Science, Technology and ICT Newsletter(NO.79)

MSIT to Announce Five Key Action Plans of the New Administration

On July 15, the Ministry of Science and ICT (MSIT; Minister Lee Jong-Ho) announced five key action plans for achieving the goal of "establishing a new national innovation system based on public and private partnership and driving social development through leading technological innovation and diffusion of digital innovation."

First, in order to gain the upper hand in technological prowess amid global technology competition, the private sector will take the initiative in innovating the national R&D system to be flexible in responding to changes.

To this end, with the aim of fostering strategic technologies* that will determine the survival of a country, an integrated process of allocating and coordinating R&D budget will be carried out, by combining all projects implemented by each ministry. Projects focusing on competitive strategic technologies, which reflect demand from companies will be implemented, so as to contribute to creating tangible outcomes.
* Technologies selected in September (10+α technologies including semiconductors, aerospace and AI) ⇒ establish roadmap for each sector, which involves specific technologies and the goal for development (2023)

In particular, R&D preliminary feasibility study system will be improved*, to effectively respond to rapid changes in technological environment.

* R&D preliminary feasibility study system improvement

Projects under examination	Projects with total project cost worth 50 billion won or over 50 billion won	▶	Projects with total project cost worth 100 billion won or over 100 billion won (large-scale projects)
Period for examination	9-11 months, regardless of differences in total project cost		6 months, if the total project cost is 300 billion won or under 300 billion won
Project details	Unable to be modified after passing preliminary feasibility study		Plans can be changed even after passing preliminary feasibility study, in the event of rapid environmental changes (COVID-19, export control etc.)

Second, diverse efforts will be made to boost investment of the private sector, and gain dominance in innovative technologies and promising emerging industries, which are future growth engines for the next ten to twenty years.

For emerging industries such as quantum, cutting-edge biotechnology and 6G, the public and private sectors will work together in preemptively securing fundamental technologies and key patents.

The areas Korea has strength in, which are semiconductors, small modular reactors (SMR), and digital emerging industries (AI, metaverse, blockchain etc.), and cyber security provide support for next-generation technologies to enter market in the shortest period of time, based on driving public demand (market) and supporting overseas expansion.

The space industry, originally led by the government, will nurture companies with many responsibilities (manufacturing+launch operation) and promote the development of space economy, by transferring technology and designating clusters (let the private sector utilize infrastructure).

In particular, the pan-government basic plan for space development and promotion will be established in the second half of this year, in order to provide systematic support to Korea's space economy. Virtual Fab*, which fosters the joint use of equipments and infrastructure held by industry, academia, and research institutes will be built, so as to lay the groundwork for supporting semiconductor industry.
* Connect over 10 nano fabs including Seoul National University Semiconductor Research Institute, National Nanofab Center of KAIST, and ETRI; reinforce support for educational and research institutes

Third, outstanding talents, who will drive technological innovation will be nurtured.

In the short term, MSIT will consult with the Ministry of Education to make flexible curriculum, by focusing on sectors where there is a serious talent shortage such as semiconductors, to foster talents tailored to the demand from the private sector. In

addition, fast learning track and digital talent educational curriculum led by companies will be expanded.

In the mid-to-long term, MSIT plans to operate exceptional programs to secure top-notch talents in strategic technologies. Some of the examples are Talent Ladder program* (growth support project by making connections between talent nurturing programs), Digging One Well program (project to provide long-term support (up to 10 years), and Global Track program (project supporting overseas training of excellent postdocs).
* Evaluation of trainees → Provide support such as exempting online tests and issuing recommendation letters, if trainees wish to take other courses

Fourth, MSIT will strengthen national digital capabilities by working together with the private sector, and place digital innovation at the forefront of society's interest.

World-class AI skills will be acquired through the development of next-generation AI technologies, and AI technologies for solving challenges in ten fields. At the same time, domestic software industry will be improved entirely, thanks to prioritizing private cloud and shifting to cloud-based service purchase methods.

