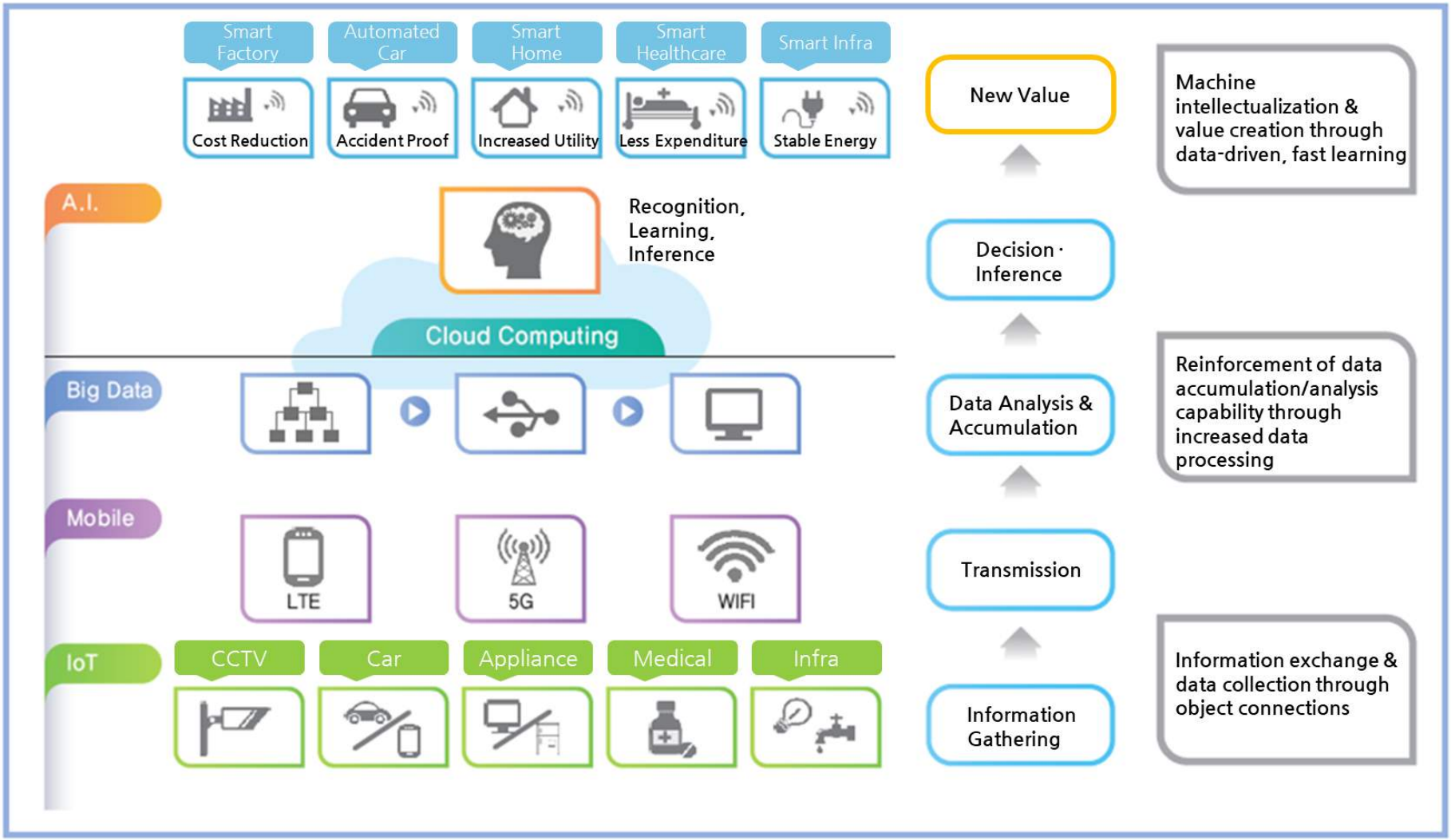
Hyper-Connected Society

Products and services that are limited to one-dimensional 'functions' can be developed into social systems through intelligent information technology and create ‘high added value’

