

2020 KISDI ANNUAL REPORT



KISDI 2020 **ANNUAL REPORT**

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Preface

KISDI

KOREA INFORMATION SOCIETY DEVELOPMENT INSTITUTE

Preface

The COVID-19 pandemic that began in Korea in early 2020 resulted in national lockdowns and a global economic crisis. Social distancing measures were put in place by governments worldwide, expediting a swift conversion to digitization and contactless transactions in all areas of economic activity.

The rapid pace of digital transformation is ushering a ‘new normal’ society, where it has become more urgent than ever for Korea to establish a mid- to long-term national digital strategy.

Against this backdrop, the Korea Information Society Development Institute (KISDI) formed the vision to “serve as an ICT policy research center at the forefront of digital policy.” To pursue this policy vision, KISDI has restructured its personnel and organization to help assist Korea’s digital transformation policies.

In 2020, with the objective of assisting Korea’s vision of becoming a software superpower and become a leader in the 4th Industrial Revolution era, KISDI conducted approximately 100 mid- and long-term policy studies in five key areas (economy and society, ICT data science, communications, broadcast media, and international cooperation) to secure foundational data for the implementation of Korea’s national initiatives. As a result, KISDI contributed to the designing of national policy through in-depth studies on topics such as AI ethical standards, analysis and development of a predictive model for big data, guidelines on network neutrality and Internet traffic control, detailed strategies for the re-allocation of telecommunications frequencies, and vision and policy tasks for the Korea Communications Commission. Beyond Korea’s borders, KISDI worked with global bodies such as the ITU, OECD, APT, and APEC to elevate Korea’s status in the international community.

KISDI also strived to expand the applicability of its research outcomes in various ways, such as through the launch of *AI Trend Watch*, an issue report that aims to broaden the horizons of AI-related research. For current issues that attract great interest (e.g. Korea’s future, manifestation of intelligent data society), both online and offline arenas for discussion were prepared in the form of video conferences and YouTube livestreams to make it easy for anyone to participate. The most prominent example is “Data, Meet the Future: Discussing the Future of Korea in 2021,” a forum that was co-hosted by KISDI and the National Research Council for Economics, Humanities and Social Sciences participated by leading experts from 18 outside institutions. The event used seven major indices in the humanities and related to our economy and society to diagnose Korea’s current state and was especially fruitful in that it explored directions for future policy and made several proposals for the stewardship of national policy initiatives.

Moving forward, KISDI will maintain its role as a leading ICT policy research center for the intelligent information era that makes educated predictions of the future based on the current society-wide digital transformation underway. I hope that this annual report not only serves as a summary of KISDI’s research outcomes of 2020 but also provides data that can be used in the creation of national policies and initiatives.

I would like to thank KISDI’s excellent research staff as it was their tireless efforts that made possible the outstanding outcomes that grace the following pages. Furthermore, I am grateful to the representatives of government, academia, industry, and all other institutions related to the themes of our research who were willing to provide advice on and moral support for the publication of this report. We are, and continue to be, in your debt.

Thank you.

Ho-yeol Kwon

President, KISDI
September 2021

II



General Information on KISDI

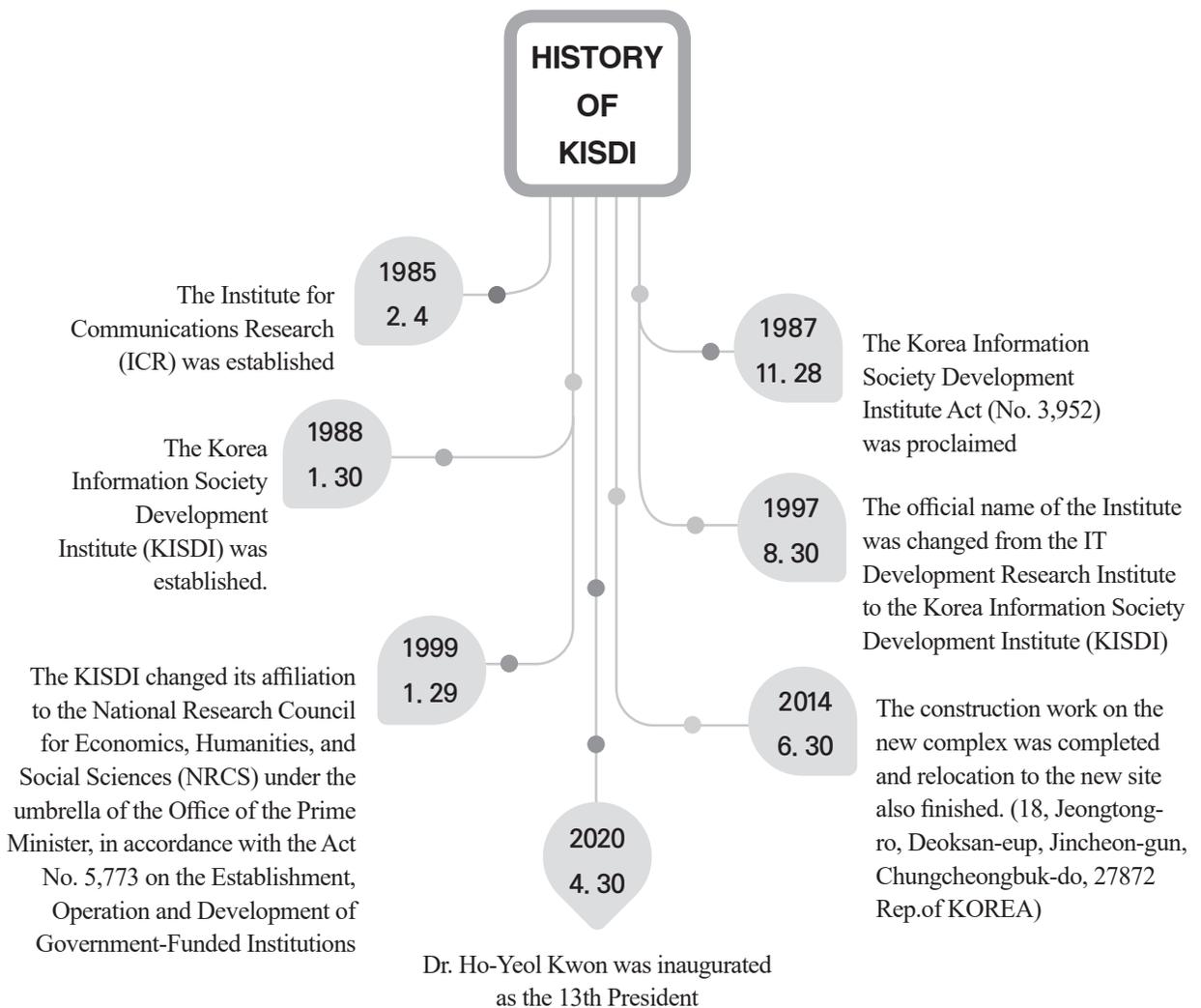
1. Founding Purpose and History
2. Organization and Personnel
3. Performance of Major Projects in 2020

Founding Purpose and History | 1

Founding Purpose

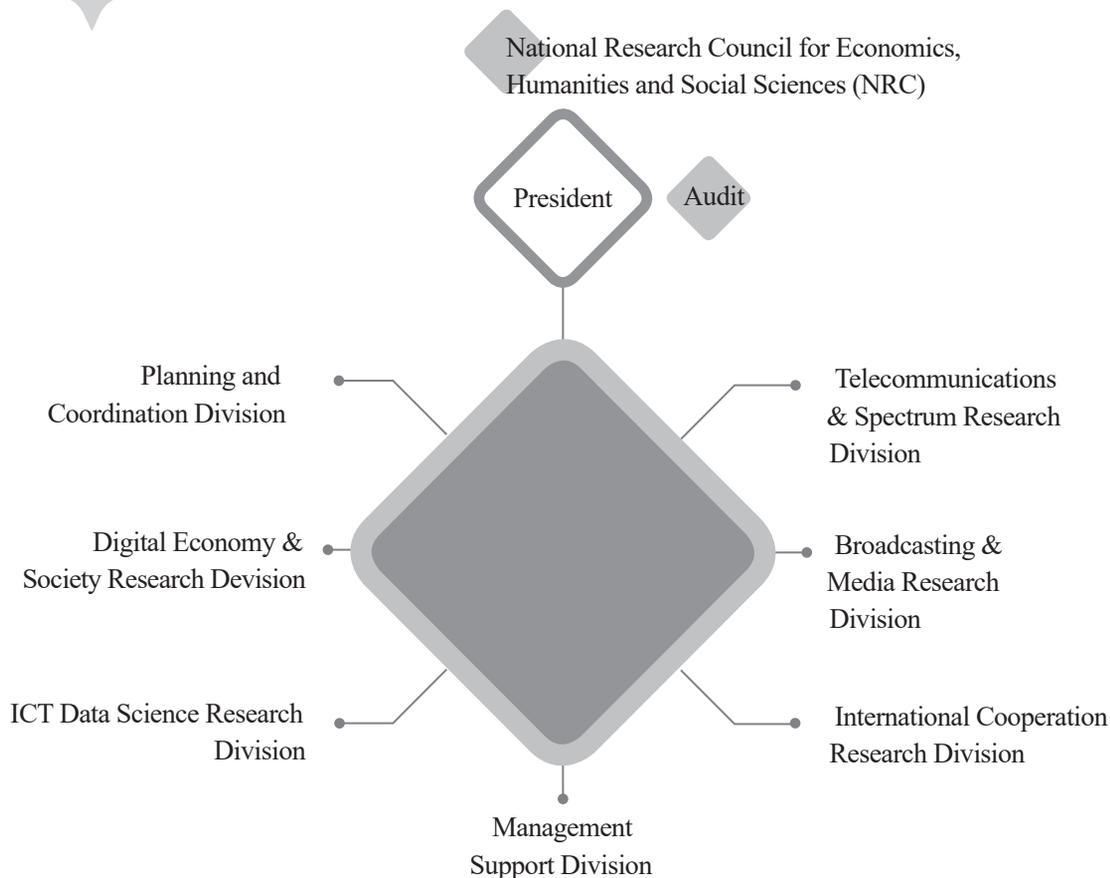
To formulate national ICT policies for the realization of a knowledge- and information-based society and contribute to national economic development

● — Article 2 of the Articles of Incorporation



2 | Organization and Personnel

Organization



Personnel

(As of Sept. 2021, no. of people)

Category	President	Researcher	Administrative Position	Technical/Office Job	Public Service Position	Total
Full Capacity	1	113	23	17	20	174
Current Staff	1	112	23	17	19	172

A total of 61 out of 112 researchers have a doctorate degree.

Roles and Responsibility

Name of epartment	Roles and Responsibilities
Planning and Coordination Division	<ul style="list-style-type: none"> · Demand forecasting for mid- to long-term policy, research planning and coordination, and budgeting · Establishment of mid- to long-term vision and action plan, research management, and performance evaluation · Internal and external cooperation with the government, related organizations, academic societies, and media organizations · Website management and PR activities
Digital Economy & Society Research Devisiion	<ul style="list-style-type: none"> · Study of mid- to long-term socioeconomic changes brought about by digital transformation and national strategy · Research of platform/data economy ecosystem and related ICT industry policy · Research of ethical and legal systems in the intelligent information society and ICT-based solutions to social problems · Establishment of strategies for securing global competitiveness related to new technologies such as artificial intelligence · Establishment of mid- to long-term development strategy for the postal business in line with changes in the ICT environment
ICT Data Science Research Division	<ul style="list-style-type: none"> · Planning, adjustment, evaluation, and analysis of related statistical information for the improvement of the ICT statistical survey system · Conducting of major statistical surveys on ICT and media and establishment of databases · Development of national and social development index for future prediction and research of data science methodology · Establishment of big data-based ontology and analysis platform
Telecommunications & Spectrum Research Division	<ul style="list-style-type: none"> · Research of promotion of competition in the telecommunications and Internet market and user policy · Analysis of the telecommunications and Internet market and research of regulatory system improvement plan · Research of mid- to long-term policy for frequency supply/demand and allocation
Broadcasting & Media Research Division	<ul style="list-style-type: none"> · Research of policy measures for revitalizing the broadcasting service sector and fostering competition · Research of policy measures related to new media, digital broadcasting, and video content · Research of measures for improving legal and regulatory systems following the convergence of broadcasting and telecommunications · Analysis of major domestic and foreign issues related to broadcasting and telecommunications and establishment of statistics
International Cooperation Research Division	<ul style="list-style-type: none"> · Research of ICT and broadcasting-related international organizations and regional cooperation · Research of ICT and broadcasting-related trade negotiations and strategies · Provision of advice on policy establishment in developing countries in the ICT and broadcasting sector · Research of inter-Korean exchange and cooperation in the ICT and broadcasting sector
Management Support Division	<ul style="list-style-type: none"> · Conducting of administrative work on HR, salary, system, service, welfare, and labor-management relations · Accounting such as operation and management of research funds, taxation, and settlement of accounts · Management of various assets, including the maintenance and management of office buildings and ancillary facilities · Establishment of a database and operation of the information network for the implementation of a KMS environment

3 | Performance of Major Projects in 2020

Key Research Areas

The vision of the Korea Information Society Development Institute (KISDI) is to become an ICT policy research institute that leads the national digital strategy. KISDI is endeavoring to improve research performance by focusing its core research capabilities on five key research areas.

Five Key Research Areas

· Digital Economy & Society Research	· Telecommunications & Spectrum Research	· International Cooperation Research
· ICT Data Science Research	· Broadcasting & Media Research	

Research Projects in 2020

Category	Basic Research	Policy Research	Policy Information	Current Issue Research
Digital Economy & Society Research Division	5	15	4	1
ICT Data Science Research Division	2	11	6	0
Telecommunications & Spectrum Research Division	2	14	1	0
Broadcasting & Media Research Division	3	8	8	0
International Cooperation Research Division	0	6	1	0
Total	12	54	20	1

III



Main Research Outcomes in 2020

1. Digital Economy & Society
Research Division
2. ICT Data Science
Research Division
3. Telecommunications & Spectrum
Research Division
4. Broadcasting & Media
Research Division
5. International Cooperation
Research Division

1

Digital
Economy &
Society
Research
Division

Study on the Switching Costs and Data Portability of Digital Platforms

Researchers: Yuri PARK, Eun-Min LEE, Yoonmo KOO

● Purpose of Research

A small number of platforms are starting to exercise immense influence on users' actions and capture their attention. These phenomena are leading to active discussion on the monopolization of both platforms and data. As causality between data and platform monopoly has not yet been identified, the discussion between the data monopoly and the platform monopoly needs to be distinguished. One thing that is clear is that platforms, after having secured a large number of users, gain access to a correspondingly large quantity of data. Such concentration of data may contribute to improve product quality and increase the switching costs, hindering the switch to other platforms.

Data portability is gaining attention as a policy-based means of revitalizing market competition by alleviating data concentration and lowering switching costs. Although significant discussion on data portability is taking place, there are relatively few analyses of the impact of introducing data portability and even fewer examples of empirical analysis. Given this situation, this study conducted a questionnaire on the data portability and format of use of data platforms. Data gained from the questionnaire was used to conduct an empirical analysis of the impact that data portability has on the switching costs of data platforms.

● Main Outcomes of Research and Policy Implications

This study focuses on four types of digital platforms: search engines, social network services, OTT (over-the-top) services, and personalized mobile financial services. Initially, the expectation was that switching costs would vary by platform type. The outcomes show, however, that data-related switching costs are very similar across all platform types. The analysis outcomes suggest that introducing data portability can help lower switching costs to a certain extent. Nevertheless, consideration should be given to strategies that increase the effectiveness of data portability (e.g. subjects of transferred (moved) data, user convenience) in terms of its design. After compiling analysis outcomes, this study offers policy strategies for several areas: establishment of evidence-based policy, incorporation of concept of data portability into and removal of systemic uncertainties from the Personal Information Protection Act, and design of mechanisms for improving the effectiveness of data portability.



Key word

Digital platform, switching costs, data portability, market competition

Changes in Global Value Chains in New Technology-Based ICT Service Industries

Researchers: Sungok KIM, Jung Sook OH, Jun Ik KIM

● Purpose of Research

The ICT services industry is developing into a kind of convergence services industry based on platforms rather than individual services. Convergence-oriented technological innovation, industrial structure reform of the manufacturing sector, and AI-enabled platform services have become major parts of the ICT services industry, in which platform-based services gather and provide agents, assets, and services in one place regardless of borders and keep expanding based on network effects. Meanwhile, AI technology makes structural changes in platforms' value chains more evident. The development of API facilitates the connection of businesses with the outside world and contributes to the expansion of their value chains, helping them readily access technology, data, algorithms, and other assets and complementing their businesses. In addition, data allows for the implementation of more refined and segmented strategies through analysis and forecasting of consumer experiences and behavior patterns as well as the needs and changes of industries and markets. Technologies that enable immediate access to and utilization of various resources that used to be distributed in a linear structure through platforms, and platforms that provide services based on such technologies have emerged, dismantling the current value chain structure to a significant degree.

Recognizing this trend, this paper aims to examine how global value chains of incumbent ICT services businesses change and identify Korean businesses' strategies for responding to the shifting global value chain of the platform-based ICT services industry. Specifically, this paper analyzes how the conventional global value chain of the ICT services industry is being dismantled or changed amid the trend of technological advancement and the so-called "platformization" and identify policy countermeasures.

● Main Outcomes of Research and Policy Implications

This paper takes stock of the global value chain of the ICT services industry amid the platform trend, looks at Korean companies' participation in the platform-based global value chain through surveys, and derives policy implications.

Several findings were made. First, along with the platformization of value chains, the traditional ICT services industry is creating value on platforms, and relevant resources are being integrated, leading to a network structure. In this process, some platform companies are moving beyond simple business networks to form a platform ecosystem. This is prompting the linear value chain to shift to a format where multiple players tap into platforms to complement resources that are scattered across the world, thereby jointly creating value. Consumers who used to simply buy products or services now create added value through multiple means such as consumer-generated data and feedback.