Efforts will be put in place for supporting the digital transition of enterprises by providing them with vouchers, and implementing local digital innovation projects which are aligned with local flagship industries. Meanwhile, MSIT will actively carry out the digital platform government initiative through the leading project* to provide one-stop service to citizens.
* Collaborate with relevant ministries to simplify the process for claiming indemnity insurance and digitalize real estate transactions

Fifth, MSIT will further enhance support for responding to pending issues directly related to people's livelihood and providing assistance to the vulnerable class, based on digital capacity and science and technology, with the goal of diffusing technologies that can satisfy everyone.

In contactless society, the benefits of telecommunications service users will be increased, by measures such as diversifying service plans (launching medium-price 5G service plans etc.), improving service quality, installling ultra-high-speed networks for rural areas, securing public Wi-Fi (10,000 places including traditional markets and parks), and providing countermeasures for voice phishing.

In the meantime, R&D activities will be continuously strengthened, in order to ensure inclusive utilization of digital technologies, boost efforts for creating mutually beneficial platform, and resolve social issues.

In addition, MSIT will take the initiative in innovating pan-government regulations and

public institutions, as well as overhauling committees.

In particular, MSIT will strive to improve outdated regulations in emerging technologies and industries, and strike a balance between regulations of Korea and foreign countries. Efforts will be put in to establish digital platforms in public institutions and streamline the administrative process, in line with the launch of digital platform government. The committee will be overhauled in ways such as integrating multiple committees into high-level committees.

Minister Lee Jong-Ho of MSIT said, “in order to lead the future and contribute to running a country with a focus on science, technology and digital capabilities, specific policies including ways forward for fostering strategic technologies and national digital strategies will be formulated and smoothly implemented.”

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Going Global

Professor June Huh to Receive Fields Medal

Professor June Huh (Princeton University of the U.S., Korea Institute for Advanced Study) received the Fields Medal, which is given to mathematicians under the age of 40 for significant contributions in the field of mathematics at the International Congress of Mathematicians (ICM*) 2022.

* The ICM, which is hosted by the International Mathematical Union (IMU) is held every four years, and the ICM 2022 took place as a fully virtual event considering the global situation. The IMU General Assembly and the Fields Medal award ceremony took place in Finland.

The Fields Medal is known to be the most prestigious international award that a mathematician can receive, and is widely regarded as the Nobel Prize of mathematics.

Professor Huh became the first person of Korean descent to receive the Fields Medal, as he was recognized for his pioneering work in the field of combinatorial algebraic geometry, by solving conjectures in combinatorics and contributing to further developing algebraic geometry.

Dr. Huh's research area is combinatorial algebraic geometry, which is a relatively emerging field that can solve conjectures in combinatorics** through algebraic geometry.*

* the field of mathematics concerned with conducting research on geometry with algebra, just like drawing and analyzing straight lines, flat surfaces, ellipses, and hyperbolic lines with the first and second degree polynomials.

** the study of satisfying or maximizing the given property for finite and additive objects

Based on the research on combinatorial algebraic geometry, Dr. Huh solved a number of conjectures early on-namely Read's conjecture*, which were presented by mathematicians in the form of conjectures.

* When the number of cases where multiple vertices are connected by line segments and the different number of colors used for the connected points are expressed in functions, the function becomes a polynomial, and the coefficients of the polynomial tend to get larger and smaller.

Being able to freely cross these two different fields, such as solving conjectures in combinatorics, based on a strong intuition for algebraic geometry, is a very challenging task that only outstanding mathematicians who are familiar with both fields can even try.

In addition, Dr. Huh's research achievements have significantly contributed to the development of various applied fields, including information and communications, designing semiconductors, transportation, logistics, machine learning and statistical physics.