Chapter

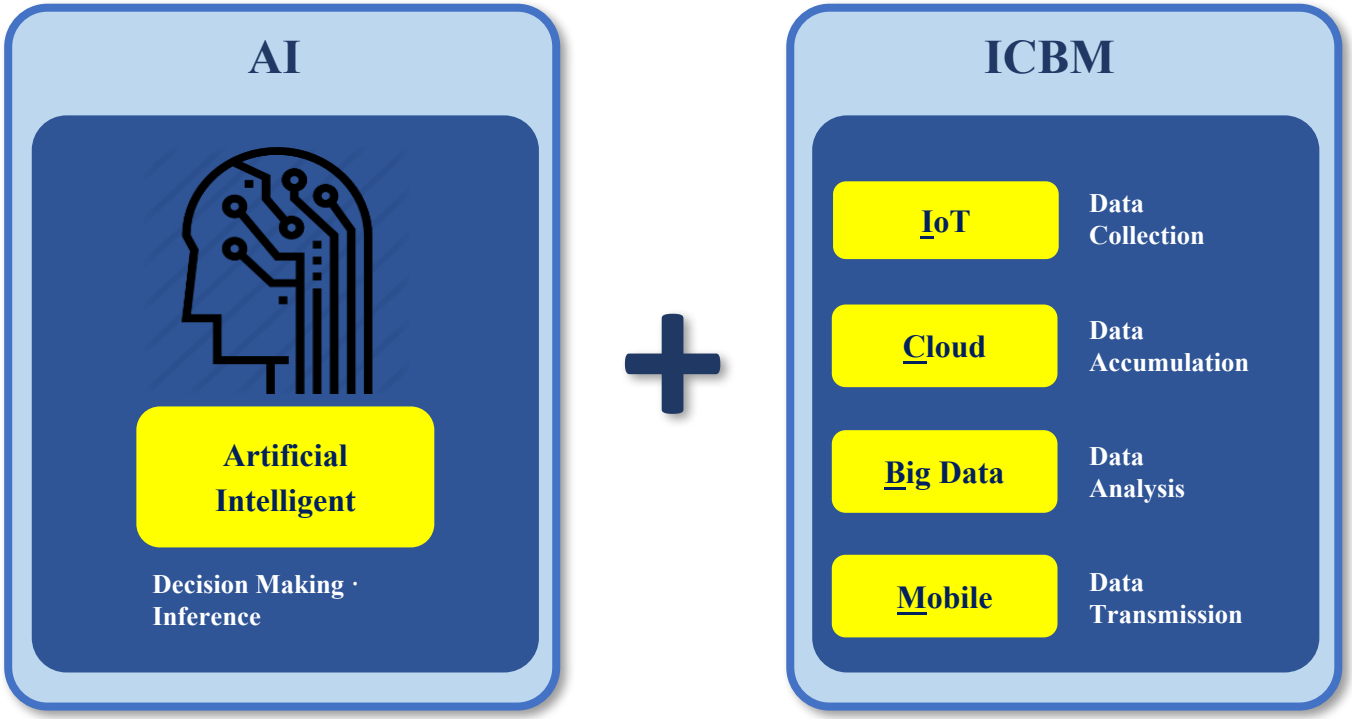
03 Core Technologies Selected by Ministry of Science and ICT

Core Technologies Selected by Ministry of Science and ICT



Source: Korean Ministry of Science and ICT (2017)

Core Technologies Selected by Ministry of Science and ICT

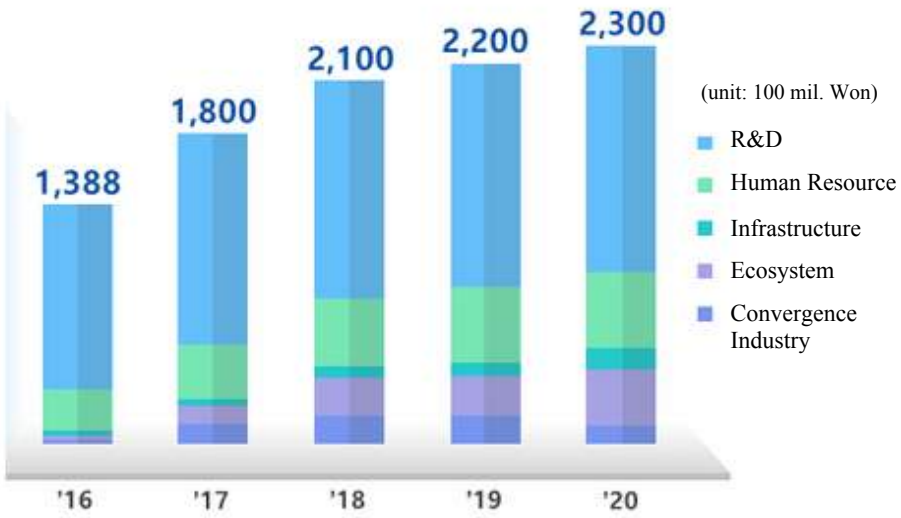


- *"A technology that embodies human's complex information processing through ICT"*
- It consists of "intelligence" implemented through AI, and "information" based on data/networking technology, ICBM (IoT, Cloud Computing, Big Data, & Mobile)

Source: Korean Ministry of Science and ICT official blog (2016)