Such value added, in terms of R&D, goods/services planning, and promotion and marketing, then changes the direction of value creation and value flow. Second, the widespread use of technologies such as AI and interfaces such as API is enabling this trend and facilitating interactions between platforms as well as between market players. Individual players develop, improve, and sophisticate their technologies and services through open interfaces, which are then traded and exchanged on platforms. Meanwhile, the advancement of AI enables the management of market players and the overall value chain and can help analyze needs to create new added value and promote interactions. This is in line with the results of surveys of Korean companies, in which businesses cited swift utilization of technologies as the biggest change driven by platforms. Third, technological factors are helping local platforms catch up with the huge platforms of technologically-advanced countries and protect local markets. With the platformization of ICT and services, activities such as R&D, goods/services planning, logistics/distribution, and marketing that used to be divided across the global value chain are now taking place on platforms. In addition, infrastructure and technologies are now provided as services on platforms, enabling latecomers to complement their services and follow and surpass global platforms based on their innovative ideas and expertise in local areas. Fourth, in order to respond to the platformization-driven changes in the global value chain, what it means to take part in the value chain and how players take part should be defined. In the existing global value chain, participation means you are part of the whole process of one finished product reaching its final destination, and the competitive edges of regions or countries determine the division of work. However, joining the platform-based global value chain is about becoming part of a huge ecosystem of platforms and creating value together with other players. This is such a wide-ranging, complex, and ambiguous concept that it takes time and hands-on experience to see whether tangible results can be achieved, and relevant policy models need to be created.

**Key word**

ICT services industry, platform, global value chain

A study on the improvement plan of the economic regulation legislation in response to the data economy era

Researchers: Joonmo KANG, Jiweon SEON, Jinyul JU

● Purpose of Research

With the advancement of the data economy, new markets and industries based on data are being created. New formats of economic activity are also emerging that are markedly different from those of traditional industries. However, whether our economic regulatory laws are adequately taking into account such activities to build up effective and innovative markets or maximize social welfare is a question that remains to be answered. To regulate activities that facilitate the use and distribution of data while simultaneously expanding the social benefits brought about by the data economy on a small group of economic agents, we must, from the perspective of economic administration law, engage in discussion on improving economic regulations and competition laws in a way that reflects the nature of such privileges and transactional formats. This study: 1) conducts a legal analysis of the rights and responsibilities related to data that emerge as a premise of data economy advancement and 2) proposes methods for improving the problems of existing legal systems that can potentially impede the facilitation of data transactions.

● Main Outcomes of Research and Policy Implications

This study explores issues of the legal system that emerge due to changes in the ways in which companies use data in the data economy as well as the status of legal restructuring/modification, based on which it proposes methods in which data-related legal systems can be improved. This study also investigates whether existing competition law is capable of serving as a check against the monopolization or concentration of data. Toward preventing the excessive dominance of data-related companies, this study explores the possibility of incorporating laws on personal information protection and mobility rights expansion, introducing the concept of a data-based approach, and improving the data market's supervisory system.

Based on a discussion of the above points, this study develops three strategies for improving economic regulatory laws: first, changing the standards on the existence and/or abuse of market dominance (in terms of competition law) according to the circumstances of the data economy; second, developing a rational data governance system (including the protection of personal information from a human rights perspective as a subject of this study); and third, potentially establishing an independent set of rules for data transactions that takes into consideration the characteristics of the data.



Key word

Data, monopoly, market competition, competition law

A study on the national strategy to secure public acceptability of the fourth industrial revolution(3): Executive Report

Researchers: Wontae LEE, Sang Young SONN, Jung Wook MOON, Seong Eun CHO, Eunjeong KWON, Sijik LEE, Gimun YANG, Sunmin JUNG, Daseul OH

● Purpose of Research

The overarching goal of this study is to ascertain the key aspects of various social sectors that influence social receptivity to the Fourth Industrial Revolution and propose a national response strategy and systemic strategies to improve such aspects. The research conducted for this study's third year (2020), based on comprehensive consideration of the outcomes of the first two years, proposes concrete policy strategies for securing social receptivity to the Fourth Industrial Revolution. In other words, along with the changes in norms proposed based on the outcomes of the first and second years of this study and research on legal restructuring and social conflict analyses (e.g. changed roles of civil society and government), this study proposes an accommodative strategy for social development based on changes that are expected to occur in the future and the outcomes of perception surveys toward securing social receptivity to the Fourth Industrial Revolution.

● Main Outcomes of Research and Policy Implications

This study focuses on social policy and legal restructuring that enable responses to social changes brought about by the Fourth Industrial Revolution. First, it explores the theoretical foundation of social receptivity to the Fourth Industrial Revolution as well as the implications of stakeholder capitalism freed from the limitations of post-humanism.

Second, given that we have arrived at a point where the effects of the Fourth Industrial Revolution are becoming tangible, this study conducted a comprehensive empirical analysis to serve as the grounds for deciding the direction of national policy. Through empirical analyses that encompass all aspects of the public and private sectors, this study develops and evaluates issues related to the expansion of intelligent data technologies and the Fourth Industrial Revolution and proposes relevant strategies from the perspective of mid- to long-term policymaking.

Third, this study explores participatory prevention and management strategies for the various kinds of conflicts of rights/interests and socioeconomic conflicts that are occurring due to the increasing production and use of new technologies as a result of the Fourth Industrial Revolution. To do this, this study investigates the nature of digital social conflict and the methods by which it expands and proposes social policies capable of alleviating such conflict.

Fourth, alongside the improvement of the development/use and social receptivity to intelligent data technologies (e.g. AI, systematic support/implementation systems) to expedite the Fourth Industrial Revolution, this study explores legislation strategies aimed at ensuring that the Fourth Industrial

Revolution is human-centric and has minimal side effects.

Looking at the research outcomes of the past three years, it can be said that the Fourth Industrial Revolution is a process through which technological innovation expands omni-directionally and that revolutionizes social systems (social, policy, legal, etc.) that are necessary to address the diverse issues that arise in the process of accommodating new technologies. Therefore, ensuring social receptivity to the Fourth Industrial Revolution must be preceded by efforts to mediate conflict and arrive at a social consensus. A technology-centric approach is certainly important (namely, strengthening accessibility to and the ability to use new technologies (e.g. AI)) in ensuring social receptivity to the Fourth Industrial Revolution. It is important to realize, however, that the task of creating the social, policy-based, legal, and systemic conditions that are necessary to reduce the gaps that inevitably occur among vastly different social groups (in terms of factors like age and income level) and mediating conflict among the countless users and stakeholders involved in the process of accommodating new technologies is equally important.



Key word

Fourth Industrial Revolution, social receptivity to intelligent data technology, digital social conflict, risk control, regulatory governance

An empirical analysis of public acceptability of social changes brought by the fourth industrial revolution and policy suggestions

Researchers: Jung Wook MOON, Gimun YANG, Seo Yong KIM, Jae Sun WANG, Song Hee YOO

● Purpose of Research

The era in which we now live is characterized by the fact that pre-digital era value systems and social conventions are no longer accepted due to the changes brought about by technologies such as AI and big data. Changes in the technological landscape, which are characterized by hyper-intelligence, hyper-connectivity, and sensitivity, are expected to have a significant influence in all areas of society, such as politics, the economy, culture, and the public sector. Under these circumstances, the issue of ensuring that nobody is left behind and everyone can adapt to our new environment is not only important for individuals, but is also a factor that can determine a country's competitive edge. Therefore, this study focuses on acceptance of intelligent information technology as a method of responding to changes in the technological environment and discusses ways to improve the acceptance of such technology among ordinary citizens and public servants. This study compares and analyses the acceptance levels and attitudes of ordinary citizens, central government bureaucrats, and provincial bureaucrats in relation to the intelligent information technologies of the Fourth Industrial Revolution. Its goal is to, by revealing the factors that influence the level of acceptance of each group, propose ways in which policies on improving acceptance should be designed.

● Main Outcomes of Research and Policy Implications

Analyses were conducted of Korean and foreign literature, existing studies, and policy resources to come up with a list of issues that are related to acceptance of intelligent information technology. The perception survey model that was used for central bureaucrats in the second year was revised according to the characteristics of provincial bureaucrats in order to apply the issues derived from the aforementioned literature analysis to the survey's questions. This was followed by a survey of the perception of and attitude toward intelligent information technology acceptance of 1,088 public servants of local governments. Based on this approach, this study proposes the type of policy that the government should put into place as well as the direction of future national policy on intelligent information technology that should be adopted toward ascertaining how citizens and central/local governments perceive intelligent information technology and improving the social, individual, and policy-level acceptance of such technology.

To achieve this goal, this study was divided into two parts. First, methods of improving the application of technologies to the tasks of government workers were developed through an analysis of provincial bureaucrats' perception of and attitude toward intelligent information technology. Second, the outcomes of the perception survey of citizens and central government bureaucrats that

was conducted in the first and second years were analyzed to ascertain the influence of intelligent information technology on social, individual, and policy-level acceptance. A comprehensive analysis was also conducted in order to propose policies through which acceptance at each level can be improved.

Based on the analysis of the perceptions and attitudes of provincial bureaucrats, this study proposes the direction that policy should take to improve the level at which intelligent data technology is used (e.g. improve bureaucrat training system, revitalize inter-governmental data sharing, and expand organizational support). Also, based on the outcomes of the comprehensive analysis that compared and analyzed citizens and central/provincial bureaucrats, this study proposes the direction that policy should take to improve the social, individual, and policy-level acceptance of intelligent information technology in terms of “digital literacy, communication, user experience, and policy-specific characteristics.”



Key word

Intelligent information technology, social acceptance, intelligent data society, government innovation

Digital social conflicts caused by the fourth industrial revolution and policy measures to achieve social cohesion

Researchers: Wontae LEE, Seong Eun CHO, Sunmin JUNG, Daseul OH, Ji-seong YANG, Myeong-ho LEE

● Purpose of Research

This study was conducted for the purpose of: 1) exploring issues of digital social conflict that have already occurred or may occur given the characteristics of Korea's socioeconomic structure based on social changes in the era of the Fourth Industrial Revolution (FIR) and 2) proposing how policy on social integration should be designed. The change of existing business models due to the emergence of new digital technologies and new business models based on such new technologies is resulting in conflict with the current socioeconomic ecosystem (market and policies) and emergence of new issues. Differences in perspective among stakeholders (mostly businesspeople, new competitors, customers, etc.) surrounding such new issues and conflicting economic interests can, through mediation, find a balance. If, on the other hand, conflict intensifies, differences can degenerate into confrontational relationships. The failure of the government, at this point, to create a new arena for competition by actively mediating or making systemic improvements may result in intensified social conflict or lower social acceptance of new technologies, resulting in demand for a strategic approach to social integration that is able to mediate and alleviate the conflicts that arise in the process of major social change.

● Main Outcomes of Research and Policy Implications

This study conducted a textual analysis of news articles to ascertain the issues of digital social conflict that exist in Korean society today and, in doing so, identified several areas that are subject to conflict: 1) the "reality" of the FIR, 2) among workers of promising and high-risk industries, 3) between technological and social discourse, 4) between jobs and labor, 5) rigidity of regulations on technological innovation, 6) factors related to the Korean economy's growth engine, and 7) within the global market (among countries).

This study proposes the following policy strategies for accommodating social development and alleviating digital social conflict. First, there needs to be a social consensus on the tenets of the FIR. With the current fuzzy definition, it is difficult, if not impossible, to develop a concrete policy. Currently, the concepts of the FIR are, depending on the stakeholder, mostly viewed with hostility by citizens, which can become an impediment to social acceptance. Second, the government and society's ability to respond to changes in the economic structure must be significantly improved. In the textual analysis of news articles, the proportion of conflict among stakeholders due to changes in industrial structure was the highest among all forms of social conflict included in this study. Various social policies are being experimented with for the benefit of workers in high-risk sectors (providing replacement tasks and training, creating new jobs, etc.), but none have demonstrated any substantive effect thus far. The government and labor/management must thus work closely together to create

a mid- to long-term plan for coexistence. Third, we must seriously consider the coevolution of technological innovation and regulatory innovation. Regulation is often regarded as an impediment to technological innovation; however, it also has the beneficial effect of imbuing technological innovation with a proper sense of direction. Fourth, there is a need to create a blueprint for the mid- to long-term development of core next-generation technologies, which first and foremost requires a reorganization of the roles of industry, academia, and research and an intelligent, specialized strategy that is able to identify the next core technologies that will fuel the Korean economy's future. Finally, efforts must be made to alleviate citizens' hostility toward the FIR. To this end, policies must be proposed that are based on an understanding of the concerns of laborers, entrepreneurs, and ordinary citizens, and this understanding must be used as the basis for alleviating concerns or proposing constructive alternatives. There is an especially pressing need for: the development of vocational retraining programs and increased accessibility to such programs, relaxation of regulations, alleviation of regulatory uncertainty, and demonstrations of and PR on the positive effects of core FIR technologies.



Key word

Digital social conflict, acceptance, stakeholder relationships, social integration, social consensus

A Study on the Transformation of Legal System for Risk Control and Technology Acceptance in the Intelligent Revolution Era

Researchers: Eunjeong KWON, Sijik LEE, Daseul OH, Chun Soo YANG, Hye Sun YOON, Yong Woo SHIN

● Purpose of Research

Intelligent information technology, which is now a key variable in diverse sectors, is accelerating Korean society's paradigm shift. The ways in which intelligent information technology are used vary widely depending on the desired goal, with subsequent risks also varying widely in terms of characteristics and severity. The AI systems that are currently in commercial use in Korea and overseas are aggravating data subjects' concerns over privacy infringements as they are based on massive quantities of personal data, with bias in the data and/or algorithms sometimes revealing new kinds of personal rights infringements. In particular, the substitution and/or supplementation of personal elements with automated, algorithm-based decision-making systems is resulting in an increasing number of areas that do not fit in with the binary approach (human-object, action-responsibility, cause-outcome) that has pervaded social norms thus far.

The advantages and risks of the "intelligent revolution" of the Fourth Industrial Revolution have not yet been demonstrated by a sufficient number of cases/examples or been defined in sufficiently concrete terms to allow the building of a widespread social consensus on them. Therefore, it is not easy to establish a preventative/predictive legal system for risks, which by nature requires a concrete value system. Focusing on the adverse effects of intelligent information technology to preemptively stipulate legal protective measures is also unlikely to actually control risks in a fast-changing technological environment. This study takes into consideration the multifaceted interactions in an intelligent information society in order to: 1) explore legal principles and normative systems that satisfy the conditions for the social acceptance of intelligent information technology (in particular, conditions for a legal system that can process risks/conflict) and 2) propose the direction that should be taken for the mid- to long-term transformation of legal systems.

● Main Outcomes of Research and Policy Implications

The Framework Act on Intelligent Informatization, which was enacted in June 2020, was designed to enable changes in systems and governance in response to the emergence of new threats in relation to intelligent information technology. Nevertheless, the risks that have emerged in relation to AI systems—discrimination and inequality due to bias in data and/or algorithms—are still not legally regulated. However, as can be seen in the multiple laws proposed in the 20th and 21st sessions of the National Assembly, discussion has become much more active over the past few years (both in Korea and overseas) on not only ethical principles but practical risk control and the regulation of AI. This study first analyzed examples of laws and policies of the EU, Germany, UK, and US in relation to risk control for intelligent information technologies. Although countries have inevitably taken different stances on the balance between the "expediting of innovation" and "risk control" based

on their levels of technological advancement and foundational conditions, “risk management,” which deals with dangers that are irregular in form, was generally exercised through regulations that function for the benefit of the intelligent information technology environment.

The legal foundation of an intelligent information society must begin with a variation of conventional risk control principles. To create a risk control system that does not impede social acceptance of new intelligent information technologies, there must first be self-regulation, action-centric regulation, and preemptive/current regulation. It is based on such variations that a legal system should be created, centered on risk management, principle-based regulation, and co-regulation, in order to effectively cope with the risks posed by intelligent information technologies. Restructuring legal systems to reflect revolutionary regulatory techniques (aid-providing regulation, impact assessment, self-audit and certification, etc.) while simultaneously creating a supervisory system that respects self-regulatory governance is the first step toward satisfying the conditions for social acceptance and ultimately achieving a level of “intelligent regulation” that meets the demands of the intelligent revolution.



Key word

intelligent revolution, intelligent information technology, AI, conditions for social acceptance, risk management, self-regulation, co-regulation

Ways for the valuation and promotion of open data to advance the AI industry

Researchers: Joonbae LEE, Eunyong HAN, Young-Jong LEE

● Purpose of Research

The advancement of AI and other analytical technologies is resulting in the collection and use of digital data emerging as an important value-creating mechanism. Global corporations (Facebook, Amazon, Microsoft, Google, Apple (FAMGA)) that have accumulated data from their existing user bases are distinguishing themselves in terms of the development/application of AI technologies. The immense socioeconomic influence these corporations have gained is leading to the active conducting of open data campaigns/movements to strengthen the transparency of the processes of data collection and use as well as data's identity as a public asset. Korea is very involved in the transition to a data economy as well. In this situation, a system of rules must be created for the new digital economy in order to ensure the prevention of excessive data privatization and that the concentration of data in select companies does not impede innovation.

● Main Outcomes of Research and Policy Implications

This study proposes a vision for a new data economy that is based on the opening and/or disclosure of data as well as how policy should be prioritized to realize this vision (through analysis of Korean/foreign literature and surveys of experts). A literature analysis was done to analyze the incentives of voluntary data disclosure from an open innovation perspective in order to develop theoretical grounds for maximizing such motivation. In addition, through an analysis of literature on assessing the value of data, this study offers a theoretical framework for quantitatively calculating the benefits of data use and tries to expand the scope of this analysis to include the benefits of data disclosure. An expert survey was done to identify obstacles to data disclosure/opening and come up with a list of areas that require policy-based intervention. Legal uncertainty and lack of understanding were revealed to be obstacles to data disclosure/opening. In terms of policy, the survey revealed the need for the restructuring of the legal system (including Korea's three major data laws) and incentives for data disclosure.