Dr. Huh's previous research on the Read's conjecture (such as research on Milner's number) began when he was doing master's degree in Seoul National University, and many studies of Dr. Huh were carried out while he was serving as a KIAS Scholar in the Korea Institute for Advanced Study (KIAS).

Dr. Huh's Fields Medal is another good news for Korea after the IMU upgraded Korea's membership from Group IV to Group V*, the uppermost tier of membership.
* Korea's IMU membership was upgraded in February 2022 (from Group IV to Group V, the uppermost tier of membership).
- Korea rose to the highest membership (Group V) in the shortest period of time among member countries, since joining as a Group I member in 1981.
- IMU's Group V countries include Korea, Germany, Russia, U.S., Brazil, UK, Israel, Italy, Japan, China, Canada, France

It is expected that Dr. Huh, a professor at Princeton University and a distinguished professor of mathematics at the Korea Institute for Advanced Study (KIAS), will continue to expand his research activities with mathematicians from home and abroad by traveling back and forth between Korea and the U.S. There are high expectations for his next move as well as development of the Korean mathematics community.

Dr. Huh said, "Personally, math is a process of understanding my own biases and limitations, and more generally, it's an activity of wondering how the human species think and with how much depth."

He added, "I am deeply grateful to receive such a meaningful award for what I enjoy doing."

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Korean-led Cloud Service Quality Model Adopted by the ISO/IEC as International Technical Specification

The Ministry of Science and ICT ("MSIT"; Minister Lee Jong-Ho) announced that Korea's SaaS (Software as a Service) quality model was adopted as parts of the ISO/IEC international technical specification on July 11.

*Quality model refers to a set of quality attributes (e.g. performance, compatibility, usability) that a technology should possess.

A Technical Specification is developed following a rather simplified procedure compared to international standards especially for technologies that are still under development or for standards that are difficult to reach an immediate agreement on. It is developed as a technology standard to swiftly respond to the rapidly developing demand of the cloud market.

※ The cloud service quality model is for SaaS is considered to be part of part of cloud computing, which is a technology under development.

The MSIT and the Telecommunications Technology Association ("TTA"; President Choi Younghae) jointly pursued a standardization project based on the consensus for the need to develop a quality model for SaaS, the most in-demand technology* in the cloud industry.
* More than 64% of the revenue in the global cloud market under consideration was formed by the SaaS segment (IDC, 2020)

The quality model for SaaS needed to reflect the characteristics of cloud computing as it has different characteristics from the existing software.

Accordingly, in addition to the characteristics of the existing software, the characteristics that cloud services should secure to ensure their quality, such as aggregated resource utilization, scalability, accessibility, service measurability and service provisionability were added, and the existing software characteristics were also amended to reflect characteristics of cloud computing.

※ ① Aggregated resource utilization: degree to which a cloud service utilizes efficiently aggregated resources from resource pooling in order to support multi-tenancy

② Scalability: degree to which physical and virtual resources are available automatically and immediately, when they are needed, subject to constraints of service agreements

③ Accessibility: degree to which a cloud service can be accessed by a variety of client devices over a network through standard mechanisms

④ Service measurability: degree to which a cloud service provides metered delivery of cloud services such that usage can be monitored and billed

⑤ Service provisionability: degree to which a cloud service is provisioned by the cloud

service customer, as needed, automatically or with minimal interaction with the cloud service provider

The MSIT announced its plans to work together with the TTA to expand the scope of application for its model to other areas of cloud services, such as Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) and then make efforts to convert the Technical Specification to international standards.

Director General Heo Wonseok of the Software Policy Bureau said, “The future of the Korean software industry depends on whether or not we can quickly develop SaaS that is as competitive as that of global companies'. Now that the service quality model that we proposed gained greater global recognition, we will build on this to develop a globally recognized SaaS, by providing active support.”