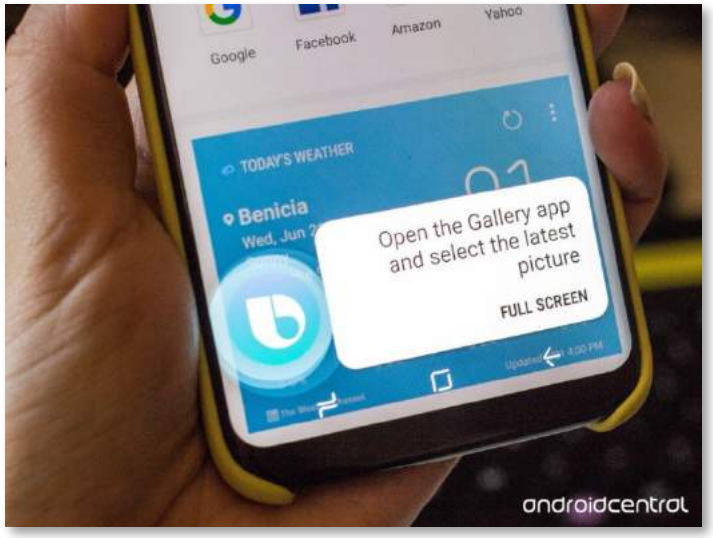
Artificial Intelligence

- Korean Government Investment Plan on AI Sector (2016~2020)



Source: http://www.ddaily.co.kr/news/article.html?no=141441

- Since 'AlphaGo Shock' in 2016, Korean government began to invest in AI sector intensively
- In 2016, Korean government has announced its plan to invest total of $1 billion on AI sector over 5 years

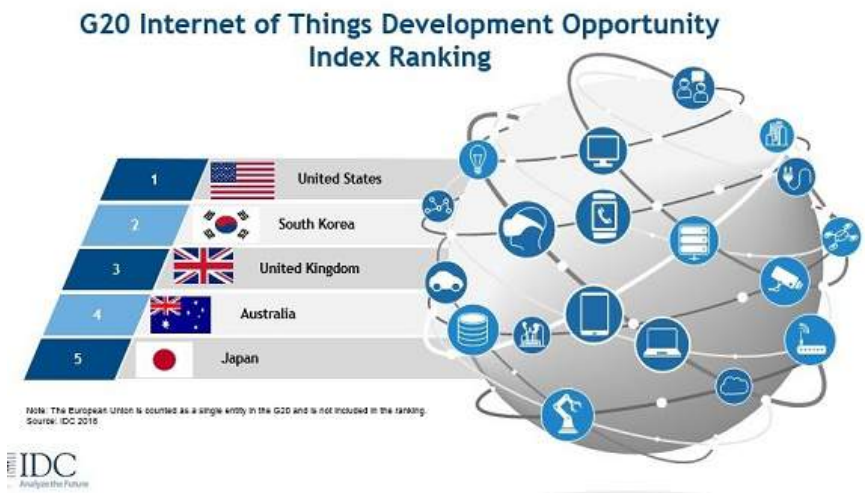


Source: https://www.androidcentral.com/bixby-voice

- In 2017, Samsung introduced own virtual assistant, *Bixby*, alongside with Galaxy S8 & S8+
- Expending application area (e.g. smart refrigerator) & supporting languages
  (digital trends 2017)

Source: https://www.digitaltrends.com/home/bixby-samsung-smart-home-appliances/

IoT & Mobile Network



Source: http://www.itworld.co.kr/tags/42405/idc/101979

- Since 2009, Korean government eagerly invested in IoT Sector
- 2014 Plan: Aim for market size of $30 billion by 2020
- Ranked 2nd in IDC's IoT Development Opportunity Index Ranking
(IDC 2016)

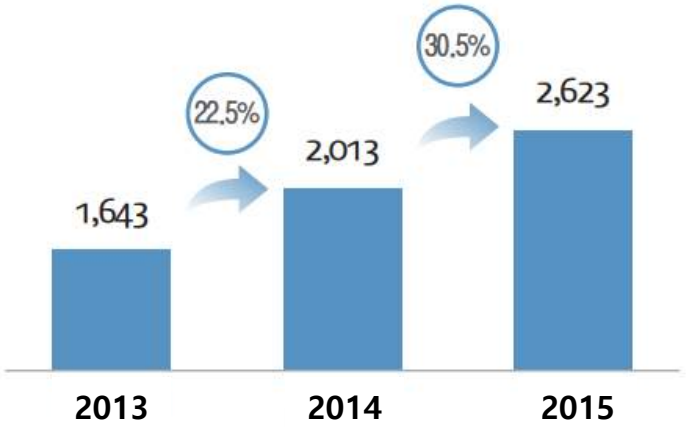
Source: http://www.newsworld.co.kr/detail.htm?no=2993

- Korea has been the most advanced country in the world for mobile communication (OpenSignal 2016)
- KT aims to provide world's first 5G services in PyeongChang Olympics, 2018