This study offers three policy implications. First, to create a healthy environment for AI data, there needs to be principles in place that achieve harmony between data ownership/access rights and the rights of data agents. In particular, voluntary disclosure must be the fundamental principle for data that includes personal information. Second, the excessive privatization of data (data silo), which is based on the fear of leaks of classified corporate information, can impede not only the overall advancement of the data environment but also companies' motivation to innovate themselves. Third, because data as a public good is always under-supplied compared to the social optimum, government intervention is needed. These implications will hopefully lead to additional research on data-related legal systems, change in the social perception of open data, and facilitation of voluntary data sharing.



Key word

Open data, open innovation, AI data environment, data value assessment

Recommendations to the Government for AI Innovation from the Perspective of AI Experts in the Private Sector

Researchers: Kyunghoon KIM, Eunyoungh HAN, Joonbae LEE, Sungwook YOON, Myeong Ok AN, Kyung Eun LEE, Min Jin KIM, Jihye KIM

● Purpose of Research

Artificial intelligence (AI) is an innovative technology that brings about paradigm changes in existing industries, and governments in major countries are building national capabilities to secure dominance in AI. Korea has also joined the competition to secure global leadership in AI by announcing its “National Strategy for AI” and “Comprehensive Plan for the Korean New Deal.” However, to secure AI competitiveness in the current AI industry environment, which is growing with unpredictable speed and direction, proactive participation not only of the government but also of the private sector, including businesses and schools, is needed. Therefore, the purpose of this study is to recommend the role and direction that the government should take to make Korea a global AI leader by reflecting the expertise of the private sector in order to efficiently implement the current national AI policy and maximize its effect.

● Main Outcomes of Research and Policy Implications

In this study, the research team worked with the Ministry of Science and ICT and the Fourth Industrial Revolution Committee (hereinafter referred to as “Fourth Committee”) and tapped into a system to collect opinions from the private sector through the Fourth Committee’s private sector members and members dedicated to promoting innovation. As a result, this study produced a recommendation for the government to strengthen AI competitiveness. Based on the opinions collected from the private sector that the role of data is more important than anything else for the development of an AI innovation ecosystem, the agenda for the recommendation became “promoting the data economy for the development of AI innovation ecosystems.” Accordingly, three principles were proposed: 1) revitalizing the private sector-led data economy to create a dynamic AI ecosystem; 2) innovating the data value chain encompassing the production, supply, distribution, analysis, and utilization of public data to prime the pump for AI ecosystems; and 3) mediating conflict among economic actors to make AI ecosystems more sustainable.

Based on these principles, six major projects were selected under the two pillars of “guaranteeing independent and creative data utilization by the private sector” and “realizing user-centered innovation across the entire public data cycle.” Specifically, in terms of the first pillar for building the basis for independent data utilization by the private sector, four tasks were derived: 1) revamp data-related statutes; 2) expand and improve the testbed for data utilization; 3) build an environment for the safe integration of heterogeneous data; and 4) foster data utilization professionals. As for the second pillar of user-centric innovation of the entire cycle of public data, two tasks were identified: 1)

establish and promote principles for public data reuse; and 2) sophisticate the entire cycle of public data.

As many government agencies and public institutions are directly or indirectly involved in the current data ecosystem, there should be a central point for effective policy implementation. In addition, a coordination system should be in place to address the problem of mismatch between the data that consumers need and the public data that is supplied. The recommendations presented in this study conclude with the suggestion that the government play the role of a market coordinator. For it to do so, 1) a policy consultative body and policy enforcement system focused on the data ecosystem should be established; 2) a national chief data officer (CDO) is needed; and 3) a window for collecting opinions from data consumers needs to be set up.

Since this study established policy directions and presented detailed measures for revitalizing the data economy from a private sector perspective, it is expected to be used as baseline data for developing relevant national strategies in the future and to contribute to enhancing the vitality of the domestic data economy.



Key word

Artificial intelligence (AI), AI innovation, recommendations for government, data, data economy, revitalization of data economy

Data Korea Risk Management Report

Researchers: Kyongsun LEE, Yuri PARK, Sungok KIM, Kyoung Nam LEE, Wonjun CHUNG

● Purpose of Research

This study proposes a data risk management framework to understand what the data risk is and to assess it quantitatively. Using the framework, we analyze the levels of data risk in three industries (finance, healthcare, and logistics), identify the high risk areas in each industry, and discuss the policy implications.

● Main Outcomes of Research and Policy Implications

First, this study reveals that there are perception gaps in data risk among citizens, industrial experts, and legal experts. Overall, risk levels were found to be highest in the risk types with a high degree of external uncertainty, which makes it difficult to control internally. This risk is hard to control within a conventional risk management framework because it can evolve into new types depending on the external environment and technological advancements. Therefore, it is necessary to build a flexible risk management system in order to quickly respond to such types of risk with high uncertainty. Second, the study finds that the awareness of data risk among citizens is very high compared to expert groups. Such high perception among citizens seems to be attributed to information asymmetry, because citizens do not clearly understand how data is collected, processed, and utilized. To cope with this situation, it is important to secure transparency in the overall data lifecycle, guarantee the rights of data subjects, strengthen the accountability of firms, and establish a trustable data ecosystem. Third, legal experts show great concern regarding the risks of unfair data collection and use. This outcome may indicate that unfair data use could emerge as an issue in diverse industries. To ensure that data is used responsibly, it is crucial to consider both the opportunities and risks in utilizing data and take a balanced approach that maximizes opportunity while managing risk.

The main outcomes of the industry-level analysis are as follows. The financial sector has a high level of data risk but is generally controlling such risks effectively, with the exception of “biased inferencing.” In the healthcare sector, people show the highest consensus on the benefits of data use. However, this sector is evaluated as having a low level of data utilization and data protection, and therefore requires the building of data infrastructure to reinforce both data utilization and data protection. In the logistics sector, data collection and utilization are the most active data-related activities. However, the level of risk management is evaluated to be relatively low, mostly due to the many SMEs without data risk management capability. This sector requires the building of risk management capabilities for all of its players.



Key word

Data risk, privacy/data protection, data risk management

A study on the strategy for promoting integrated data market

Researchers: Joonmo KANG, Kyunghoon KIM, Sungwook YOON, Joonbae LEE, Jaeyoung JANG,
Jung Sook OH, Kyung Eun LEE, Young Jong LEE, Eun-Min LEE

● Purpose of Research

With the advent of the data economy, data is now recognized as an element of production alongside the three traditional elements (land, labor, and capital). The need for the sharing and reuse of data is growing, but firms are finding it difficult to engage in data transactions. This study aims to do three things: 1) analyze Korea's data transaction environment in three parts (market environment, legal system environment, and policy environment) and ascertain the obstacles to data transactions; 2) explore the need for and policy validity of a public sector-led, data transaction system as a means of revitalizing data transactions; and 3) propose an ideal data transaction platform that reflects the characteristics of data transactions and the market.

● Main Outcomes of Research and Policy Implications

Korea's data transaction market is plagued by systemic problems caused by its small scale (inefficiency, inadequacy of data capability, obscure laws, immature perception of data utilization, etc.), which lead to functional problems such as: lack of supply and demand for data products; difficulty in making decisions on quality, standardization, and pricing; and complicated transaction contracts. When considering Korea's level of data capability, such problems cannot be resolved in the short term solely through the market: regularly-provided government support is required to facilitate data transactions. There are two methods of government intervention that we can consider: 1) the establishment of a single data transaction supervisory body to oversee the transaction system and provide assistance for functional issues when necessary and 2) the creation of a new public data market that is authorized to provide support for data transactions.

In the case of the latter, a data market could serve as the basis for not only solving functional issues but also enhancing human capital and providing research funding for the fundamental strengthening of Korea's data utilization capabilities. To make this possible, this study proposes supplementing data transaction supervision with functions such as the mediation of data solutions and a community function as well as the designing of a system for the implementation of such functions.

The outcomes of this study can be used to determine the policy stance that the government should take on data transaction revitalization and create a basic model for a government-directed integrated data transaction platform.



Key word

Data economy, data value chain, data transaction, data market

Research on ICT-Based Solutions to Social Issues

Researchers: Seong Eun CHO, Hoyeong LEE, Wontae LEE, Jung Wook MOON, Ahram MOON, Eunjeong KWON, Sijik LEE, Gimun YANG, Sunmin JUNG, Sunyoung HWANG, Daseul OH, Tae-oh KIM, Seung-yong RHO, Hyeon-suk LYU, Ho Young YOON, Inkwan CHUNG, Seulki CHOI, Joon HAN

● Purpose of Research

Because artificial intelligence (AI) technology becomes more complex and uncertain the more it is studied, it is not easy to completely understand its outcomes or conduct feasibility assessments. In the early stages of AI development, as long as the outcomes were positive, it was not regarded as very important to understand the processes/standards by which such outcomes were gained or the technologies that gave rise to them. Now that AI has become an integral part of daily life, however, social demand for better understanding of its social impacts and the making of relevant laws and regulations is growing. Given that AI-based technologies and services are being commercialized for mass production instead of being made the subject of research by a small group of experts, the creation of a safe AI environment has become essential for the good of future generations. This study aims to identify the policy issues and tasks that are necessary to ensure safety and trustworthiness for the AI-based society of the future. In other words, it aims to present the policy issues and tasks that are needed to respond to AI-driven social change, maximize opportunities, and enhance our ability as a society to respond to the adverse effects of AI.

● Main Outcomes of Research and Policy Implications

This study was conducted as multiple research projects with the goal of creating a policy roadmap for the realization of a safe AI society. First, it explored the stances on AI policies currently being taken by other countries, through which a list was made of key policy areas. An analysis was done of social issues mentioned in newspaper articles on AI to get a comprehensive sense of Korea's strategies and status of social discourse on AI. Second, an in-depth study was carried out of the major issues that arise from an AI society. Focus was given to issues related to algorithms, the driving mechanism of AI algorithm-based platform labor, as well as the exploration of policy-based response to make this study a means of preemptively securing the safety of platform labor and minimizing any systemic gaps. The designing of a legal system for preventing cyber threats and preemptive response by the new AI-based social system to prevent social inequality and digital alienation were also discussed. Third, basic research was done on applying systems (e.g. concepts, governance, systems, and legal grounds of AI social impact assessments) as a means of systemizing social consensus mechanisms (social discourse and stakeholder mediation processes). Fourth, this study proposes the restructuring of the government's role based on future changes in the scope of personal space and local communities.

Based on these outcomes, this study came up with several mid- to long-term policy agendas:

1) response to changes in employment/labor structures in the AI era, 2) innovation of AI-based public/administrative services, 3) realization of ethical AI, 4) response to latent threats/issues of AI technology, 5) privacy in the AI era, 6) digital inclusiveness in the AI era, and 7) miscellaneous policy issues of the AI society. These agenda were used to develop 10 to 15 policy initiatives, whose priority was determined based on prior literature and expert surveys, and a mid- to long-term roadmap for realizing a safe AI society.

This study is a precedent study that can help develop the social resilience and durability that will be required to effectively respond to the latent threats we may face while living in an AI society. It aims to anticipate/predict the threats that can be caused by AI, initiate social discourse on responses to such threats, and provide basic data for the designing of policies when such latent threats emerge as concrete social phenomena.



Key word

AI society, transparency, safety, AI ethics, AI

Base Study for ICT Regulatory Reform

Researchers: Joonmo KANG, Jeong-Eon Kim, Yuri Park, Hakki LEE, Jung Wook MOON, Jung Sook OH, Sijik LEE

● Purpose of Research

This study has two aims: 1) create a systemic foundation for revitalizing new ICT industries by conducting a legal review and coming up with tasks related to the Ministry of Science and ICT (MSI)'s regulatory overhaul and 2) provide assistance for the MSI's regulatory cost management system in the ICT sector by analyzing regulatory cost benefits (according to enacted/amended ICT regulations), reviewing/revising the regulatory impact assessment form and regulatory cost analysis form, and revising the MSI's manual on the regulatory cost management system.

● Main Outcomes of Research and Policy Implications

This study is comprised of three parts: impact assessment and cost analysis of ICT regulations, assessment of costs related to MSI-led regulatory overhaul, and editing/revision of the MSI's manual on the regulatory cost management system.

First, the regulatory impact analysis was tested for 10 regulations of eight laws that were introduced in actual regulatory inspections: 1) mandatory installation of viewers' committee as outlined by the Internet Multimedia Broadcast Services Act; 2) mandatory installation of users' committee as outlined by the Broadcasting Act; 3) expansion of the container port's electromagnetic wave measuring frequency range, creation of new product categories, and change of receptivity assessment standards; 4) authorization of the manufacturing of electromagnetic wave-blocking devices; 5) standard/procedure for designating assessment institutions; 6) registration for damage reparation insurance; 7) carrying out of measures to secure the stability of value-added services of telecommunications businesses; 8) responsibilities related to registering members and protecting users; 9) suspension/elimination of the legal force of e-signature certificates and mandatory protection of facilities/data (e.g. protection of produced data); and 10) mandatory disclosure of data protection rights.

This study also produced three regulatory cost analysis reports on cost-reducing regulations to help create a standard for regulatory costs in three areas: standard for designating radio wave use fees, management of equipment necessary for adequacy assessment exams, and the Brain Research Promotion Act's standards for calculating costs and benefits.

Second, this study reviewed whether sunset regulations proposed in 2020 (for the purpose of providing funding for regulatory overhaul) were discontinued, modified, or continued and examined the validity of being classified as a sunset regulation. It also: found regulatory provisions applied to SMEs, came up with tasks for overhauling requirements imposed on small business owners

(regulation of area and type of facility, etc.), reviewed laws on the regulatory responsibility verification system for operational support for this system, created a pre-inspection form for the regulatory responsibility verification system, and reviewed the feasibility of ideas on regulations that were rejected (from among the regulatory reform suggestions submitted to the central government by citizens).

Finally, edits were made to the MSI's manual on the regulatory cost management system that reflect the most recent guidelines on writing regulatory impact analysis reports and outcomes of studies on cases of the regulatory cost management system and the calculation of regulatory cost benefits in the ICT sector.



Key word

Regulatory overhaul, regulatory impact analysis, regulatory cost analysis, manual on regulatory cost management system

General Report on “Creating an environment to protect users of an intelligent information society”: 2020

Researchers: Hoyeong LEE, Jung Wook MOON, Wontae LEE, Seong Eun CHO, Ahram MOON, Eunjeong KWON, Gimun YANG, Sa Hyuk KIM, Sijik LEE, Sunmin JUNG, Jihyeon CHOE, Daseul OH, Byoung Pil KIM, Yong Chan KIM, Kyung Tae MA, Sang Hyun MOON, Suebok MOON, Wookjoon SUNG, Seung Hyun YU, Yong Min RYU, Dohoon LEE, Sang Hyun CHO, Yongsuk HWANG

● Purpose of Research

This study, which is in its third year since starting in 2018, aims to develop grounds for user protection policy that reflects changes in the telecommunications environment of an intelligent information society. In the mid- to long-term, it aims to explore the principles and future direction of user protection. Based on these objectives, this study was conducted in four branches: 1) Building and investigating panel data of Artificial Intelligence(AI) system users, 2) Development and demonstration of a research methodology concerning the behavior of AI system users, 3) Building a network of user policy stakeholders in the intelligent information society, and 4) Development of ethical AI/data policies.

● Main Outcomes of Research and Policy Implications

The main content and implications of each branch of this study are as follows. First, the study provides a longitudinal and latitudinal analysis of a social survey that was conducted in 2020 (as in 2018 and 2019) on the impact of AI systems on users. It also provides grounds for policy-based actions based on analyses of quantitative data on user attitudes toward AI services and solutions (changes and segmentation of attitudes, degree of acceptance of data technologies, various issues related to the intelligent information society (e.g. privacy), etc.) through a nationwide panel. Second, a convergence research approach—namely, the combination of simulation testing, document analysis, and in-depth expert interviews—was taken to develop strategies to ensure algorithmic fairness in recommendation systems (which is responsible for automated decision-making). This resulted in a list of methodology/policy suggestions that can make recommendation systems fairer. Thirdly, this year, a user policy forum that was formed in 2018 was expanded into a public-private council for the protection of users of the intelligent information society. The council is a public-private partnership network made up of representatives from the public sector, the corporate sector, civic groups, and academia. It aims to represent the interests of all stakeholders and build consensus on the issue of user protection. The 2nd International Conference on the Protection of Intelligent Information Society Users was held to raise awareness of the social and policy implications of user protection and to create international rapport to cooperate in the domain of ethical AI policies.

We focus on the following two areas to make ethical AI polices more effective: 1) preventing infringements of potential users' rights through the creation of a safe intelligent information society

and 2) creating a better-connected environment in which everyone can enjoy the benefits of new technologies and play a role in the digital economy. This study can serve as a resource that heralds a turning point in user protection policy through its empirical analysis of socio-economic impacts resulting from the expansion of intelligent information technologies and services and the use of this analysis as the basis for proposing standards and future policy directions that protect users in intelligent information society.