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Global cooperation

MSIT to sign ICT cooperation MoU with CABEI

The Ministry of Science and ICT (MSIT, Minister: Lee Jong-Ho) signed the Memorandum of Understanding on ICT cooperation with the Central American Bank for Economic Integration (CABEI) on July 12. CABEI is an international multilateral financial institution which Korea joined in 2020 and established a branch in Korea this July.

Since the MoU was a renewal of the cooperation agreement of 2018, MSIT and CABEI will continue to strengthen cooperation in ICT by dispatching experts from Korea Internet and Security Agency (KISA) to CABEI and sharing knowledge and experiences.

The Vice Minister Park Yun-Kyu welcomed the opening of the Korea branch and said "We expect this MoU and the Korea branch to bring greater partnership between Korea and CABEI by strengthening cooperation, spreading the advanced ICT technology of Korea, and helping Korean companies to reach Central American market."

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First Vice Minister Oh Tae-Seog Attends the Europe-Korea

Conference on Science and Technology (EKC)

First Vice Minister Oh Tae-Seog of the Ministry of Science and ICT ("MSIT"; Minister Lee Jong-Ho) attended the Europe-Korea Conference on Science and Technology 202 (EKC*) on July 20, in Marseille, France, and delivered encouraging remarks to Korean scientists and engineers in Europe and Korea.
* EKC: Europe-Korea Conference on Science and Technology

The EKC brings together Korean scientists and engineers in Europe and Korea to network and discuss the latest trends in science and technology and potential cooperation. The 14th Europe-Korea Conference on S&T, jointly hosted by the Association des Scientifiques Coréens en France ("ASCoF"; President Kim Junbeum) and Korean Federation of Science and Technology Societies ("KOFST"; President Lee Woo Il), is held under the theme of "Pathways to Sustainability: The Role of Emerging Technologies."

The 14th EKC, held from July 20-21, 2022, attracted approximately 700 scientists and engineers from Korea and Europe.

Former United Nations Secretary General Ban Ki-moon delivered a keynote speech on climate change and carbon neutrality, follwed by thematic presentations from Professor Jean-Pierre Sauvage (who was awarded the 2016 Nobel Prize in Chemistry) and the Former Vice-Minister for Science, Technology and Innovation Dr. Lee Gyung-su on "Topology and Molecular Machines: Two Interlinked Research Fields" and "Fusion Energy Development in the Era of Climate Crisis," respectively.

Following the opening ceremony, a series of S&T sessions were held, in which Korean and European experts discuss ways of cooperation on sustainable development in areas such as joint carbon neutrality research, maritime climate change modeling, and life science and health.

On the sidelines of the EKC, Dr. Kim Keunjae in Sweden was given the Best Scientist·Engineer of the Year Award for 2022 with citation from the Minister of Science and ICT.

Dr. Kim was awarded in recognition of his contribution to enhancing design and performance of ships by studying fluid dynamics in ship design for about 20 years as a member of SSPA Sweden, and also for his work in transferring advanced European technologies to Korea which helped to strengthen the competitiveness of the country's shipbuilding technologies.

In his congratulatory speech, Vice Minister Oh stressed that sustainability is an important agenda for scientists in Korea and Europe to put their heads together for the sake of humanity, and that the Korean government will actively provide support and make efforts to promote science and technology cooperation between Korea and Europe.

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Vice Minister Park Yun Kyu Has a Bilateral Meeting with Deputy Foreign Minister of Argentina

Park Yun Kyu, Second Vice Minister of Science and ICT (Ministry of Science and ICT (MSIT); Minister Lee Jong-Ho) had a bilateral meeting with Pablo Anselmo Tetamanti, Deputy Foreign Minister of Argentina, on July 28 (Thursday) to discuss cooperation measures for sectors in the information and communication technology (ICT) field, such as 5G networks and artificial intelligence (AI).

The meeting was held on the occasion of Argentina's Deputy Foreign Minister's visit to Seoul for a high-level consultation between the two countries' foreign ministries.