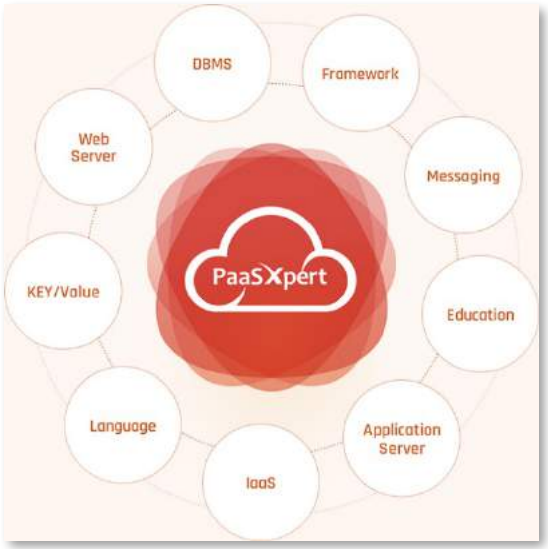
Source: Korean Ministry of Science and ICT (2017)

Big Data & Cloud Computing

- Korea Big Data market investment status



(KRW billion) Source: KRG, 2015



Source: http://www.crossent.com/html/cloud/platform.html/

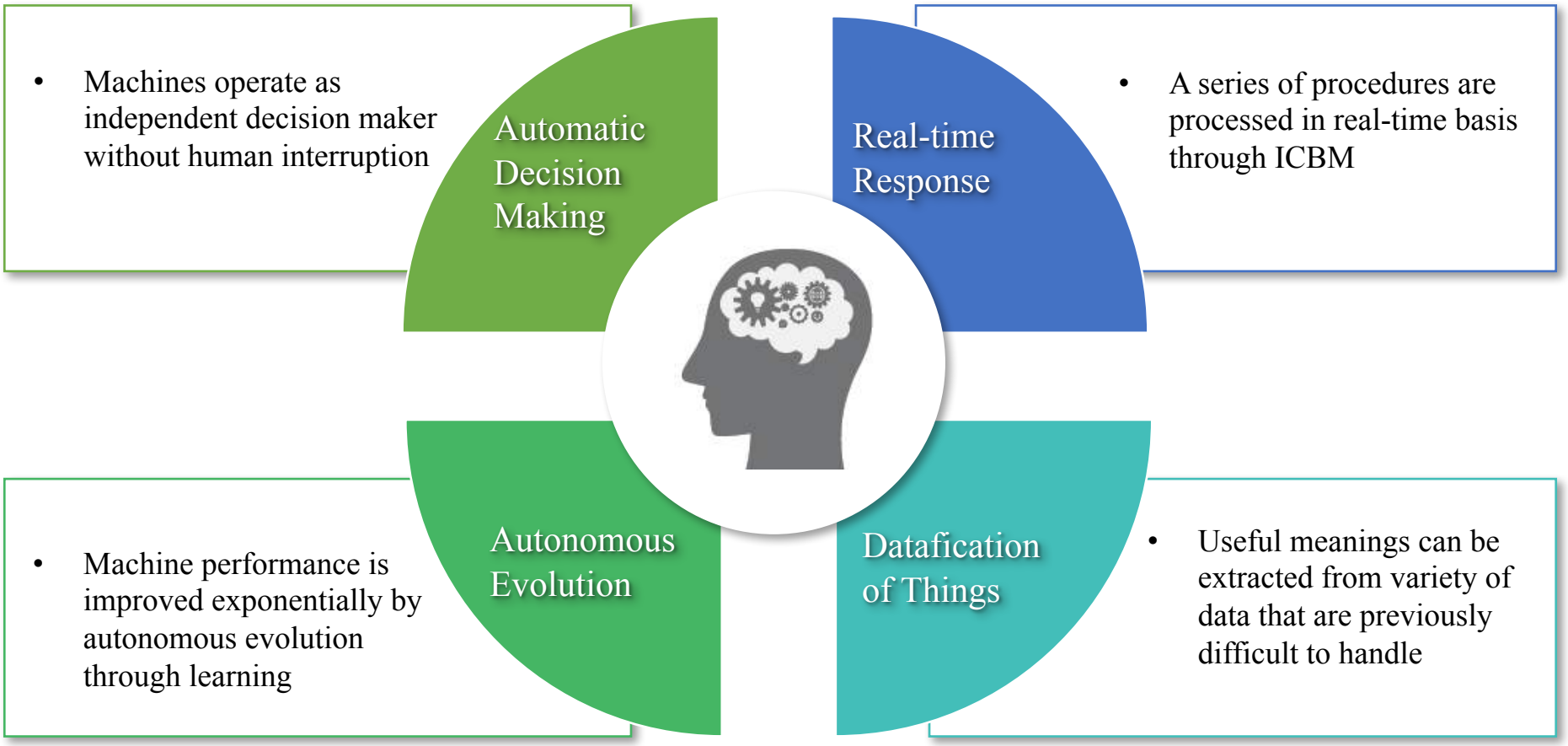
- Big Data market is expected to grow at a CAGR of 23.1% over long time, reaching $366 million by 2020 (SPRi, 2016)

- Ministry of Science and ICT (2017) proposed 3 major tasks for utilizing Big Data in connection with the 'National Strategy Project'
  - ① 3D spatial and real-time information data
  - ② Cohort data for precision medical care
  - ③ Scientific Big Data

- Alliance with domestic and foreign cloud platform companies to incubate world-leading SaaS