Key word

Intelligent information society, user protection, algorithmic bias, AI, ethical framework

Building and Investigating the Panel Data of the Intelligent Information User: 2020

Researchers: Hoyeong Lee, Seong Eun Cho, Ahram Moon, Gimun Yang, Sunmin Jung, Da Seul Oh, Yong Chan Kim, Dohoon Lee

● Purpose of Research

This report is about the statistical analysis outcomes of the third year of the “Building and Investigating Data for Users of Intelligent Information Society” study, which began in 2018. Panel data was accumulated through face-to-face interviews of users of intelligent information technologies/services to assess their perception, attitude, and inclination to-ward using particular technologies or services, among other matters. This study aimed to investigate/analyze, by year, accumulated data on 1) users’ perception of their use of in-telligent information services and future technologies, 2) perception of the risks of intelli-gent information technologies/services, and 3) awareness of their rights through a national panel survey. The survey was used as the grounds for creating policies that are tailored to the needs of each user group (social class, age/generation, area of residence, etc.). This study also aimed to gain insights into users’ expectations and concerns for the future in a broadcasting/telecommunications environment that is changing rapidly due to the expanded use of AI and algorithms as well as changes in users’ awareness of their rights in order to find ways to incorporate such insights into user protection policies.

● Main Outcomes of Research and Policy Implications

A follow-up survey was conducted of the approximately 2,000 households accumulated as panel data in the study’s first year. This was accompanied by a special survey on new technologies that are the focus of policymaking and/or major environmental changes in consideration of the data-communications environment, which changes drastically by the year. The special survey is conducted with different questions each year: in 2018, the topic was AI speakers; in 2019, video services (e.g. OTT); and in 2020, ways in which contactless online services are used during the COVID-19 pandemic. Furthermore, an in-depth analysis was done of the relationship between increased social isolation due to COVID-19 and ways in which intelligent information technology services are used.

This study shows that the predictive regulatory approach has become a key aspect of digital receptivity policies due to the drastic changes in Korean society brought about by COVID-19. Given the difficulty of predicting directionality and high degree of need for expertise on intelligent information technologies, regulatory authorities must make con-certed efforts to improve their expertise, which can be done most effectively through a collaborative system with diverse outside resources that can supplement any deficiencies in the government’s capabilities (“collaboration” includes not only communicating outside personnel for capability building but also engaging in

cooperative projects with relevant institutions). Emphasis was also given to building the capabilities of media users. Efforts to improve one's digital skills should prioritize not only improving one's ability to adapt to the digital society but also gaining the ability to actively obtain benefits. Finally, educational programs designed for digital inclusion need to be restructured. Revitalizing large-scale, remote educational methods can increase the accessibility of digital inclusion programs as well as guarantee citizens' right to choose the best program for themselves. This study also proposes modifying digital inclusion programs for socially-underprivileged groups so that they can play a role in assisting the integration of such groups into society.



Key word

User protection, panel survey, users of intelligent information society, user rights, acceptance

A study on the method to correct the bias and ensure fairness of the recommendation system

Researchers: Wontae LEE, Yong-suk HWANG, Suebok MOON, Jae-Seon JEONG, Ji-Wan JEONG, Hyeon-Jeong HWANG, Ji Hyeon CHOE

● Purpose of Research

This study aims to achieve two goals in relation to recommendation systems: 1) conduct a conceptual and empirical exploration of bias adjustment and the guaranteeing of fairness and 2) develop a research methodology that is expected to be used frequently in the coming years. To achieve these goals, this study took multiple approaches: namely, a simulation testing-based engineering approach and non-engineering approaches (literature survey and in-depth expert survey). More specifically, a literature survey was conducted to ascertain the definition of a recommendation system and types/development and applied areas of algorithm-based recommendation systems, while a review of Korean and foreign case studies was conducted to explore systems and policies that can secure the fairness of actual recommendation systems. Existing studies on the fairness of recommendation systems were analyzed from three perspectives (subject, object, and group) to ascertain the prerequisites for securing fairness as well as the definition of fairness. Finally, this study used an in-depth expert survey on systems and policy recommendations as the basis for compiling a guideline on bias adjustment and guaranteeing the fairness of recommendation systems.

● Main Outcomes of Research and Policy Implications

This study used User-KNN and the SVD algorithm as the basis for an artificial recommendation system for a simulation-based experimental study in order to propose ways of adjusting the biases that occur in recommendation systems due to the imbalance of user group size. Virtually-generated synthetic data were applied to the system to ascertain differences in bias, which were verified with actual MovieLens data. The experiment's outcomes revealed that, when using an algorithm, the system provides a much broader range of recommendations than desired by the user, proving that biases can occur even when using an algorithm. This study came up with four methods of adjusting the impact of such biases: 1) preprocessing entered data, 2) cloning users to reduce bias, 3) adjusting the size of small groups, and 4) generating new user values. Furthermore, an in-depth expert survey was conducted to come up with a guideline for defining the concept of a fair recommendation system and how to reduce bias. Multiple experts pointed out the fact that there is no universal definition for algorithm fairness and that, in order to account for deviations, analytical methods need to be used broadly and in various ways. The experts also stressed that an overhaul of the recommendation algorithm needs to be approached through individual cases and that the relevant research methodology needs to be based on a multi-disciplinary (engineering and non-engineering) approach.

Ultimately, this study shows that the issue of the fairness of recommendation system algorithms needs to be monitored in a way in which the system provider does not damage the system's social value. Such preservation of the system's social value will require an ethical guideline and relevant policies.



Key word

Recommendation system, bias adjustment, algorithm fairness, simulation testing

The Socio-Cultural Impact of Using Algorithm Data

Researchers: Hoyeong LEE, Ahram MOON, Gimun YANG, Sung Hyuk BYUN,
Sang Hyun MOON, Seung Hyun YU, Yong Min RYU

● Purpose of Research

This study derived future scenarios for the intelligent information society that automated decision-making will create and reviewed the impact of the introduction of AI/big data/algorithm-based services on the future of media and intelligent information service users. It also aimed to ascertain the processes/methods by which decision-making technology is selected or operated based on the technology's fundamental traits and media service providers. Based on this understanding, the traits of the diverse sociocultural issues that arise from the use of algorithm-based automated decision-making technology were categorized, and the ways in which such issues can be diagnosed and addressed were explored.

● Main Outcomes of Research and Policy Implications

This study aimed to: 1) review the impact of intelligent information technology-based services on the future of user and 2) derive future user-related policy agendas by analyzing the sociocultural impact of algorithm-based automated decision-making.

To achieve this goal, this study developed four future scenarios based on two aspects: 1) extent of users' reaction to intelligent information technology and 2) the agent of the realization of an intelligent information society. Scenarios 1 and 2 are about users actively adopting intelligent information technology (Scenario 1: public sector is the key implementing agent of an intelligent information society; Scenario 2: private sector is the key implementing agent of an intelligent information society). Scenarios 3 and 4 are about users' passive selection of intelligent information technology (Scenario 3: realization of an intelligent information society led by the public sector, Scenario 4: realization of an intelligent data society led by the private sector).

This study also presented the basic principles and composition of the Automated Decision System (ADS) and diverse cases in which ADS has been used in media and non-media sectors and proposed relevant problems and their key issues. Especially in the media sector, three key issues were deduced: accuracy, trust and the transfer of value. Based on these issues, focus group interviews (FGI) were conducted to ascertain how ADS media is being used. The FGIs were then used as the basis for ascertaining what it means to use media based on optimum algorithms as well as the types of literacy support that are needed for the optimum use of ADS media.

Finally, this study examined the changes and shocks to our society caused by the dissemination of algorithm-based automated decision-making at the individual, public sector, private sector and international levels. This examination was used as the basis for reviewing the social and policy

alternatives that are needed (from the standpoint of governance) to minimize social side-effects and dysfunctions caused by algorithm-based automated decision-making.

The following is a summary of the two outcomes derived from the above research processes. First, there are four categories of policy agendas for users of the future intelligent information society: 1) privacy protection, ethicality/responsibilities of algorithms, and protection/use of data from the standpoint of user protection; 2) diversity, quality, and innovativeness of products/services from the standpoint of the user's available resources; 3) compensation and intellectual property rights of user labor from the standpoint of the relations between users and private companies; and 4) digital/algorithmic literacy education and alleviation of the digital divide/inequality from the standpoint of inter-user gaps. Furthermore, the development of industrial standards, human rights, and international cooperation were presented as important considerations for algorithmic governance, with four policy options (each of which is multi-layered and must be applied simultaneously with one another) proposed to review each of these areas: 1) improve social perception, 2) disclose the content and scope of the responsibility of the public use of algorithm-based decisions, 3) designate the rights and scope of algorithm regulatory supervision in the private sector (market), and 4) mutually align and relate algorithmic governance at the global level.



Key word

Future scenario, intelligent information society, Future prospects of user, sociocultural impact, algorithm, data

A Study on Enhancing the Competitiveness of the AI Semiconductor Ecosystem

Researchers: Kyunghoon KIM, Minsik KIM, Young-Jong LEE

● Purpose of Research

For artificial intelligence (AI) to be continuously used in various industries, the advancement of semiconductor technology is essential. As AI semiconductors are where AI ecosystems and semiconductor ecosystems intersect, strengthening the competitiveness of AI semiconductor ecosystems is the foundation for enhancing the competitiveness of AI technologies. Fortunately, the AI semiconductor market is still in its early stages, meaning that if Korea can dominate the market through policy efforts, it will be able to reform the current unstable industrial structure, which is oriented toward the memory semiconductor market, and strengthen national competitiveness in the long run. Therefore, the purpose of this study is to propose a policy plan for strengthening the competitiveness of the AI semiconductor ecosystem in Korea by analyzing the structure and characteristics of the AI semiconductor ecosystem and current status and cases of major domestic and foreign companies in the field.

● Main Outcomes of Research and Policy Implications

This study began by looking at each ecosystem of semiconductors and AI, and then defining and analyzing the AI semiconductor ecosystem, which is the focal point of both ecosystems. As a result, it was confirmed that foundries have become increasingly important in the semiconductor industry in recent years, while also recognizing the role and importance of AI semiconductors in the AI ecosystem. In other words, AI semiconductors are a means of promoting AI-based convergence and diffusion in all industries, and their importance is growing as system semiconductors used in existing terminals are increasingly converging with AI due to the expansion of AI's application beyond server and cloud infrastructure to mobile devices, cars, home appliances, and other various terminals (edge computing).

Next, this study predicted the development of AI semiconductor technologies by field and conducted a Delphi survey and focus group interviews (FGI) with experts to predict changes in the AI semiconductor market in Korea. Specifically, the Delphi survey was conducted to collect quantitative data, such as data on the current competitiveness of the AI semiconductor market in Korea and its expected market shares in 2022, 2026, and 2030. During the FGI, the results of the Delphi survey were shared and the experts' opinions on the current use of AI semiconductors in four major areas (industrial Internet of Things, servers, cars, and consumer devices), development scenarios, and policies for vitalizing Korea's AI semiconductor ecosystem were collected.

In addition, for the benchmarking of major AI semiconductor companies overseas, case analysis on the current status and development strategies of such companies was conducted. By dividing

foreign AI semiconductor companies into the data center and edge computing & terminal sectors, the current status, including company overview, investment, products, and performance, of three companies related to data center semiconductors and four companies related to the edge computing and terminal sectors were studied and analyzed.

Finally, the results of the above research were combined to present measures for establishing a virtuous cycle of ecosystems and provide support policies in order to strengthen the competitiveness of Korea's AI semiconductor ecosystems. This study was used as baseline data for establishing the "Artificial Intelligence Semiconductor Industry Development Strategy," which was jointly announced in October 2020 by the Ministry of Science and ICT and other relevant government agencies to provide opportunities to lead the AI semiconductor market.



Key word

Artificial intelligence (AI), semiconductor, AI semiconductor, intelligent semiconductor

Establishment of National Policy for Ethical AI

Researchers: Jung Wook Moon, Ahram Moon, Jeong Eon Kim, Si Jik Lee, Gi Mun Yang, Sun Young Hwang, Sun Yong Byun, Myoung jae Moon, Ji Weon Seon, Hyeong Joo Kim, Cheong Ho Lee, Bong Je Kim

● Purpose of Research

Along with the rapid development of AI technology, which is the driving force of the intelligent data society, and increased productivity/convenience achieved through its socioeconomic application, expectations for economic development and a better quality of life are increasing. On the other hand, the use of massive quantities of data and algorithms is giving rise to complex and diverse ethical issues, leading to more people voicing concern about AI's effects. To respond adequately to the negative effects of AI's proliferation, there needs to be an in-depth analysis of AI ethical guidelines, which are the subject of diverse international discourses. Just as important as finding a guideline that best suits Korea's AI policy is the establishment of a concrete implementation plan for all sectors. This study aims to propose short-term and mid- to long-term policies for the development and social receptivity to ethical AI. It also aims to develop a human-centric AI ethics policy while also proposing various concrete ways in which this policy can be implemented in all areas of life.

● Main Outcomes of Research and Policy Implications

By establishing 'National Guidelines for AI Ethics' that can be referenced throughout the processes of developing and using AI, this study aims to create an environment in all relevant industrial/economic sectors that is conducive to the self-regulation of AI while simultaneously increasing the social receptivity to new technologies. By creating a virtual cycle of AI industrial development (planning, developing, and use) that can be used to realize a "human-centric AI society" in which all Koreans actively use AI services, this study hopes to serve as a cornerstone for Korea's advancement as an AI powerhouse.

'National Guidelines for AI Ethics' present three principles and 10 key requirements for humanity, which is the highest value that should be upheld for "human-centered AI." In the process of developing and utilizing AI for humanity, the principles of 1) respect for human dignity, 2) common good of society, and 3) fitness for purpose should be observed. In order to abide by the three principles, the entire process of AI development and utilization should ensure ① human rights, ② protection of privacy, ③ respect for diversity, ④ prevention of harm ⑤ public good, ⑥ solidarity, ⑦ data management, ⑧ accountability, ⑨ safety, and ⑩ transparency.

The goal of 'National Guidelines for AI Ethics' can be summarized as follows. First, to realize a "human-centric AI," a basic ethical standard must be provided to all members of society (developers, suppliers, users, and public sector) that can be participated in for all processes, from the development of AI to its use. Second, this ethical standard should be presented as a guideline that

encourages voluntary participation, rather than as a coercive “law” with binding power, in order to create an ethics discourse that respects corporate autonomy, encourages technological development, and responds flexibly to technological and social change. Third, creating an autonomous regulatory environment in industrial/economic sectors has the dual benefit of not impeding AI R&D/industrial growth and not excessively burdening developers and suppliers.

‘National Guidelines for AI Ethics’ that can be designed as a set of general and universal principles can serve as the foundation for the flexible evolution of ethical guidelines per sector by serving as: 1) a reference model for AI ethical standards in diverse sectors and 2) grounds for the enacting of AI ethical standards per issue or sector. Furthermore, it can serve as an AI ethical platform by constantly being revised/updated—namely, by reflecting AI ethical issues as they arise alongside socioeconomic and/or technological change.



Key word

AI, AI society, ethical principles, AI ethics, human-centered

Strategies for Creating an AI Data Environment and Enhancing Korea's AI Competitiveness

Researchers: Joonbae LEE, Sungwook YOON, Kyung Eun LEE, Wonjun CHUNG

● Purpose of Research

With the growing trend of applying AI technologies to work tasks, there is increasing demand for processes that systematically collect necessary data, create data models, and reflect outcomes of such models in the data collection process. This study aims to: 1) identify and find solutions for the problems in today's AI data environment and 2) develop policy proposals based on feedback on the status and current problems of Korea's AI environment from AI and data experts.

● Main Outcomes of Research and Policy Implications

First, this study explores the latest trends of AI technologies and the areas to which such technologies have been applied, the definition of AI training data, Korean/foreign trends in open data, and status of policies that are being undertaken in Korea and overseas to create environments conducive to the widespread collection and use of AI training data.

Second, this study analyzes the elements of the legal system involved in creating an AI data ecosystem in Korea. The enactment of Korea's three major data laws (Personal Information Protection Act, Act on Promotion of Information and Communications Network Utilization and Information Protection, etc., and Credit Information Use and Protection Act) was a watershed moment for working-level efforts to create a data environment in Korea. However, there are still many obstacles to industrial development in the areas of voice recognition, data mining, and video processing.

Finally, this study conducted focus group interviews (FGI) to ascertain how citizens feel about the current status and (future) revitalization of Korea's AI data ecosystem and collect feedback on policies for revitalizing the AI data industry. Despite the fact that interest in AI- training data is currently being reflected in the government's policies on data creation, data users in the corporate and research communities insist that it is still very difficult to collect valid data. Policy alternatives, based on feedback from the FGIs, are as follows:

- Despite the enactment of Korea's three major data laws, all of which deal with data use, legal system uncertainties and fear of personal data infringement are making companies reluctant to open and use data. Systemic/policy-based improvement is thus crucial.
- From the perspective of increased welfare and alleviation of data asymmetry through data use, excessive protection of personal information is not a desirable option. There is thus a need to find a balance between protection and utilization.

- There is a need for systemic/technological foundations based on which individuals can voluntarily contribute data or transfer their data from one place to another. There also needs to be a system that guarantees benefits as compensation for providing data.
- Data accumulation should be understood as a continuous process in which data are accumulated according to the purpose of a particular study or area of research. Efforts must consistently be made to encourage communication among relevant players on everything from data collection to data use, depending on the characteristics of such data and/or research purposes.



Key word

AI training data, data ecosystem, data economy

A Study on medium and long term ICT policy in the post-COVID-19 era

Researchers: Yuri PARK, Kyoungsun LEE, Gae-Iyong CHOI, Yuri JO, Sungok KIM, Jaeyoung JANG, Kyoung Nam LEE, Jung Sook OH, Ka Nyeong SON

● Purpose of Research

After the COVID-19 pandemic comes to a close, the gap between countries that have digital capabilities and those that do not will grow larger with time. This makes the careful inspection of the environmental changes caused by COVID-19 in Korea and other countries an urgent priority, as are discussions on whether such change is conducive to our current policies and the direction that Korea's policy should take to strengthen digital competitiveness. Given these circumstances, this study aims to come up with the direction that Korea's ICT industry should take to dominate the digital economy through an analysis of ICT policy issues related to digital economy paradigm changes.