In the meeting, Vice Minister Park presented Korea's achievements in infrastructure construction as a leading country in 5G, as well as the direction of the 5G+ Strategy, Korea’s national strategy for fostering 5G-based industries.

By sharing the main points of strategies for securing technologies in the AI field, the two sides enhanced their understandings of each other’s policy environment and exchanged opinions on future cooperation between the two countries.

Following the meeting, the two sides held a signing ceremony to revise the Memorandum of Understanding (MoU) on Korea-Argentina Information and Communication Technology.

It is the first time to revise the MoU since it was signed in 2004; through this revision, the key areas of cooperation between Korea and Argentina will be reorganized into 5G, AI, and the Internet of Things (IoT), and the two countries will cooperate in the areas of Fourth Industrial Revolution.

Vice Minister Park said, "There will be many opportunities for cooperation in areas that both countries are fostering, such as communication network upgrade. We hope that today’s meeting leads to a more active ICT cooperation between our two countries."

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ICT Trends of affiliated organizations

RRA's Five International Standard Proposals for 5G, Cloud Computing, and Quantum Cryptography Communication Technology Were Adopted by ITU

The National Radio Research Agency (RRA) under the Ministry of Science and ICT (MSIT, Minister Lee Jong-ho) announced, "At the ITU-T Future Networks Study Group (SG13*) held in Geneva, Switzerland from July 4 to 15, five international standard proposals for 5G, cloud computing, and quantum cryptography (Head of the Korean Delegation: Dr. Kim Hyung-soo from KT) developed by Korea were consented**. Korea also secured 11 leadership positions for the SG13."

* SG13: Study group on setting and revising standards related to future networks

** The stage just before the final adoption of a standard; if there is no disagreement through circulation among member countries, the standard is adopted.

[Five International Standard Proposals Consented]

① The "Requirements and framework for jitter guarantee in large scale networks including IMT-2020 and beyond" standard prevents data delay in large scale networks, providing stable and secure services. Based on this, the standard is expected to contribute to the promotion of industries related to ultra-low latency services in 5G, Internet, and the metaverse.

* Jitter: The amount of change in latency of data transmitted and received

② The "Cloud computing – Functional requirements of cloud service partner for multi-cloud" standard, which is the first Korean-led development of multi-cloud technology standard, provides the concept and functional requirements of multi-cloud.

③ The "Cloud computing – Global Management Framework of Distributed Cloud" standard defines the requirements of distributed cloud, a core 5G application technology. The two standards are expected to create a broader new market for the existing cloud computing environment and serve as a guide.

** Multi-Cloud: An environment that uses cloud services from two or more cloud providers simultaneously

*** Distributed Cloud: Cloud on a network close to service users, not on a central server

④ The “Quantum key distribution networks (QKDN) - Functional architecture for quality of service assurance” and ⑤ “Quantum key distribution networks – Requirements for machine learning based quality of service assurance” standards are about technologies for guaranteeing the quality of quantum cryptography communication networks that are drawing attention as one of the security communication technologies for the future. It is expected that they will greatly contribute to the establishment of quantum cryptography communication networks that use these technologies and the commercialization through service quality assessment.

As a new study period (2022-2024) began after the World Telecommunications Standardization Assembly (WTSA) held in March, the reorganization of the leadership positions of the Future Network Study Group (three Working Parties, 13 Questions under Study) was discussed.

Korea secured 11 leadership positions for the SG13—9 seats re-elected and two seats additionally elected, including the working parties in the cloud and big data sectors and the JCA-ML* whose establishment was led by Korea.
* JCA-ML : Group that jointly coordinates standardization activities between study groups and cooperates with other standardization organizations such as ISO/IEC to prevent duplication of machine learning standards development within ITU-T

The RRA said, "We will continue to work with industry, academia and research institutions to lead international standardization activities in future network fields such as quantum, space, 6G, artificial intelligence and cloud."

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