- Launching first open cloud platform PaaS-TA
  - PaaS-TA developed through the R&D support of government has established a service called 'K PaaS-TA' through Koscom, a securities and financial IT service company
  - Co-developed by 5 domestic SW companies (CROSSENT, BD, HANCOM, SW in Life, cloud4U)

Characteristics of Intelligent Information Technology

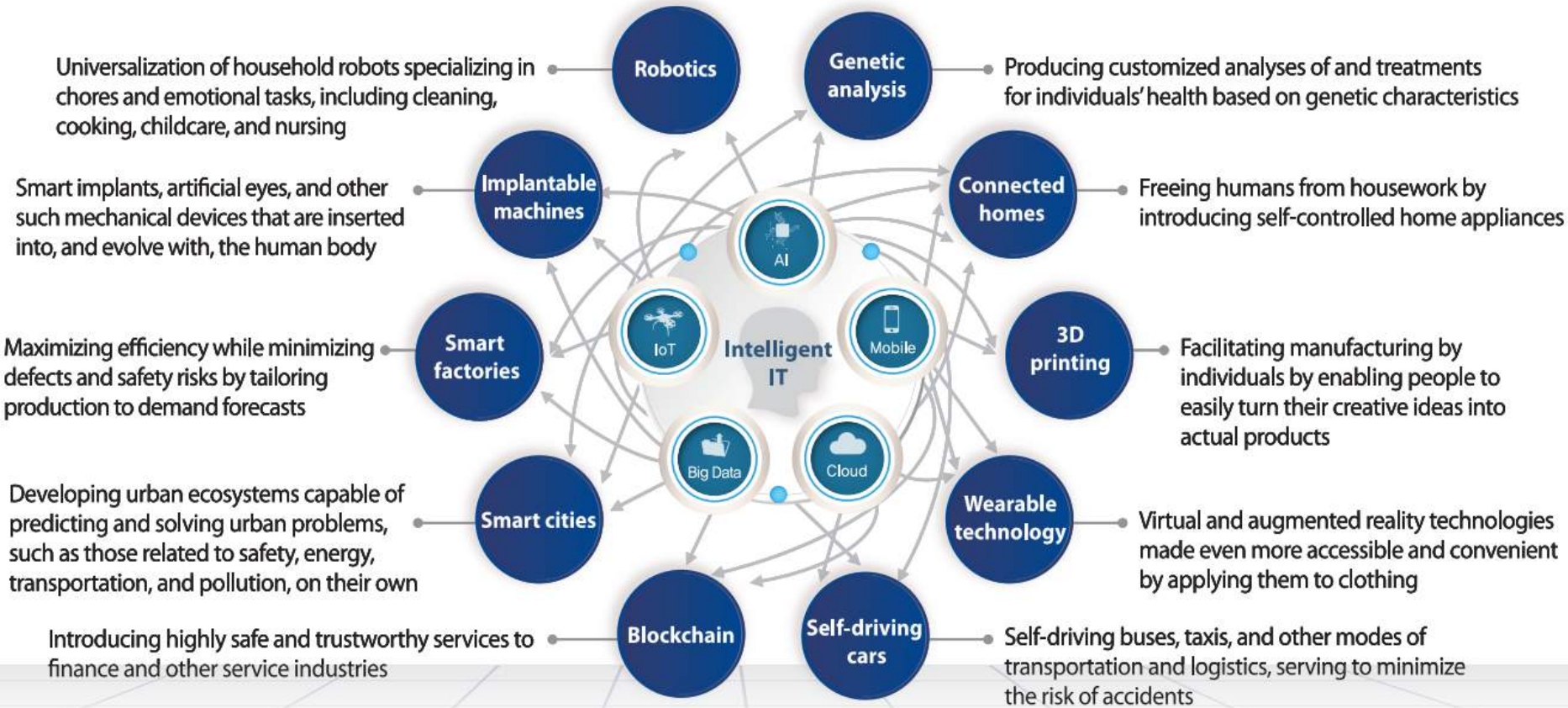


Source: Korean Ministry of Science and ICT (2017)

Chapter

04 Top 10 Application Areas Selected by Ministry of Science and ICT

Top 10 Application Areas Selected by Ministry of Science and ICT



Source: Korean Ministry of Science and ICT (2017)

Intelligent Robots

- Hubo drives an electric car
  (Picture: Ministry of Science and ICT)

Source: http://www.segye.com/photoView/20161204001408

KAIST intelligent robot 'HUBO'

- HUBO developed by KAIST took on people and drove pure electric cars directly in 2016
- HUBO, first developed in 2004, continued evolving and took first prize in the US DARPA Robotics Challenge competition held in California in 2015.