● Main Outcomes of Research and Policy Implications

This study is comprised as follows. Chapter 2 explores the changes brought about by COVID-19 in two categories: 1) changes in the socioeconomic environment and 2) changes in the ICT industrial environment. Chapter 3 explores the ICT policy issues that have emerged in Korea due to COVID-19 through the outcomes of expert surveys. Next, Chapter 4 analyzes policy issues (strengthened competitiveness of platforms, securing of competitive edge of core technological infrastructures, startup environment, response to changes in the global value chain, and reduction of the digital divide in the corporate world) of ICT industries that should be noted in the post-COVID-19 era. Finally, Chapter 5 offers suggestions for the direction that should be taken by Korea's mid- to long-term ICT policy.

This study can help determine the direction that policy should take to ensure the soft landing of the digital/platform economies, which have been growing at increasingly accelerated rates since COVID-19. It can also help in deciding the stance of preemptive response policies that can enable the post-COVID-19 ICT industry to serve as the driving force of Korea's economic growth.



Key word

Post-COVID-19, mid- to long-term ICT policy, platform, technological infrastructure

A Study of global issues related to digital platforms and research on policy directions

Researchers: Gae-Iyong CHOI, Minsik KIM, Sungok KIM

● Purpose of Research

This study analyzes: 1) the key global issues derived from the strengthened market dominance of global digital platforms and 2) trends in the Korean platform market/policies that are related to such global issues. Through such analysis, the study aims to come up with a policy stance that is most conducive to the development of the Korean platform market.

● Main Outcomes of Research and Policy Implications

To achieve this end, an analysis on mechanisms for strengthening the impact of global digital platforms was used as the basis for an analysis of resulting global issues, with a focus on the following four areas:

- 1) Fair competition in the digital platform market: analysis in terms of two perspectives on the anti-competitive impact that can bring about intensified market dominance of global digital platforms: dynamic (impact on technology innovation and emergence of new markets/industries) and distribution (distribution of values/rent that are created within platforms and between platform providers and participants)
- 2) Data policy: comprehensive review of user protection issues (infringements of privacy that occur alongside strengthened market dominance of digital platforms, etc.), access to data on global platforms, and issues related to data (e.g. data governance)
- 3) Analysis of issues brought about by the increased impact of global digital platforms on users and foreign markets (e.g. user protection, protection of domestic platforms)

This was followed by an analysis of the feasibility and appropriateness of diverse foreign policy proposals on the above issues with a focus on global issues related to the circumstances and policies of Korea's platform market.

Finally, the above analyses were used as the basis for a proposal regarding the policy stance that should be taken on the advancement of Korean platforms.



Key word

Digital platform, policy direction, fair competition, global issue

A study on the policy platform for promoting smart services

Researchers: Yuri PARK, Sungok KIM, Kyoungsun LEE, Kyoung Nam LEE, Yuri OH, Hyun Jin AN

● Purpose of Research

The need to convert services into smart versions is increasing due to the need to innovate traditional service industries. The transformation of traditional service industries into smart/more sophisticated versions of themselves through the use of advanced technologies could be crucial to solving the fundamental problems of Korea's service industry.

This study is about innovation mechanisms that exist across the entire policymaking process (creation of a policy platform for discussing issues raised by diverse on-site players in the smart service sector, using the platform to translate results into policies, etc.).

To achieve these goals, this study was divided into three working groups (digital healthcare, tech platform, and startup environment), based on which on-site feedback was obtained on problems of current policies and discussions held on methods of improvement. Each working group produced in-depth policy proposals based on a process made up of three steps: pre-survey of corporation(s), brainstorming, and creation of concrete agenda items.

● Main Outcomes of Research and Policy Implications

The digital healthcare working group came up with the policy agenda of “empiricization of digital healthcare service platforms for data-based innovation” to revitalize the digital healthcare industry and enhance user convenience, while the tech platform working group came up with the agenda of “private sector-directed application of AI and enhancement of support for AI” as a means of reviving the smart technology environment. Finally, the startup environment working group came up with a concrete policy proposal on “provision of support for service platform startups” for the purpose of revitalizing the service innovation sector.

By resolving existing problems through concrete policy agenda (based on discussions on policy platforms regarding issues posed by diverse on-site players in the smart service sector), this study can help enhance the competitiveness of Korea's smart services.



Key word

Smart service, policy platform, digital healthcare, tech platform, startup environment

2020 ICT Venture·Startup panel Data

Researchers: Yuri JO, Ka Nyeong SON, Jeahoon JEONG

● Purpose of Research

This study is a part of the “ICT Start-up Company Panel Data Construction Project for Analysis of Changes in the ICT Start-up Ecosystem” and aims to build an “ICT Venture Start-up Panel” that tracks the history, behavior, and performance of innovative start-ups in the domestic ICT sector on an annual basis. The domestic start-up ecosystem has recently undergone significant change. However, as the statistical indicators of domestic start-up companies are mainly composed of cross-sectional data at a specific point in time targeting venture companies, they do not fully reflect long-term changes. Given the growing need to secure dynamic data on innovative start-up companies in order to support effective start-up ecosystem research and related policymaking efforts, this study intends to build panel data by collecting multifaceted data on a company-by-company basis.

● Main Outcomes of Research and Policy Implications

The panel survey is conducted by dividing the population into venture companies and start-ups in order to understand the characteristics of innovative ICT start-ups in a multifaceted manner. In addition, multi-faceted data from various sources, such as general corporate information, tracking information, surveys, financial accounting, and intellectual property rights, are collected so that the actual life and death and qualitative and quantitative information of the companies can be identified.

In 2020, the second year of the panel survey, a follow-up study, survey, collection of financial accounting and intellectual property data, weight model development and calculation, and data integration were performed. The panel tracking principles, data structure principles, and data collection principles were established and followed. As a result of the data collection, it was found that 40 out of 1,558 companies in the panel sample deviated, and out of 1,518 valid samples, the survey collection rate was 61.7%, the financial accounting data collection rate was 93.7%, and the intellectual property data collection rate was 99.9%.



Key word

ICT, ventures, start-ups, panel survey

The comprehensive study of Korea ICT Entrepreneurial Firms

Researchers: Yuri JO, Ka Nyeong SON

● Purpose of Research

This study was conducted to derive policy implications for the domestic start-up ecosystem by using the data of the 2019 ICT Venture Start-up Panel Survey to assess the current status of domestic ICT venture and start-up companies, and compare them with overseas start-ups. This is a detailed research project of the “ICT Start-up Company Panel Data Construction Project for Analysis of Changes in the ICT Start-up Ecosystem” and provides a comprehensive view of the current status of ICT start-ups in Korea by using the microdata of companies collected for the panel survey.

● Main Outcomes of Research and Policy Implications

This study can be likened to an encyclopedia of domestic ICT start-ups as of 2019. It provides a wide range of detailed data on ICT start-ups, from simple statistics such as the type of industry and history of domestic ICT start-up companies in 2019 to the distribution of business size, entry into domestic and overseas markets, and whether companies benefit from government support. In addition, by analyzing panel data spanning a period of four years, this study looks at the growth and change of ICT venture companies, and tries to provide a balanced view of their extinction and decline by classifying the types of business closures. In addition, policy implications for the domestic ICT start-up ecosystem are derived by drawing comparisons with foreign data. As a result of examining the overall landscape of domestic ICT start-up companies in 2019, the most striking finding is the emergence of a new group of companies that cannot be captured by only a venture company survey and rise of start-ups pursuing high-risk, high-growth businesses based on investment. It was also found that domestic start-up companies receive small-scale investment more frequently than foreign companies despite their short business history, which is deemed to be a problem stemming from the domestic system’s emphasis of young companies. By analyzing the changes in domestic ICT venture companies over the past four years, this study confirms the low closure rate and increase in corporate heterogeneity. Accordingly, the start-up policy needs to be reformed in consideration of corporate heterogeneity, moving away from the “one-size-fits-all” growth support policy.



Key word

ICT, venture, start-up, company analysis, international comparison

An empirical study on the ICT venture ecosystem using the ‘ICT Venture Panel (2016~2018)’

Researchers: Hakki LEE, Kang Hyuk GOH, Dong Hyun OH, Ki Young JEON

● Purpose of Research

This study is a specific research task of the “ICT Start-up Company Panel Data Construction Project for Analysis of Changes in the ICT Start-up Ecosystem,” through which the ICT venture panel that was developed for three years, from 2016 to 2018, is made public. This study applies quantitative techniques to this panel data in order to analyze and validate the results of ICT venture companies and the effectiveness of government support policies.

This study was designed to promote the usability of the ICT venture panel by disclosing the panel data and conducting empirical analysis using the disclosed data as well as to contribute to the expansion of the research base in related fields.

● Main Outcomes of Research and Policy Implications

Chapter 2 of the research report touches on the structure of the ICT venture panel and explains unidentified variables for the disclosure of data. Chapters 3 through 5 use the ICT venture panel to demonstrate and analyze the performance of domestic ICT venture companies. Finally, Chapter 6 summarizes the results of the study and discusses policy measures for strengthening the competitiveness of the startup ecosystem based on the results obtained through this empirical study.

The results of the first empirical analysis of efficiency showed that ICT venture companies lacked efficiency but were improving, and most of them were growing in size. The results of the second empirical analysis showed that the closure rates and business performance of ICT venture companies were not affected by government support in a significant way, which is in line with previous studies conducted abroad. The last empirical study looked at changes in the effects of government support by growth stage and found that the effects of government support differed depending on how the growth stages of ICT venture companies were categorized. When the stages were categorized based on firm age, R&D support boosted revenues, while financial support increased employment.



Key word

ICT venture panels, ventures, empirical research

The Role of the ICT According to the Paradigm Shift in Disaster Response and the Policy Implications

Researchers: Wontae LEE, Yong Chan JUNG, Wook-Jei SUNG, Kyunghoon KIM, Heeyong NOH, Sa Hyuk KIM, Seong-gyoon PARK, Sijik LEE

● Purpose of Research

The purpose of this study is to propose ways in which the roles and utility of ICT can be maximized for the prediction of and effective response to disasters and crises (such as COVID-19). The task of identifying such ways involves not only the transition of traditional disaster response systems (for natural disasters, etc.) to ICT-based systems but also efforts to come up with ICT policy initiatives for effective response to new forms of complex disasters after the COVID-19 pandemic (infectious disease, climate change, digital/cyber disaster, etc.). This study serves not only as basic research on the role of ICT in the early discovery of, response to, and recovery of damages caused by new kinds of risks (particularly complex social disasters) but also, from a mid- to long-term perspective, as a source of suggestions for comprehensive, ICT-based response strategies for large-scale disaster/crisis situations.

● Main Outcomes of Research and Policy Implications

This study covers several points: 1) the COVID-19 pandemic is an amalgam of multiple types of disasters (natural, social, digital, etc.) that has the characteristics of a complex social disaster, the most prominent of which is a domino-like proliferation capacity, 2) the extent to which ICT was applied to COVID-19 response brought about drastic differences among advanced countries in the effectiveness of sanitation/disease-fighting measures, 3) there needs to be ICT response in five categories (AI, blockchain, big data, 5G, and fake news) in order to adequately respond to the diverse complex social disasters that are expected to occur after COVID-19 is brought under control, and 4) the basic stance of mid- to long-term ICT policy on responses to complex social disasters is rooted in the comprehensive disaster management platform, which is based on intelligent data technologies (e.g. digital twin). Sub-tasks are also proposed for the concrete implementation of the above points.

By proposing strategies for maximizing the utility of ICT technologies, which are useful for the effective, preemptive response to complex social disasters in a way that moves away from the current method of follow-up disaster management to a data-based, preventative, and preemptive response method, the outcomes of this study can contribute to the building of a comprehensive, ICT-based disaster response system. Furthermore, by not being limited to an ICT-related area but rather utilizing and converging expertise from diverse sectors (economy, society, mass media, etc.), this study can help create a research system for ICT-based disaster response.



Key word

COVID-19, disaster response, disaster response paradigm, disaster management, ICT policy

2

ICT Data
Science
Research
Division

A Study on Hegemonic Competition to Dominate Emerging ICT and Its Ripple Effects on Korea's Domestic Economy

Researchers: Dong-Whan KO, Wookjoon KIM, Eunyong LEE, Dongnyok SHIM

● Purpose of Research

The US-China trade dispute and competition over technology have already emerged as a major cause of risk and uncertainty, not just for the two countries directly involved but also for the external conditions of countries around the world. Such conflict is centered around new ICT, which means that it is expected to have a significant impact on Korea due to the country's heavy reliance on the ICT industry. Against this backdrop, this study focuses on the possible impacts that the hegemonic competition over ICT among major countries may have on Korea in terms of restrictions on foreign investment and changes in the global value chain (GVC). Therefore, this study conducted a quantitative analysis on such impact on Korea's industry, especially on total factor productivity (TFP), using the panel regression model.

● Main Outcomes of Research and Policy Implications

This study analyzes the direct and indirect impacts of the hegemonic competition over ICT on Korea's industrial TFP. To this end, the present paper considers restrictions on foreign direct investment (FDI) and changes in the GVC as major channels through which the competition affects Korea's ICT industry. This is because such competition could induce inefficient resource allocation and hence productivity by limiting the movement of physical and human resources. In theory, less FDI and a weakened GVC could have both positive and negative impacts on countries' productivity, depending on the situation of each country, calling for empirical analysis.

Forward and backward GVC participation by industry, industrial sensitivity to foreign demand, and outward foreign direct investment (volume and number of companies) are used to measure the changes in the GVC and restrictions on investment. Firm-level total factor productivity, which is unobservable, is estimated using the data of the Business Activities Survey from 2006 to 2018 based on Akerberg et al. (2015). Industrial TFP is computed by averaging firm-level TFP by industry. Moreover, industrial intellectual property and R&D investment are also considered to control the heterogeneity of industries' technological capabilities.

According to the estimation results of the static panel model, an industry's productivity has a positive correlation with GVC participation, sensitivity to external demand, and amount of FDI. In other words, the more closely an industry is connected to the GVC, the more sensitive it is to external demand, and the larger the amount of FDI, the higher the industry's productivity. Such results remain robust when accounting for methods of estimating productivity and the dynamic model.

In the meantime, it was found that the effect of sensitivity to external demand and outward FDI on an industry is negatively related to its R&D intensity. Therefore, if the GVC is reshaped in a way that lowers the dependency of added value on foreign markets, the revitalization of domestic R&D is expected to offset the decrease in industries' productivity. In addition, the negative impact of companies going abroad can be reduced through R&D as well.

This empirical analysis has several policy implications. Other than the direct path by which R&D investment impacts productivity, the GVC and FDI are indirect paths that can impact productivity. Therefore, they are worth considering as policy tools for responding to the hegemonic competition over ICT. Previous studies suggested reshoring and GVC diversification as solutions, but these are excessively long-term responses and are insufficient to respond to the rapidly changing global environment.

**Key word**

ICT, hegemonic competition over technology, restrictions on foreign investment, total factor productivity, GVC participation level, foreign direct investment

A Study on Improving Labor Market Participation of Women with Career Break in ICT Field

Researchers: Jieun CHOI, Sae Ran KOH, Yoonsuk OH

● Purpose of Research

This study aims to gain understandings of the opportunity cost incurred by career breaks in the ICT industry. To address this, this study examines wage loss using a propensity score model and analyzes the determinants of reemployment of women in the ICT industry.

● Main Outcomes of Research and Policy Implications

According to the human capital theory, depreciation of human capital during the period when labor activity is suspended results in a decrease in productivity, which can explain the decline in wages of women with career breaks. In addition, in returning to the labor market, it is known that wage loss occurs due to transitioning to a career different from one's previous career or shifting to a low-wage job.

In the ICT industry, technology changes rapidly, which can reduce the accumulated value of human capital much more than in other industries. On the other hand, the vocational education and training of workers to respond to changes in ICT technology may be relatively active, allowing workers to catch up with their skills rather quickly.

This study empirically analyzes wage loss to understand the opportunity cost incurred by career breaks in the ICT industry and looks at the determinants of reemployment of women in the ICT industry. To this end, we surveyed 800 women to collect the necessary data and empirically examined the data to estimate the wage loss of women with career breaks in the software/ICT service industry and identify the factors affecting how long it took for them to be reemployed.

Employing a propensity score model and survival analysis, we find no evidence of wage loss for women with career disruptions in the ICT industry, unlike other industries. In other words, when a woman returned from a career break in the software and ICT service industries, no evidence of opportunity cost or wage loss resulting from the depreciation of human capital was found. This shows that women in the ICT industry are likely to have a relatively higher economic status than women in other industries if they return to the labor market after a career break. To be sure, further analysis is needed regarding changes in labor market outcome variables in other aspects such as turnover, promotions, and wage growth of women with career breaks in order to estimate the opportunity cost for women who take career breaks in the ICT industry. The survival analysis confirms that the characteristics of jobs women had at the time they took a career break can affect their reemployment decision.

Altogether, our findings suggest industry-specific policies for female workers can help women return to the ICT industry. For instance, it is important to establish policies based on the unique characteristics of industries to prevent career disruptions, strengthen vocational training, and provide opportunities for women to rebuild their careers.



Key word

ICT, female employment, career break, PSM, wage loss, survival analysis

Big Data Analysis and Forecasting Model for ICT Policy Support

Researchers: Yong Chan JUNG, Dong-Whan KO, Dongnyok SHIM, Sunsil YU, Buyeon JUNG, Sun-Hee LEE, Heeyoon RO, Jong Ho IM, Hyun Hak KIM, Ki Jun LEE, Seong Gook KANG, Han Seung LEE, Young Ho SON

● Purpose of Research

Establishing evidence-based policies and planning predictive policies has been highlighted in the ICT sector due to the expansion of economic and social volatility and uncertainty and the increased complexity of government issues. Accordingly, this study aims to identify issues in the ICT field early and supplement traditional econometric prediction models by utilizing unstructured text data, which has been emerging as a new source of information.

