9. Country Report of Republic of Korea[1]

9.1 Current Status of the ICT Sector of Republic of Korea

The Advent of the 4th Industrial Revolution

Recent technology has developed to a level that it can carry out even some intellectual judgment as well as human physical labor with minimized human intervention. It is said that a new revolutionary period of the fourth industrial revolution has arrived. Until now, humanity has so far experienced three revolutionary changes by means of versatile technology. The first was by steam engine technology, the second by electricity, and the third by computer and internet technology. Revolutionary change means that the technology with universality affects the industry, and as the successive ripple effect increases, it changes the whole society and life including the industrial structure, income distribution and lifestyle.

In the case of the UK, where the first industrial revolution occurred, the UK steadily developed technology for the mass production of textiles, with the textile industry as the national growth engine at that time. As a result, machinery industry and steel industry developed. In addition, with the invention of the steam engine technology, which is the general technology of the first industrial revolution, the supply of energy sources for machinery and steel industry, and the revolution of transportation, the UK reached a remarkable economic growth period due to technological progress and changes in industrial structure.

If the first industrial revolution was triggered by steam engine technology, the second industrial revolution was due to electric technology, and the countries leading the second industrial revolution era were Germany, France, USA, Japan and Italy. The United States once overtook British industrial production.

Meanwhile, Korea responded late in the period of the second industrial revolution, but during the third industrial revolution period, which is referred to as the computer and Internet technology revolution, the government has made preemptive efforts to grow the information and communication industry as the main industry of the nation. First, it established the world-class network infrastructure with national informatization and ranked first in the ICT development index announced by ITU in 2016 and 2017. Based on this, Korea has secured world-class ICT accessibility and usability. In addition, the information and telecommunications industry has grown into the nation's flagship industry, enabling the mobile phone and memory semiconductor

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display fields to gain a high market share in the global market.

So, the global market share of mobile phones was the second highest in the world at 22.9%, followed by memory semiconductors at 57.5% and display at 46.9%, the world's highest market share in 2016. As a result, Korea's ICT industry is the fourth largest ICT export country in the world, accounting for 10.4% of GDP and about 30% of total exports, making it the driving force behind economic growth through the industrialization and informatization.

As mentioned earlier, human beings are facing the fourth industrial revolution in recent years. Many experts anticipate that the fourth industrial revolution will be accelerating more rapidly than the previous industrial revolutions and will have a greater impact. Nations around the world are taking keen interest in the key features of the fourth industrial revolution and trying to prepare for the new revolution for their survival and growth. However, there will be a wide gap between the countries that lead the fourth industrial revolution and those that do not.

The Current Status Korea's Digital Technology

The universal technology of the fourth industrial revolution is called digital technology, which includes network (IOT, 5G), data (cloud, Big data), and AI (machine learning, algorithm).

Korea's Institute for Information and Communications Technology Promotion (ITTP) conducts Information and Communication Technology level survey every year to diagnose the current level of ICT and to identify areas that are in need of backward technology and government support. The ICT technology areas covered by the survey are 10 in total, including convergence services, mobile communications, networks, telephone, satellite, broadcasting, smart media, software, digital contents, and information protection and ICT device, which are subdivided into 141 technologies. The questionnaire focused on technical importance (importance, urgency, and ripple effect) and technical level (relative level, gap period) of those technologies, and the survey is conducted on 5,000 domestic related experts.

According to the results of the survey in 2016, the level of ICT technology in Korea was 80.5% of that of developed countries (USA), which was slightly lower than in Europe (89), and the period of technological gap was 1.5 years behind, the highest level in the United States (0 years). The technology levels of IoT, artificial intelligence, cloud, big data, and computing systems, which are digital technologies related to the fourth industrial revolution, among the 10 ICT fields are as shown in Table 9[2].

[2] Information and Communication Technology level survey report, 2016, Institute for information & communication technology Promotion

Among the four technologies, IOT and AI showed high technology level in application field, but big data showed high level of technology in basic field.

Table 1. Relative Technology Level and Technological Gap

	Relative Level (100%)						Technology Gap(0year)	
	Korea			America			Korea	America
	Basic	Applied	Commercialization	Basic	Applied	Commercialization		
IoT	80.7	81.5	80.8	100	100	100	1.2	0
AI	73.6	74.5	73.5	100	100	100	2.2	0
Cloud	70.4	74.9	71.9	100	100	100	1.6	0
Big data	79.0	73.0	71.2	100	100	100	1.7	0

The technology gap with the US was the largest in artificial intelligence, followed by the big data cloud and the Internet.

Government Policy Direction for the Fourth Industrial Revolution

The Korean government has taken note of the fourth industrial revolution as a momentum for providing new opportunities to overcome the current structural and complex economic crises. In November of 2016, the Fourth Industrial Revolution Commission, which consists of 20 civilian members and 5 government members, was launched under the direct control of the President. The Fourth Industrial Revolution Commission is responsible for deliberating and coordinating matters related to the Fourth Industrial Revolution in accordance with the provisions for the establishment and operation of the Fourth Industrial Revolution Commission.

There are four things related to the Fourth Industrial Revolution Commission.

- Comprehensive national strategy for the Fourth Industrial Revolution
- The implementation plans and major policies of each ministry related to the Fourth Industrial Revolution.
- Matters on securing key technologies such as support for technological development, artificial intelligence, and ICT, which are the basis of the 4th Industrial Revolution, and strengthening the creation of technological innovation type R & D performance
- Fostering new industries and new services through intelligent promotion of all industries

To this end, the committee selects industries with high economic impact from intelligence by industry and social sectors. In the industrial sector, medical, manufacturing, finance, logistics, energy, and agriculture and fisheries industries were selected. In the social sector, cities,

transportation, welfare, environment, safety and defense sectors were selected.

Focusing on selected sectors, the specific direction is as follows: First, to secure the required growth engine technology, a total of 2.2 trillion won will be invested in intelligent technology R & D, and researcher-oriented R & D system will be established for creative challenging research.

Next, to establish an industrial ecosystem, major industry big data centers will be established, regulatory sandboxes will be introduced, and an innovative venture fund will be set up for $ 10 billion. Also, the proportion of the prospective products of the fourth industrial revolution will be included in the list of priority items for public institutions. Finally, the committee plans to nurture 46,000 smart workers to cope effectively with the new future, to strengthen job retraining in response to changes in the employment structure, and to expand job safety nets such as expanding employment insurance.