* DARPA Robotics Challenge aims to develop robots that can be put into the field instead of humans in the event of a disaster

Intelligent Robots R&D Investment Status

- The government's R&D investment in the field of intelligent robots totaled 1.12 trillion won ($986 million) from 2009 to 2016
- Average annual growth rate of 27% from 2009 to 2015

Source: Ministry of Science and ICT (2016)

Smart Factory

POSCO Smart Factory platform ‘PosFrame’

- PosFrame monitors and manages facility status remotely through various media
- Visualization of operator's know-how by using AR(Augmented Reality) and mobile technology
- Product tracking and management using LBS-based transportation system and RFID-based distribution management system

KT Smart Factory platform ‘IoT Makers’

- Creation of IoT ecosystem with IoT platform and IoT-specialized network (such as LTE-M)
- Mobile system that can monitor and control factory facilities (e.g. refrigeration warehouse) in real time with smartphone
- Improved sales through freshness maintenance and reduction of waste rate based on accurate first-in-first-out system

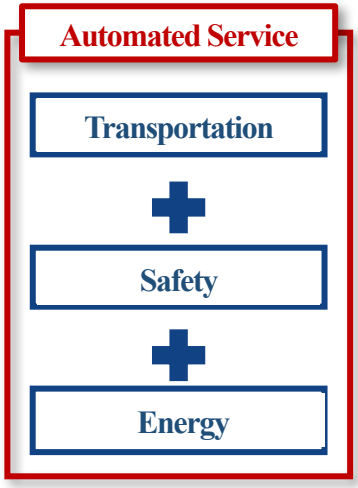
Source: Korean Ministry of Science and ICT (2017)

Smart City

http://www.elec4.co.kr/article/articleView.asp?idx=2520

'Songdo', Smart city in Korea

- KT, Cisco, and Incheon City cooperate in making Incheon Free Economic Zone (IFEZ) in Songdo into a smart city
- Aim for a center of business in Northeast Asia with optimized business environment, combining capabilities of telecommunication companies, global IT companies and local governments



Name	Location (City)	Area	Population	Period of Project
Administrative complex smart city	Se-jong	72.9	500,000	'05~'30
Pangyo new city	Seongnam	8.9	87,789	'03~'30
IFEZ (Incheon Free Economic Zone)	Incheon, Songdo	132.9	(Now)263,423 (Plan)512,000	'03~'20
Dongtan 2 new city	Gyung-gi Hwasung	24	286,000	'08~'16

Fin-Tech

Honest Fund

- P2P lending intermediation service
- Credit evaluation with comprehensive and detailed analysis of non-financial data
- Provides a platform that can design investment products based on a risk profile of users

coinplug

- Bit-coin trading platform
- Implementing blockchain-based overseas remittance technology(PoC, Proof of Concept) with KB
- The world's 2nd-most blockchain patent applicant (after IBM)

kakaobank

- Internet-only bank with Smart phone messenger platform
- Applied Kakao's channel system into KB Kookmin Bank's core banking system to provide enhanced user experience through big data analysis and fin-tech service history
- Attracted more than 1 million accounts in 5 days

Source: Korean Ministry of Science and ICT (2017)