● Main Outcomes of Research and Policy Implications

In the research of methodology of ICT issue identification and analysis using text data, text data from analysis reports listed in the ITFIND, a database of data collected from the domestic and global IT industries, were used to evaluate the usability of text data in analyzing ICT issues. Frequency analysis, network analysis, and topic modeling were applied to gauge the possibility of using text data in identifying and analyzing recent ICT issues. In addition, the impact of the escalating US-China trade dispute on the domestic ICT industry was analyzed retrospectively using text data from major foreign newspapers mostly in the US and China. The results showed that big data analysis on news by nation was able to detect signals related to conflicts between nations. Of particular note, the study found that, in the case of disputes and events involving international conflicts, discourse related to justification tended to spread continuously via news media. This study is thus significant in that it uses news from the US and China to identify the paths by which the national interests of the two countries can affect Korea's ICT industry.

In the research on the development of a methodology for forecasting ICT exports based on structured and unstructured data, online news articles were broken down by demand, supply, and competitiveness and translated into indices using machine learning and word dictionaries. Ratio estimation was then applied to forecast the volume of ICT semiconductor exports, resulting in excellent forecasting capabilities on a quarterly basis. When analysis based on the combination of structured and unstructured data was performed, some models that adjusted the ratio at which unstructured data were utilized showed a significantly better forecasting capability than models that relied only on structured data.

In the study on the development of machine learning-based forecast models for demand for higher education by department, taking demographic changes into account, employment statistics of graduates for each higher education institute and research data from businesses across the nation

were utilized with the help of machine learning to forecast the demand of each department of higher education in industries. Given that research on demand forecast in the field of education is insufficient, this study is meaningful in that it applies a new big data forecasting methodology and analyzes the industry demand of specific major and subdepartment.



Key word

ICT, big data, issue search, export forecast, education demand forecast

A Study on the Data-driven Future Forecasting and Policy Support Project of NRC(National Research Council for Economics, Humanities and Social Sciences)

Researchers: Yong Chan JUNG, Dongnyok SHIM, Yoonhwa KIM, Heetae CHUNG

● **Purpose of Research**

This study was carried out to derive implementation strategies for successfully pursuing the “Data-based Future Prediction and Policy Support Project,” which the National Research Council for Economics, Humanities and Social Sciences has been conducting since 2018. This study was proposed to support anticipatory governance for uncertain changes in the future and consists of the establishment of the Council’s data analysis platform and topic-based analysis (scenario and model building).

● **Main Outcomes of Research and Policy Implications**

In Chapter 2, this study presents implications derived from the benchmarking of domestic and international cases for the purpose of devising strategies for the construction of a data analysis platform for the Council. In Chapter 3, the data analysis platform requirements of the Council are divided into data-sharing strategies, definitions of system establishment scope, physical installation of the big data platform, and requirements for data analysis solutions, as well as portal system work requirements. Chapter 4 presents a guide for building a data analysis platform for the Council, while Chapter 5 proposes a plan for converting an operating system for the data analysis platform and a plan for the mid-term development of a big data platform.

If the data analysis platform is successfully established based on the implementation strategy proposed in this study, it will certainly contribute to transparent and scientific administration by reducing subjective policy enforcement in the decision-making processes of the government and supporting policy-making based on objective data, which will narrow the gap between policy research and policy execution



Key word

Data-based Future Prediction and Policy Support Project, anticipatory governance, big data platform

Research on System Improvement to Become a Leader in The Field of Intellectual Property

Researchers: Hakki LEE, Wonjun CHUNG, Jingeun JEONG, Seungu SON, Jinwon CHOI, Juhwan KIM, Sangyug CHA, Wono KIM, Jeonghun LEE

● Purpose of Research

Recently, the revitalization of intellectual property activities and quality improvement of intellectual property has emerged as crucial factors for innovative growth to break away from the low growth of the Korean economy, which has been affected by the weakening of flagship industries at home caused by the slowdown of the global economy. Although Korea invests a large amount of money in research and development every year, the quality of its intellectual property has fallen short and has not been systematically linked to industrial growth. Therefore, to respond to the rapidly changing global environment, it is necessary to address the problems with the country's intellectual property system and support the establishment of well-organized strategies.

Therefore, this study aims to objectively and comprehensively diagnose the problems of the current intellectual property system in order to enhance national IP competitiveness and prepare countermeasures by identifying obstacles at the national strategic level.

● Primary Outcomes of Research and Policy Implications

This study intends to diagnose the current status of Korea from the perspective of the entire intellectual property cycle (creation, utilization, protection, and building of foundation) and derive reasonable measures for improving relevant institutions to secure national competitiveness in intellectual property. To that end, literature-based research was conducted by analyzing domestic and overseas literature and collecting professional advice, along with the collection of opinions from professionals, by operating research teams, resulting in crucial policy agendas and specific recommendations. Of particular note, this study identified key agendas under the grand theme of measures to create high-quality intellectual property in terms of the quality of technology and applied patents and new intellectual property rights and copyrights to respond to future intellectual property issues.



Key word

Intellectual property, technology quality, quality of applied patents, new intellectual property rights, copyrights

A Study on the Planning and Improvement of ICT Statistics System in 2020

Researchers: Hyun-Joon JUNG, Gae-Iyong CHOI, Jeong-Eon KIM, Yong Chan JUNG, Dong-Whan KO, Jieun CHOI, Nyeong Seon SON, Hakki LEE, Sunsil YU, Wookjoon KIM, Sun-Hee LEE, Woocheol SHIN, Yoonsuk OH, Eunyoung LEE, Seung Hee HA

● Purpose of Research

With the role of ICT and technology now in the spotlight in relation to the acceleration of the Fourth Industrial Revolution, the accurate and timely production and analysis of ICT statistics that can measure the market's status and future direction is required. This study presents directions for improving the ICT statistics production and analysis system in order to make it more accurate and timely, enabling effective response to the rapid evolution of the ICT market.

● Main Outcomes of Research and Policy Implications

To address these issues, this study suggests adding planning and coordination functions to the current ICT statistics production system, efficiently relocating existing statistical surveys through the status analysis of individual statistics, and introducing an evaluation system to boost the use and reliability of existing ICT statistics.

The overview of this study is as follows. Following the introduction in Chapter 1, Chapter 2 examines the main directions for improving the ICT statistics system and summarizes the status of support for the operation of the system. Chapter 3 summarizes the results of ICT statistics system planning and production support for ICT statistics development, including the operation of an integrated population for ICT statistics, revision of the ICT integrated classification system, building and operation of microdata, improvement of the ICT statistics production system, preparation of ICT statistical notebooks, and provision of support for the management of statistics supplied by international organizations. Chapter 4 provides a summary of the support for and results of the ICT statistics approval system toward improving ICT statistics quality. Chapter 5 presents the results of expert surveys on major issues and organizes the results as discussions and prospects for the development of ICT industries that have grown in importance. Chapter 6 describes the diagnosis of the ICT statistics system and the results of major evaluations. Chapter 7 summarizes the results of the ICT industry employment analysis, while Chapter 8 analyzes trade-related issues of the ICT industry. Finally, Chapter 9 introduces the operational status of the ICT statistics portal toward increasing the use and promoting the expansion of ICT statistics.



Key word

ICT statistics, improvement of statistics production system, ICT employment, statistics approval, approval of statistics changes, ICT statistics portal

Construction and Operation of ICT Integrated Population

Researchers: Hyun-Joon JUNG, Woocheol SHIN

● Purpose of Research

In the past, the Ministry of Science and ICT had to build a separate population for each statistics agency and conduct research to produce statistics, which posed problems in terms of overlaps and limits of statistical comparison. This raised the need to conduct a study for the purposes of aligning the scope of research on different ICT statistics and addressing overlaps between statistics while making it easier to compare different statistics. Therefore, an ICT integrated population that corresponds to data in an integrated classification system collected since 2017 was built and put into operation with the aim of applying it to all ICT statistics surveys conducted by the Ministry of Science and ICT, pursuant to the ICT Statistics Survey Implementation Plan.

● Main Outcomes of Research and Policy Implications

The 2020 ICT integrated population consists of six files in total, providing 188 basic variables. The files include a list of companies, reference list of companies surveyed by the Ministry of Science and ICT, list of newly-established companies, list of special/additional communications companies, and data on company characteristics (closures, SME status, utilization of Fourth Industrial Revolution technologies). The ICT integrated population (2020) contains a total of 78,363 companies from among major industries, with information and communications broadcasting device companies accounting for the biggest proportion at 42,983 (54.9%), followed by software at 27,479 (35.1%) and information and communications services at 7,901 (10.1%).

The construction and operation of the ICT integrated population is expected to improve the quality and use of statistics by making ICT statistics easier to compare with each other and more consistent. Moreover, it is expected that the ICT integrated population will be widely used for statistics in emerging ICT industries that are being created in response to new needs of the government and private sector while also serving as a benchmark for the statistics management systems of other government agencies.



Key word

ICT integrated population, ICT statistics, sample design, statistics management, statistics quality

Improvement for Approval of ICT Statistics

Researchers: Nyeong Seon SON, Hyun-Joon JUNG, Sunsil YU

● Purpose of Research

Surveys of unapproved ICT statistics are conducted to identify the sizes of emerging markets and needs in the ICT sector as well as to formulate and support policies to promote the industry. Such statistics surveys are indeed necessary given the characteristics of new industries, but a comprehensive assessment of the overall survey management system regarding issues of overlap with existing ICT statistics and quality management across the entire survey process is required. In addition, surveys of approved ICT statistics need to be altered frequently to reflect the rapid changes occurring in the industry, resulting in the need for frequent approvals for statistics alterations. When a statistics alteration is approved, it needs to be reviewed from the perspective of the standardization of the ICT statistics system, review of duplicate statistics, and alternation necessity.

● Main Outcomes of Research and Policy Implications

Reflecting the new ICT statistics approval environment resulting from the completion of the quality assessment of unapproved statistics conducted from 2016 to 2018, this study expanded the scope of research to include support for the approval of unapproved ICT statistics as well as the approval of ICT statistics alterations.

Chapter 1 summarizes the background and system of research, while Chapter 2 deals with the national statistics approval process broken down into new approval and alteration approval. Chapter 3 gives an overview of the planned approval of statistics for 2020 and describes the approval process and results. This chapter also includes follow-up measures and future directions for approvals. Chapter 4 outlines the history of approved statistics alterations and reviews duplicates by type of statistics. Finally, Chapter 5 deals with research outcomes and measures for improvement.



Key word

ICT statistics quality assessment, new national statistics approval, approval of national statistics alteration

ICT Sector Microdata Construction for Analysis

Researchers: Nyeong Seon SON, Hyun-Joon JUNG, Jieun CHOI, Eunyoung LEE

● Purpose of Research

As there is a mounting need for polices to respond to the Fourth Industrial Revolution and expanded ICT statistics services centered on users, the establishment and operation of microdata is also growing in importance. The provision of microdata entails the conflicting values of “data utilization” and “data protection.” In other words, when the data utilization is valued, there is a bigger exposure risk of microdata, while there is a risk of data loss when data protection is prioritized. As society becomes increasingly data-driven, research on how to build and operate microdata is becoming more and more pivotal. Therefore, this study aims to provide ICT statistics microdata through research on the exposure risk assessment of ICT statistics and de-identification.

● Main Outcomes of Research and Policy Implications

This study first looked at the theoretical background of exposure control of microdata for ICT statistics by researching methods of statistical exposure control, which was followed by an assessment of the exposure risk of 21 types of microdata statistics. By doing so, the need to de-identify data was reviewed. The exposure risk of de-identified statistics was re-assessed to build microdata for ICT statistics.

The increasing provision of microdata for ICT statistics is expected to contribute to the utilization of national statistics in the era of the data economy. The ICT sector is characterized by rapid technological advancement and plays a central role in convergence between industries, leading to growing demand for microdata for ICT statistics in various areas. Therefore, microdata will make a huge contribution to the decision-making of businesses, government, and academia. This study looked at methods of assessing statistical exposure risks and exposure control related to the provision of microdata in order to sufficiently reflect data protection concerns in the data economy and applied such methods to 21 types of ICT statistics. The research outcomes are expected to serve as a guide on the appropriate use of microdata that will become available in the future.



Key word

Microdata, ICT statistics, exposure risk assessment, de-identification

ICT Statistics Evaluation and Support for Improvement

Researchers: Jieun CHOI, Hyun-Joon JUNG, Nyeong Seon SON, Sun-Hee LEE, Eunyoung LEE, Seung Hee HA, Eunjin JEONG, Yonghee LEE

● Purpose of Research

With the aim of improving the ICT statistics system, this study derives improvement measures by type of statistics and reviewed and monitored the implementation process.

● Main Outcomes of Research and Policy Implications

This study built a review system to monitor the implementation of improvement measures for the ICT statistics system. To be specific, items for ICT statistics maps (survey areas, survey purposes and rationales, population/sample design, survey items, etc.) and major issues (unit nonresponse, item nonresponse, and management of research companies) were assessed and evaluated for ICT-approved statistics and statistics that were planned to be approved, which resulted in detailed improvement measures. Since statistics that were newly approved or planned to be approved were not subject to assessment and evaluation prior to this study, there was no discussion on improvement measures for them. Therefore, this study suggested such improvement recommendations and supported their implementation.

The improvement measures for statistical surveys were broken down into a planning and design stage, a survey stage, and a post-management stage, for which the implementation review was conducted. For each stage, targets and plans for implementation, improvement progress, and implementation results and plans for further improvement were assessed. In most cases, each improvement measure was reviewed, the results of which were then reflected in the devising of a future plan. In cases where implementing recommendations was not feasible, the explanation for that and alternatives were provided. This study confirmed the need to set a new direction for the quality management of the ICT statistics system in order to improve it in the long run.

Meanwhile, as this year's statistical surveys faced a unique situation because of the COVID-19 pandemic, measures to manage the quality of the ICT statistical survey amid the spread of COVID-19 and relevant countermeasures were devised. This study looked at the overall impact that the current situation had on the ICT statistical survey and held two focus group interviews (FGI) with persons in charge of all seven of the statistical surveys during the month of November to collect their opinions in writing and review the specific challenges they faced and how they responded to such challenges. The FGI mostly dealt with the general process and methods of the surveys as well as changes brought about by the pandemic. In addition, the participants shared difficulties and countermeasures in the management of statistics in this new environment and identified their needs for policy support to improve the management of the quality of ICT statistics.



Key word

ICT, statistics survey, statistics system, statistics evaluation, statistics diagnosis

Issues on ICT Trade and Its Policy Implication

Researchers: Dong-Whan KO, Gae-Iyong CHOI, Sun-Hee LEE, Yoonsuk OH

● Purpose of Research

After joining the WTO in 2001, China positioned itself as a central hub of the global value chain (GVC) of the ICT manufacturing sector. Since 2010, however, it has attempted to shift its economic structure through expanded government-led investment aimed at boosting localization rates by nurturing local industries and promoting the development of core technologies. Meanwhile, the US has responded to the rise of China by working to maintain its hegemony, particularly its technological hegemony. To that end, it has limited the movement of human capital, financial capital, knowledge, technology, and other production elements that are necessary to move up the global ICT value chain. As a result, interdependency between countries has been weaponized, with the US trying to reshape the GVC centering around its allies. Along with this, the COVID-19 pandemic, which began in March 2020, activated discussion on reshaping the GVC in a way that emphasizes resiliency and stability, instead of efficiency. Against this background, this study used international input-output tables to calculate and analyze GVC indicators of ICT and non-ICT industries of major countries since 2000 in order to derive implications for Korea's ICT industry.

● Main Outcomes of Research and Policy Implications

This study first utilized a multi-region input-output table (MRIO) of the Asia Development Bank (ADB) to obtain various GVC indicators of major countries and compare the data between countries in order to discuss implications for Korea's ICT industry.

The results showed that the Korean ICT industry's participation in the GVC was higher than that of major countries as of 2019, but the figure was similar to the 2007 level and was a lot lower than its peak. Moreover, from 2010, the forward GVC participation of the Korean ICT industry expanded faster than its backward GVC participation, before declining in 2019. Japan accounted for the highest level of backward participation in the GVC of Korea's ICT industry in 2000, but it was replaced by China in 2010, along with a dramatic increase in Korea's dependency on the Asian region. The share of complex GVC activities in Korea's ICT industry has declined since 2010, which is similar to general GVC activities, but when broken into manufacturing and services, the share of complex GVC activities in the services sector expanded. When compared with other industries, the ICT manufacturing industry showed a higher proportion of complex GVC activities than that of the non-ICT manufacturing industry, but the latter is on an upward trend.

The Korean ICT industry's production inducement coefficient showed that it had become more sensitive to external demand since 2000. Especially, the production inducement coefficient of the ICT manufacturing sector surged from 5.13 in 2000 to 7.73 in 2019.

To reduce the risks stemming from the intensified geopolitical competition and supply chain disruptions in the wake of the pandemic, the possibility of reshaping the GVC is being more and more widely discussed. In response to this trend, new regional cooperative bodies such as an economic prosperity network to replace multilateralism might emerge. However, the ICT industry is a knowledge-intensive industry with an established, specialized ecosystem, meaning that there is no reason to change the current supply chain for the sake of product quality and transaction stability. Particularly, its manufacturing sector is characterized by complex relationships among core component manufacturers, which makes it difficult to pursue risk distribution by diversifying the supply chain. Therefore, the government needs to focus on establishing a deep network map for the current GVC system in order to identify and manage core suppliers, rather than pushing for a short-term reshuffling of the GVC.



Key word

ICT, international trade environment, GVC, global value chain, multi-region input-output table

Establishment of Employment Analysis System for ICT Industry

Researchers: Hyun-Joon JUNG, Hakki LEE, Nyeong Seon SON,
Woocheol SHIN, Eunyoung LEE, Seung Hee HA

● Purpose of Research

Since the Fourth Industrial Revolution began and the COVID-19 pandemic broke out, there has been growing need for research on efficient government support measures to enable the ICT industry to keep up with the rapidly changing labor market. The swift changes that have occurred in Korea's employment trends across industries since 2018 have fueled interest in the current and future states of employment in the ICT industry. This study aims to take stock of and forecast ICT employment through in-depth analysis of employment in the ICT industry, which is a key area of the Fourth Industrial Revolution.

● Main Outcomes of Research and Policy Implications

This study first tapped into microdata of Statistics Korea and the Ministry of Employment and Labor from January 2020 to look at the current state of employment in the ICT sector on a monthly basis and provide policy support. Next, a detailed analysis was conducted on ICT industry employment with the aim of supporting relevant employment policies. In addition, this study outlined the process of developing online labor indicators to identify the status of employment in the ICT industry in a timely manner while also forecasting the industry's employment volume from 2021 to 2025 and changes in its employment structure.

This study on ICT employment analysis and forecasting will provide baseline data for the formulation of policies based on the current employment structure and relevant forecasting in the industry, help re-interpret changes in the industrial structure driven by ICT technological advancements, and derive implications of the changing economic environments, thereby contributing to economic and social policy-making.



Key word

ICT employment, current state of employment, technological advancement, employment forecast

Mid- to Long-term Prospects of the ICT Industry (2021-2025) and ICT Exports Strategies

Researchers: Dong-Whan KO, Yong Chan JUNG, Sunghyun NA, Hakki LEE, Sae Ran KOH, Sunsil YU, Minsik KIM, Kyoung Nam LEE, Jung Sook OH, Eun-Min LEE, Heeyoon RO, Yoonsuk OH, Jeongmin JIN, Do-Kyeong YUN

● Purpose of Research

With ICT innovation causing an economic and social paradigm shift, ICT-related policy-making requires comprehensive and objective data on the assessment and prospects of the ICT industry and market.

This study aimed to assess achievements in domestic information and communications broadcasting devices, information and communications broadcasting services, and software in terms of production (revenues) and exports and imports. Based on an analysis of domestic and global macro-environments and ICT trends, this study suggests short-term (2020) and mid- to long-term (2021-2025) forecasts, derives policy implications, and proposes response strategies for revitalizing ICT exports.

● Main Outcomes of Research and Policy Implications

First, this study mainly analyzed the prospect of macro-economic environments at home and abroad and used a time series model to forecast Korea's ICT industry based on data. Second, this study analyzed the domestic and global ICT markets and their prospects. Third, it looked at the market prospects for specific major ICT products, such as electronic components (semiconductors and display panels), computers and ancillary devices, communications and broadcasting devices, communications services, broadcasting services, information services, and software. In particular, a survey and focus group interview were conducted to study the impact of the COVID-19 pandemic and identify the demand for policies and countermeasures that support ICT services and software exports.

The forecast based on the time series model showed that the production of electronic components would make a clear recovery by December 2025, while communications and broadcasting devices and video and sound equipment are expected to remain on a downward trend. Production in the ICT services sector is predicted to slow slightly but continue growing, while exports of ICT devices are predicted to slow due to the pandemic but show a clear recovery from the low of 2019.

When combined with qualitative analysis, the production and export prospects for Korea's ICT industry showed the following results. From 2021 to 2025, there would be continuous demand for high-value-added components in the ICT production sector, such as semiconductors and flexible OLED panels, related to 5G, AI, and IoT, along with steady growth of the software market. However, the rise of China would fuel competition in the global market, alongside an increase in overseas production, which would slow down Korea's ICT device industry to an average annual

growth rate of 1.5% (2021-2025). Regarding ICT exports from 2021 to 2025, Korea would keep its competitive edge in high-value-added products such as memory semiconductors, flexible displays, and foldable smartphones, but with Chinese companies catching up fast, Korean companies would face more difficulties in expanding their exports, posting an average annual growth rate of 8.1% as a result.

Moreover, this study looked at ICT businesses' awareness of government policies supporting exports and relevant policy needs, and found a huge gap between support policies and policy needs. In addition, even though businesses clearly recognized the need for government support, support projects of the Ministry of Science and ICT were not well-known. To improve this situation, it is necessary to link different support projects that provide stage-specific assistance and management support for the overseas expansion of promising ICT companies while also offering relevant consulting. In the meantime, a pan-governmental support platform for overseas expansion needs to be established to promote various support projects and provide customized support services.



Key word

Communications services, broadcasting services, smartphones, semiconductors, display channels, software

International discussions and countermeasures on digital economic measurement

Researchers: Hyun-Joon JUNG, Hakki LEE, Wookjoon KIM, Woocheol SHIN

● Purpose of Research

Digital economy's importance and significance is growing as the digital transformation accelerates. The necessity for devising methodologies for estimating the size and the economic impact of the digital economy is increasing. Also, the difference of the definition and the scope of the digital transformation between countries should be analyzed and the countermeasures on digital economic measurement and comparison is necessary.

● Main Outcomes of Research and Policy Implications

This study diagnoses the definition and scope of the digital economy and the current status of international discussions on digital economic measurements and key indicators of the digital economy that have been carried out so far.

Digital economy has been defined in different aspects by the academia and international organizations, however, the consensus is yet to be set and still in the process of finding it. Research and debated on defining the digital economy in Korea is still in the early stage while the importance of its measurement is being more emphasized. It is necessary to update the contents and criteria of the indicators to more effectively reflect Korea's digital economic surroundings. We suggest to include digital economic indicators provided to the international organizations to the contents of ICT Statistics Portal to facilitate the distribution and utilization of the digital economic indicators.



Key word

digital economy, digital transformation, digital economy measurement, digital technology

A Study on the Development of Industrial Productivity Data and the Growth Contribution of ICT and Intangible Assets for the 4th Industrial Revolution

Researchers: Hyun-Joon JUNG, Jeong-Eon Kim, Nyeong-Seon Son, Woo-Cheol Shin, Eunyoung LEE

● Purpose of Research

Korea is facing external and internal challenges; global protectionism and rise in the US interest rates induced international funds to outflow from the domestic financial market and the fall of the potential output growth and labor productivity.

In order to implement intelligent information society by analyzing the roll of intangible assets in each industry's productivity, this research aimed to accomplish the following three objectives; first, construct productivity account for each industry and analyze the contribution of the ICT and R&D investment to the economic growth, second, analyzing individual firms dynamics and productivity.

● Main Outcomes of Research and Policy Implications

For the first objective, we constructed productivity accounts for each industry and analyzed the effect of various inputs on each individual industry's growth and productivity. To do so, we designed a methodology to estimate various intangible assets of each industry and integrated the data with the international productivity data base. For the second objective, we evaluated the factors of individual firms' dynamics regarding ICT industry, and analyzed the effect of the dynamics on the industry's productivity.

This research provides empirical research on the roll of the ICT and R&D investment in the national economy and suggests the main growth factor of Korea and implications for sustainable growth.



Key word

productivity accounts, growth accounting, productivity analysis, investment in intangible asset, company dynamics, CGE model

Project Report: Establishment and Management of Media Statistics DB

Researchers: Yong Chan JUNG, Heeyong NOH, Yoonhwa KIM, Yoonsuk OH

● Purpose of Research

With the COVID-19 pandemic dragging on, contactless culture, characterized by increased non-face-to-face activities, has become commonplace across society. This has resulted in a dramatic surge in data resources. In today's contactless society, decision-making driven by statistics and data is gaining traction not only in the private sector but also in the public sector. Toward meeting these needs, the 2020 project to establish and operate a media statistics database created a user-centric system to provide reliable statistics.

● Main Outcomes of Research and Policy Implications

The results of the Korea Media Panel Survey were augmented to provide statistical tables and graphs and use unstructured data from news articles and tweets to analyze issues related to the media such as TVs and smartphones. In addition to functional improvement, existing statistical data were renewed and updated.

The results of the Korea Media Panel Survey, which are national statistics (Approval No. 405001), were uploaded to the database system, while the way in which overseas broadcasting statistics are uploaded was renewed and the latest data uploaded in the form of a database.

To promote communication with statistics users, the "7th KISDI STAT Supporters" were nominated to provide statistical content, including the "KISDI STAT Report" and other major statistics in various, easy-to-understand formats, such as card news on dedicated blogs.



Key word

Media statistics portal, media and ICT statistics, Korea Media Panel Survey, KISDI STAT Report

2020 Korea Media Panel Survey

Researchers: JiHyung SHIN, Yoonhwa KIM, Yoonsuk OH

● Purpose of Research

The Korea Media Panel Survey has been conducted annually since its launch in 2010 to collect government-approved statistics for monitoring the current status of the changing media environment, media industry, and user behavior from a mid- to long-term perspective. Its aim is to reflect how today's smart ecosystem in the multimedia/multichannel era is affecting the overall media environment and, in turn, people's daily lives.

● Main Outcomes of Research and Policy Implications

The Korea Media Panel Survey began with panels of residents of the Seoul metropolitan area and five other metropolitan areas in 2010, which was later expanded to include panel households and members of households across the nation in 2011. In 2020, which marked the Korea Media Panel Survey's 11th year, a survey of 4,214 households and 10,203 individuals was completed.

The nationwide panel data gathered from 2011 were provided to relevant universities, research institutes, industries, and policymakers. In addition, the 8th Korea Media Panel Academic Conference was held to share research outcomes that were produced using the data.

Separate survey questionnaires are distributed to households and individuals. The survey consists of sections for the status of media device ownership of households, households' usage of and spending on media broadcasting and communications services, media usage patterns of individuals, and media diaries. In 2020, the questionnaires were updated to reflect the dramatic advancements of technologies and products that have occurred in media-related industries. A special section inquiring about self-esteem and the need for cognition was added.

This survey holds significance in that it proposes a new approach to and measurement framework for producing indicators that can aid understanding of cross-media usage patterns in the multimedia era. The panel data are expected to meet the needs of the government, industry, and academia, which demand longitudinal data analysis of media usage time distribution, media spending, and status of media device ownership.



Key word

Panel survey (longitudinal survey), media usage patterns, media spending

A Study of Quality Evaluation on Broadcasting Programs : 2020

Researchers: Ji Hyung SHIN, Jieun CHOI, Heeyoon RO

● Purpose of Research

In a media environment that has been changed by the emergence of multimedia and the multichannel era, numerous programs that recklessly seek viewership tend to be produced and scheduled for broadcasting. This calls for policies aimed at ensuring the quality of such programs.

This study aims to enable viewers themselves to rate the quality of broadcasting programs in order to collect and provide baseline data for the production of high-quality programs, ultimately leading to a broadcasting program evaluation system in which viewers engage directly.

● Main Outcomes of Research and Policy Implications

This study analyzes recent trends regarding evaluations of the quality of domestic and global broadcasting programs and discusses their implications. According to the survey design for the calculation of the quality evaluation index for broadcasting programs, an online panel was formed to evaluate all broadcasting programs (satisfaction and quality index) of four channels (KBS1, KBS2, MBC, and SBS) that are broadcast via ground wave and general programming channels (TV Chosun, JTBC, Channel A, and MBN) four times a year (March, May, August, and November). The calculated indices were found to be highly consistent and reliable, as evidenced by the sufficient number of panelists (12,000 for five weeks) and high response rates. This study also conducted evaluations of broadcasting channels on seven items (interest, diversity, reliability, usefulness, creativity, fairness, and public benefit) and assessed the characteristics of each broadcasting company and the differences between them, which were then used to interpret the results of the evaluations. An additional survey was conducted on viewers' awareness of broadcasting programs, which looked at changes in their awareness and criteria of broadcasting content to help promote understanding and reliability of the KI evaluations. The survey content included changes in the quality of broadcasting programs, changes in the criteria for and awareness of what constitutes a quality program, and awareness and attitudes about harmful content.

Of special note, this study validated the representativeness of the panel and checked the quality of the survey process while also evaluating the consistency of the indices and concreteness of the survey items. To that end, various types of analyses were done, such as analysis by viewing time (broken down into the overall time zone and prime time when viewers watch broadcasting programs), analysis by panelist group (those who rated programs every day for a week and those who gave ratings for less than a week), and analyses of satisfaction index (SI) and quality index (QI).

This study is expected to further highlight the importance of broadcasting programs with excellent quality, not only for the broadcasting industry, which is pressured to prioritize viewership at all costs amid the intense competition over viewers, but also for the viewers who enjoy the programs. As a result, this study can help build a more balanced broadcasting ecosystem where quantitative and qualitative evaluations go hand in hand.



Key word

Broadcasting program quality evaluation, satisfaction index, quality index, channel evaluation

2020 Audience Behavior Survey

Researchers: Yong Chan JUNG, Yoonhwa KIM

● Purpose of Research

This study conducted regular survey on the attitudes and changing usage behaviors of audiences regarding various media, such as terrestrial TV, cable TV, satellite TV, and DMB, in the shifting broadcasting environment. By doing so, it aimed to support the formulation of audience policies and business plans of private companies, aid universities and institutes in their research, and provide audiences of various media with basic statistics.

● Main Outcomes of Research and Policy Implications

This survey was conducted among individuals of 4,042 households aged over 13 across the nation from July 6 to September 18 in 2020, using a structured questionnaire for the face-to-face interview. The main survey items include: amount of media usage, media ownership, awareness of what media is considered necessary, terrestrial TV usage patterns, pay TV(cable, satellite, and IPTV) usage patterns, radio usage patterns, smart device usage patterns, children's broadcasting media usage patterns, and overseas program viewing patterns.

The research measured the influence of smartphones, which are accelerating the personalized use of broadcasting contents and spread of multimedia culture, and found that the level of their influence among those in their 60s increased from 85.4% in 2019 to 91.7% in 2020. More people (67.2%) counted smartphones as necessary media in everyday life compared to the previous year (63.0%), while the share of people who counted TVs as necessary media dropped significantly from 32.3% in the previous year to 29.5% this year, positioning smartphones as more essential than TVs. By age, the majority of those in their 50s or younger chose smartphones as their necessary media, while the choice of those in their 60s or older was TVs, meaning that the age group that considered smartphones as necessary media is getting older and older.

This research paper, as the government-authorized survey on media usage, is expected to be utilized as important evidential data for making audience policies.



Key word

TV usage patterns, TV usage patterns, Internet, smartphone, media diary

2020 Census of Broadcasting Industry

Researchers: Ji Hyung SHIN, Yong Chan JUNG, Sun-Hee LEE, Heeyoon RO, Yeoul KIM

● Purpose of Research

The Survey on the Current Status of the Broadcasting Industry is a type of national statistics survey that has been conducted since 2000 to secure basic data for policy-making by studying the conditions of the industry by field. The survey results are used to aid businesses in formulating their basic management plans, assist academia and research institutes in their studies, and provide viewers of various media with basic statistics.

● Main Outcomes of Research and Policy Implications

This survey was carried out online from May 7 to June 3, 2020, among broadcasting business operators registered with the Ministry of Science and ICT and Korea Communications Commission regarding the conditions of the broadcasting business in 2019. The survey mainly looked at workers, revenues, subscribers to paid broadcasting services, operation of channels, production and distribution of programs, program scheduling, business combination and ownership structure, and facilities, among others.

The research outcomes show that the broadcast revenue of domestic operators in 2019 was KRW 17.67 trillion, up by 2.1% year on year. Of special note, program providers accounted for the biggest share of the revenue at 40.1%. The number of paid subscribers to broadcasting services rose by 3.2% from a year ago to 33.81 million.

The number of workers in the broadcasting industry increased by 0.7% to 37,553 year on year. The figure for ground wave broadcasting stood at 14,458, a slight increase from a year ago, while that of system operators barely changed from the previous year at 4,587. The number of people working for program providers increased by 0.7% year on year to 17,181 due to boosted employment in the television commerce field, while the equivalent of IPTV continued to increase to 814, up by 7.8%.

The annual cost of producing and procuring broadcasts was KRW 3.24 trillion, up by 6.5% year on year. Exports of ground wave broadcasting programs and program providers' broadcasts posted USD 367.14 million, up by 12.3% from the previous year, while their imports fell by 0.5% to USD 97.02 million.

This study is expected to provide important baseline data for formulating policies for each area of the broadcasting industry and making forecasts of the market.



Key word

Broadcasting industry, broadcast revenue, subscribers to paid broadcasting services, broadcast production costs, export and import of broadcasts

3

Tele
communications
& Spectrum
Research
Division

Mobile Device Distribution Structure in Korea and Policy Suggestions for 5G Era

Researchers: Minchul KIM

● Purpose of Research

In April 2019, 5G smartphones began to be released following the full-fledged commercialization of 5G technology, which is characterized by its high speed, ultra-low latency, and hyper-connectivity. Although the nationwide network has yet to be completed and the quality is not fully satisfactory, it is clear that it will become the core of the infrastructure for digital transformation in the future. However, while mobile communications technology has evolved to 5G, the distribution of mobile communications devices is still stuck in the old 3G and LTE era. Despite the enactment of the Mobile Device Distribution Improvement Act in 2014, with the aim of enhancing the transparency of mobile communications device distribution and preventing unreasonable discrimination against users, the 5G device distribution market has changed little over the years, with illegal subsidies being provided to 5G network service users. This study aims to find a desirable distribution structure in the 5G era by examining and theoretically analyzing the traditional structure of device distribution.