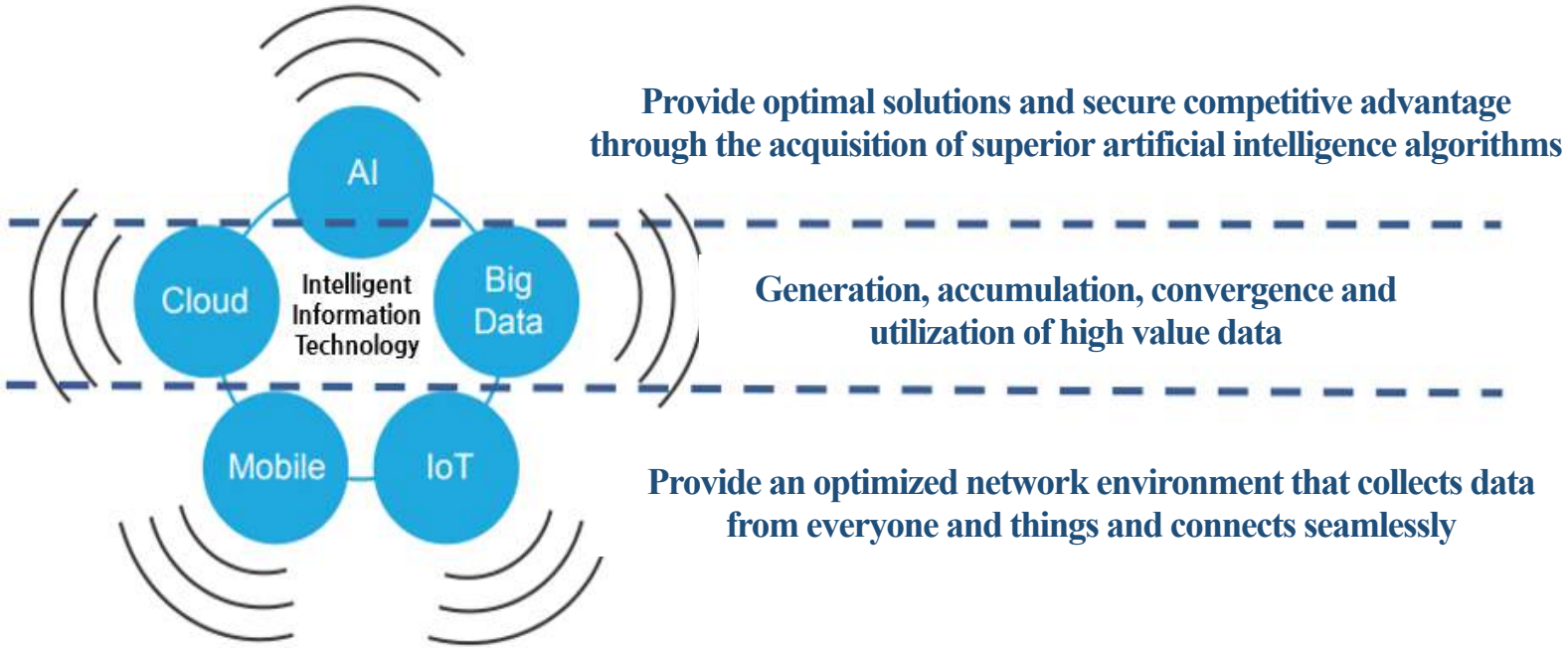
Chapter

05 Smart Technology R&D Policy in Korea

Smart Technology R&D Policy in Korea

1. Securing of global level intelligent information technology

- Securing own technology, data and network infrastructure to lead intelligent information technology without lagging behind global competition



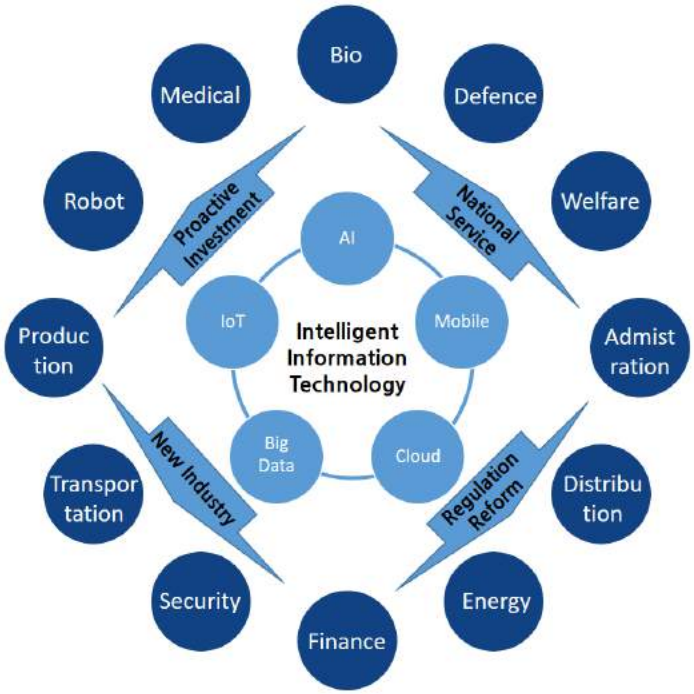
- Need to develop technology, data and network infrastructure through the government-private cooperation, since it is a area with high-risks in an early stage where long-term research investment is needed

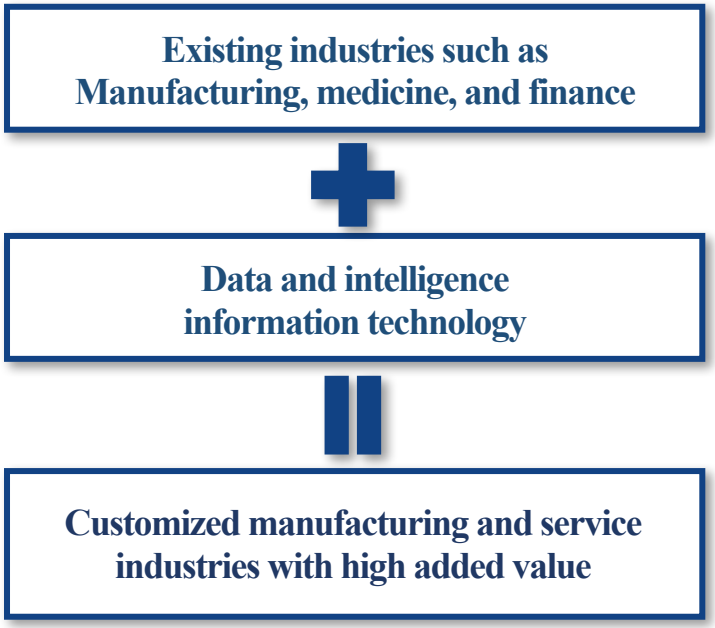
Source: Korean Ministry of Science and ICT (2017)

Smart Technology R&D Policy in Korea

2. Promotion of intelligence informatization of all industries

- Improving productivity and secure national competitiveness through the early introduction of intelligent information technology in public service and private industry





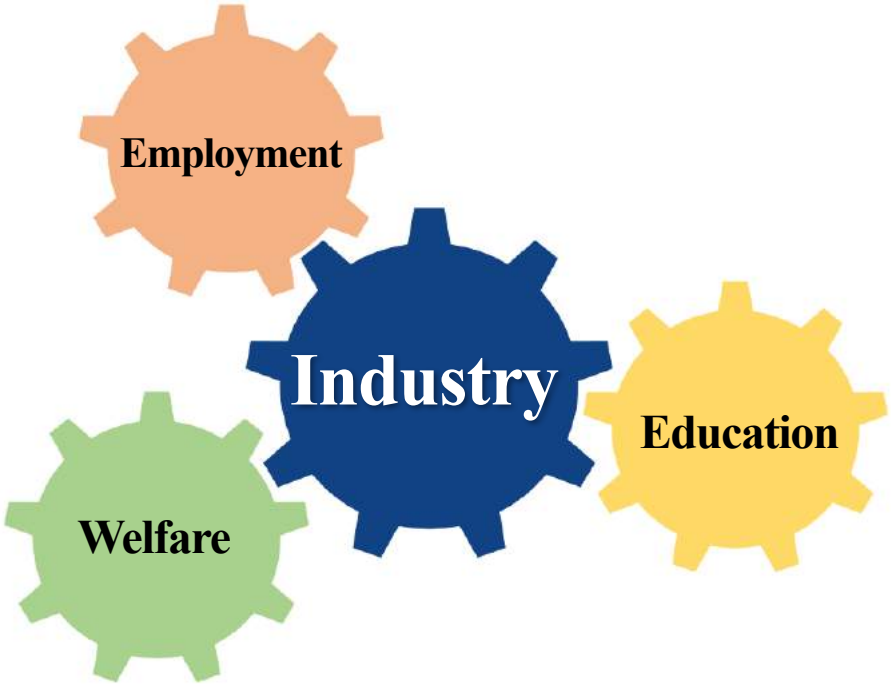
- Need to promote private investment and act as primaries by preemptively introducing public services through the regulatory reform, test-beds and ecosystem development

Source: Korean Ministry of Science and ICT (2017)

Smart Technology R&D Policy in Korea

3. Preemptive response through the reformation of social policy

- Implementing a safe intelligence information society that benefits everyone through the education, employment and welfare system that reflect changing social conditions



- Need to **cultivate creative talents** that are key to intelligence information society and develop social policies and systems to **build safety nets** in preparation for social structure changes and dysfunctions

Source: Korean Ministry of Science and ICT (2017)

Chapter

06 Korean Promotion Strategy of Smart Technology Activation

Korean Promotion Strategy of Smart Technology Activation

1. Securing of global level intelligent information technology

① Establishment of a data-based society that easily searches the desired data and create value

② Actively carry out basic science and basic research that is the basis of intelligent information industry

③ Data generated from all things, including people and things, can be safely transmitted and used anytime and anywhere through the hyper connection network

Source: Korean Ministry of Science and ICT (2017)

Korean Promotion Strategy of Smart Technology Activation

2. Promotion of intelligence informatization of all industries

④ Improving the quality of public services by applying intelligent information technology to the service

⑤ Establishment of private innovation partnership through construction of intelligence information industry ecosystem where anyone can commercialize their ideas

⑥ Providing safe and precise medical services with intelligent information technology, preventing diseases and customized treatment

⑦ Improved manufacturing quality and productivity through the introduction of platform production system based on consumer and market data throughout the entire process and the use of intelligent robot and 3D printing technology

Source: Korean Ministry of Science and ICT (2017)

Korean Promotion Strategy of Smart Technology Activation

3. Preemptive response through the reformation of social policy

⑧ Creating new opportunities for the intelligent information society through optimized education tailored to each individual's level

⑨ Actively responding to diversification of automation and forms of employment

⑩ Constructing a society that can live without inconvenience and enjoy social benefit without discrimination by developing intelligent information technology applicable in everyday life

⑪ Establishment of legal system and ethics for intelligence information society

⑫ Respond to the adverse effects of AI and cyber threat

Source: Korean Ministry of Science and ICT (2017)

Korea Ministry of SMEs and Startups

Ministry of SMEs and Startups

- Minister
  - Vice Minister
    - Office of Planning and Coordination
    - Office of SME Policy
    - Office of Startups and Venture Innovation
    - Office of Micro-Enterprise Policy

- The Ministry of SMEs and Startups(MSS) is a government organization whose objective is to strengthen competitiveness and support innovation of Small and Medium-sized Enterprises (SMEs) and Micro Enterprises (MEs).

Source: http://www.mss.go.kr/site/eng/01/10104010000002016112403.jsp

Thank You!

junhwang@snu.ac.kr
http://itpp.snu.ac.kr
http://gii.kaist.ac.kr

Prof. Junseok Hwang, Seoul National University

Q&A