● Main Outcomes of Research and Policy Implications

First, this study closely examines the current status of domestic mobile device distribution and the distribution structure in order to draw comparisons with that of home appliances for the purpose of understanding how the distribution structure of mobile devices has evolved. Next, existing theoretical studies are classified into the subsidy effect, mobile device distribution regulation, and general distribution competition for in-depth review. Based on existing research results, theoretical models suitable for the domestic situation, such as the exclusive sales agent model and common retailer model, are constructed, and the effects of these structures and various competition patterns on social welfare and efficiency are analyzed. Also, the status of devices in the new 5G service ecosystems is examined in the two areas of B2B and B2C. In consideration of case analysis, theoretical models, and the characteristics of the 5G era, in which B2B services are expected to be invigorated, policy implications related to the distribution of devices in the 5G era are derived. In the traditional B2C terminal distribution sector, it is important to provide support for self-supply device distribution channels in order to enhance competitiveness, and it is desirable for the government to allow existing mobile carriers to differentiate themselves through non-price factors such as quality. Meanwhile, in the B2B arena, since it is a somewhat closed market in which small-scale and customized production is common, excessive regulation of devices would not be conducive to the formation of a new service ecosystem.

The results of this study are expected to be utilized for the improvement of related laws and regulations, such as the Mobile Device Distribution Improvement Act, policies for invigorating self-supply device distribution channels, and policies for promoting 5G.



Key word

5G, mobile device, smartphone, mobile device distribution law

Study on 5G communication service business model change

Researchers: Soohyun YUM, Doo Hee CHUNG (Professor, Handong Global University), Hyungi HONG

● Purpose of Research

As a wide range of new communication services are expected to emerge with the rapid development of 5G network communications technologies, such as enhanced mobile broadband, massive machine-type communications, ultra-reliable low-latency communications, and network-slicing technologies, interest in changes in the structure of communications services is increasing. To support 5G communications service policy, it is necessary to gain a sufficient understanding of the new 5G business models, methods of service provision, and pricing strategies. In particular, as the B2B market is expected to expand in the 5G environment, it is also necessary to prepare for related policy demands.

Therefore, this study analyzes the factors that are influencing changes in the communications service structure with the development of 5G technology and provides suggestions for communications policies based on case studies of various new business models for communications services.

● Main Outcomes of Research and Policy Implications

To support the continuous growth of 5G and expansion of value added in related industries, it is necessary to establish a business model development methodology that reflects the attributes of 5G technology. Business models for 5G can be classified into three types depending on how they deal with connectivity. The first is a connectivity provision type of model that provides a 5G communications environment and generates revenue from fees. The second is a connectivity realization type that supports the use or development of services using 5G. Finally, the third is a platform business type in which various services are integrated in the 5G communications environment.

Differentiated service, which is one of the key elements of various 5G business models, is directly related to the regulation of network neutrality because it can affect the general quality of Internet access services. To resolve business uncertainty, it is necessary to clarify the criteria that are used to judge whether differentiated and managed services are allowed. In the case of the issue of the 5G tariff structure, including zero rating, this study proposes ex-post regulation (enforcing regulation when user damage occurs). In relation to this, it is necessary to continuously monitor the situation to see if there is a need to further refine the regulations on prohibited acts under the Telecommunications Business Act. In the 5G era, there are many services that require different QoS, so continuous improvement in quality and coverage metrics may be required. In addition, when managed services are invigorated, a more detailed methodology for determining the effect of managed services on the quality of Internet access service will be required. To promote the deployment of the 5G network, it is necessary to examine whether there are factors that make facility construction difficult and increase costs in relation to resident consent and local government permits in the case of small cell construction.



Key word

5G communication service, business model

A Study on the Telecommunications Business Act Reorganization in Response to Change in the Telecommunication Market Environment

Researchers: Hyeon Soo KIM, Yeenkyu KANG

● Purpose of Research

This study is designed to shift the legal framework of the Telecommunications Business Act from the existing operator-oriented system to a market-oriented system in order to maximize innovation in the ICT industry, increase user convenience, and enhance the overall ICT ecosystem in response to technological developments such as the development of 5G and IoT and changes in the global market environment.

● Main Outcomes of Research and Policy Implications

This study presents plans for reforming the legal framework of the Telecommunications Business Act, with the basic direction being deregulation, in order to revitalize innovative industries and services by reflecting changes in the technological and market environments, shift from retail regulation to wholesale regulation, create a level playing field for new markets and technologies, and strengthen the rights and interests of telecommunications service users.

First, as various hyper-connected and convergence services are expected to emerge through 5G, it is necessary to minimize direct and ex ante regulations in order to vitalize innovative industries and services. Second, instead of easing retail regulations, such as the telecommunications charge approval system, we must increase market autonomy and expand retail business opportunities for new operators by shifting to wholesale regulations. Third, it is necessary to establish a basis for fair competition among various participants in the ICT ecosystem by reflecting the new market and technological environments. Last but not least, we must strengthen disaster management for communications services, which serve as a fundamental infrastructure for all industries, and induce the creation of a user-led ecosystem by enhancing users' rational selection and utilization of communications services.



Key word

Deregulation, ex ante regulation, entry regulation, rate regulation, wholesale regulation

A Study on Improving the Telecommunication Regulation in the 5G Era

Researchers: Hyeon Soo KIM, Jaehyun YEO, Minchul KIM, Soohyun YUM, Sunghyun NA, Gwangjae JUNG, Min Suk LEE, Minhee KIM, Yeenkyu KANG

● Purpose of Research

As 5G is expected to converge with other industries, as the core infrastructure of the Fourth Industrial Revolution, and bring about great changes in the overall ICT ecosystem with the advent of the intelligent information society, this study aims to suggest a mid- to long-term communications policy direction in response to these changes in environment.

● Main Outcomes of Research and Policy Implications

In response to the development of the ICT ecosystem and changes in the communications market, this study analyzes the performance and limitations of current communications policies, including policies on universal service, interconnection, network neutrality, rates, MVNOs, and terminal distribution, and suggests mid- to long-term policy directions.

As for the universal service policy, easing the obligation to provide universal service for local calls in terms of securing availability through alternative services can be considered. Also, it is necessary to prepare a basis for public budget input in order to expand the universal scope, such as the user's share of the construction cost, which can be a factor restricting access to universal services for the underprivileged, or support for the establishment of a school network. In terms of the interconnection policy, it is necessary to review improving the interconnection rate calculation model to reflect changes in the market environment, such as network IP and wired/wireless convergence in relation to the voice interconnection policy. Regarding Internet interconnection, it seems that a policy for the transparent disclosure of information on transactions and market conditions among various stakeholders in the interconnection market is necessary, in consideration of the impact on stakeholders and the relevant ecosystem. When it comes to net neutrality policy, 5G is expected to act as a foundation for innovation in various industries, making it necessary to ensure “legitimate” network access for a wide variety of innovators. In terms of rate policy, it is desirable to ease the charge approval system applied to first-tier operators, making it more similar to that applied to latecomers, depending on business size and market share, when market competition is activated. As for MVNO policy, to establish an efficient regulatory system in preparation for the entry of various operators in the future, we must classify the types of operators in detail and establish a policy direction suitable for each type. With respect to terminal distribution policy, there is a need to re-establish the scope and types of mobile communications terminal devices, determine whether to regulate the contractual relationship surrounding terminal devices, and improve the relevant system in response to the new competition in the market.



Key word

Universal service, interconnection, network neutrality, rate, MVNO, terminal distribution

State of Value-added Telecommunication Industry Report, 2020

Researchers: Gwangjae JUNG, Yuri JO, Sung Ho JEON

● Purpose of Research

With the continuous growth of the value-added communication industry and expansion of the Internet, the influence of large-scale platform operators such as Netflix and Google is gradually increasing. In particular, as the use of video services rapidly expands due to the increasing use of mobile Internet and advancement of data communications, the importance of video services in Internet use is growing as well. Amid these changes, the legal basis for conducting a survey on the actual status of the value-added communications industry was established in 2018 through the revision of the Telecommunications Business Act. For the implementation of the revised bill in 2021, it is necessary to identify areas requiring improvement by drawing up plans to conduct a survey on the actual status of the value-added communications industry and conducting a pilot survey.

● Main Outcomes of Research and Policy Implications

This study aims to devise plans for conducting a survey on the actual status of video service platforms, among various value-added communications services, and draw implications by carrying out such plans on a pilot basis. Accordingly, in this study, the plans for the survey are divided into three groups: market status index analysis, usage behavior and user issue analysis, and competition issue analysis.

The analysis results show that the market for video service platforms was formed around five or six major operators, and the use of YouTube is overwhelmingly high. In terms of user issues, issues related to refund regulations and rate plan selection are analyzed. In terms of competition issues, it was found that demand substitutability between services is not high. If this survey is conducted in the future, it will be necessary to conduct an analysis focusing on understanding the actual status of B2B transactions by securing a wider range of data.



Key word

Value-added communications, video service, survey on actual status, market situation, market competition

2020 Telecommunications Market Review

Researchers: Sunghyun NA, Soohyun YUM, Min Suk LEE, Hyeon Soo KIM, Gwangjae JUNG, Jaehyun YEO, Minchul KIM, Ahram MOON, Yeonkyu KANG, Bokyum LEE, Sangmi PARK, Jeongmin JIN, Dowon YUN, Sung Ho JEON, Hye In HWANG, Hyungi HONG, Jeong Wook BYUN, Sol Hee LEE

● Purpose of Research

This study aims to contribute to the creation of a fair competition environment in the telecommunications market by evaluating the current status and competition situation of individual markets, reflecting changes in the environment of the telecommunications market such as the transition to 5G and M&As. It is also designed to gain an understanding of the market situation and support the establishment of communications policies by analyzing the use of bundled products and status of the IDC market.

● Main Outcomes of Research and Policy Implications

The results of this study can be used as basic data for establishing communications policies that promote competition in the market and enhance user convenience. The evaluation process includes, first, selecting the target service and, second, determining the relevant market and deriving evaluation results by comprehensively considering key indicators such as market structure and market performance,

In 2020, the mobile telecommunications market (in which SKT is the No. 1 operator) and the fixed-line phone market (in which KT is the No. 1 operator) were evaluated as “markets with insufficient competition” as of 2019. In particular, in the case of mobile communications, the market share of the No. 1 operator, which had been decreasing slightly every year, increased due to the delay in 5G service provision by MVNO operators. Meanwhile, the broadband Internet market (in which KT is the No. 1 operator) was evaluated as a somewhat competitive market, which is different from the previous year, when it was evaluated as an actively competitive market, reflecting the increasing trend of market concentration following the execution of M&As. As competition in the telecommunications market is categorized as either “uncompetitive” or “competitive,” the finding of “somewhat competitive” can be evaluated as meaning “competitive,” but it also means that it is necessary to carefully observe whether competition is declining. Competition in terms of dedicated line and international calls was evaluated as “active competition,” which is the same as last year.

M&As among telecommunications operators, which have been underway since 2019, are intensifying competition centered on the major three telecommunications companies, thereby reducing the competitiveness of individual operators such as MVNOs and cable television system operators. The 2020 evaluation of telecommunications market competition is expected to contribute to the establishment of policies for revitalizing competition in the telecommunications service market in the future by reflecting changes in the market structure in a timely manner.



Key word

Telecommunications market, market definition, evaluation of status of competition

A Study on Improvement of Unfair Standard Contract Terms of Mobile Telecommunication Service for Users' welfare

Researchers: Jaehyun YEO, Ahram MOON, Dowon YUN, Sol Hee LEE

● Purpose of Research

With the acceptance of mobile communications services as essential services, customers' sensitivity to the characteristics of such services has been gradually increasing. The contract between the telecommunications service provider and the user is based on terms and conditions, and due to the complexity of the structure of such terms and conditions, it is difficult for the user to identify whether there are unfair clauses in the terms and conditions before signing the contract. Even if the user recognizes disadvantages arising from the terms and conditions while using the service, it is difficult to have the provisions of the terms and conditions revised, and if the user cancels the service, damages such as cancellation fees may be incurred. In particular, there have been cases where users filed a complaint saying that they had not been sufficiently notified of changes made to the service under the terms and conditions that led to additional charges. Therefore, this study aims to contribute to the promotion of users' rights and interests by analyzing the structure of the terms and conditions of mobile communications services, identifying user complaints arising out of such terms and conditions, and coming up with ways to improve such matters. In particular, it proposes policy measures with a focus on improving the ways in which user notification is conducted.

● Main Outcomes of Research and Policy Implications

This study suggests ways to protect users and expand their options by identifying areas requiring improvement regarding the terms and conditions of mobile communications services and the systems of service providers. First, it is necessary to ensure that the method of notification and number of notifications issued to users for rate plans that are automatically switched to a different rate plan upon the end of the contract are specified in the terms and conditions. Notification needs to be provided at least three times through text message, email, billing statement, or other means, and if the rate plan subject to automatic switching is a rate plan for minors, the legal representatives of the minors should be issued notifications as well. Second, it is necessary to increase the number of text message notifications issued to those whose contract period has expired from two to at least three notifications, and to specify that additional notifications are to be issued to the legal representatives of users who are minors. In addition, it is necessary to apply the optional contract discount guide *mutatis mutandis* to subscribers who used the mandatory contract discount. Users are not permitted to apply for a service reservation in advance, and it is difficult to designate a new contract date. Since these are unfavorable conditions for consumers, it is necessary to make sure that consumers are free to choose when they renew the contract. To this end, adjustments must be made to the business procedures of service providers to allow users to reserve their desired renewal date before the contract expires. Third, with respect to free value-added services, it is necessary to clarify

the content of the service by specifying whether the service is provided by the mobile carrier or its partner companies, whether it will be switched to a paid service, and who is entitled to subscribe to or cancel the service. It is also recommended that the minimum number of notifications to be issued before switching to a paid service be specified for free value-added services provided by the mobile carrier. As for services provided by partner companies of the mobile carrier, the means of cancellation must be diversified so that users can cancel the relevant service through their mobile carrier. These suggested improvements are expected to serve as a reference for the establishment of user protection policies, thus contributing to the preparation of effective terms and conditions.

**Key word**

Mobile telecommunications service, unfair terms and conditions, promotion of user rights and interests, user protection

A Study on the Behaviors under Mobile Device Distribution Improvement Act and a Plan to Promote Competition

Researchers: Soohyun YUM, Yeankyung KANG, Sangmi PARK, Dowon YUN, Hyunhong CHOI

● Purpose of Research

This study focuses on improving the system of the mobile communications device market in order to induce legal subsidy competition based on an analysis of competitive behavior in the mobile communications market following the enactment of the Mobile Device Distribution Improvement Act. Specifically, it reviews history-based subsidy discrimination, expansion of the limit on additional subsidies, reduction of the posting cycle, and designation of the posting date.

● Main Outcomes of Research and Policy Implications

This study focuses on promoting competition in the mobile communications device market in order to induce legal subsidy competition based on an analysis of competitive behavior in the mobile communications market following the enactment of the Mobile Device Distribution Improvement Act. Specifically, it reviews history-based subsidy discrimination, expansion of the limit on additional subsidies, reduction of the posting cycle, and designation of the posting date while also checking the fairness of the early termination charges. Finally, the results of the survey of consumers' mobile device purchase and wireless service subscription behaviors are provided, and the estimation of the cost arising from switching mobile carriers is presented.

Since the switching cost can reduce competition among service providers, it may be necessary to allow history-based subsidy discrimination and promote subsidy competition so that the subsidy can offset the switching cost to some extent. However, the confusion experienced by users due to the different subsidies for each subscription type must be taken into consideration when making policy decisions under the circumstances where there are different switching costs among carriers and the subsidy posting system is maintained. Regarding the regulation of additional subsidies, it is desirable to increase the autonomy of mobile device distributors and increase user benefits by raising the limit on additional subsidies ($x\%$ of posted subsidy).

When it comes to the posting cycle, it is necessary to induce competition for posted subsidies by shortening the period during which mobile carriers must keep their posting content unchanged so that the increase of subsidies can be used as a short-term marketing tool. Since notification of the timing of the change of posting date is not provided in advance, it is desirable to designate the date on which posting may be changed in order to increase predictability for users. Currently, the early termination charge (return of discount amount) is determined based on the accumulated discount amount. The refund of the optional contract discount for a two-year contract is, on average, 14.6% of the one-year contract amount, and the amount to be returned for the cancellation of a two-year contract is higher than the early termination charge imposed by small businesses such as fitness

clubs, which tend to have contract periods no longer than one year.

The result of the survey on consumers' mobile device purchase and service subscription behavior and switching costs showed that the switching cost (including carrier loyalty) of SKT users was the highest, followed by users of KT and LGU+. For long-term customers of more than 10 years, it was found that the switching cost was significantly higher than that of short-term customers of less than 10 years. This difference can be attributed to the additional benefits that long-term customers receive and their loyalty to the carriers they are currently using. In the conjoint analysis results, no significant difference was observed between 5G and 4G in relation to speed-related attributes. This can be interpreted as meaning that consumers are not yet perceiving 5G services to be significantly more useful than 4G services.



Key word

Mobile Device Distribution Improvement Act, promotion of competition for subsidies, switching costs, consumer behavior

A Study on Internet Ecosystem Development Strategy in the Age of Intelligence Information

Researchers: Gwangjae JUNG, Hyeon Soo KIM, Soohyun YUM, Hyungi HONG, Sung Ho JEON

● Purpose of Research

With the development of information and communications technology, the use of the Internet is spreading and various types of digital content and services are being born. As the Internet environment changes due to the accelerated growth and development of these new Internet services and the digital economy, it is necessary to discuss various policy measures for the development of the Internet ecosystem, such as the revitalization of new services, and enhancement of user convenience. In this study, policy measures for the development of the Internet ecosystem are discussed in relation to industrial development and user convenience in response to the rapid change in the Internet environment in today's intelligent information era.

● Main Outcomes of Research and Policy Implications

To this end, this study discusses ways to further develop the Internet ecosystem through a consultative body composed of experts and industry stakeholders and draws major policy implications. The consultative body discussed measures to deal with damages suffered by users of new types of services, ways to enhance user rights and interests, and measures to strengthen the user-oriented Internet ecosystem and revitalize 5G and new services.

As a result of the discussion, a consensus was reached on the necessity of strengthening information provision for user protection and enhancing autonomous management of the operators of new types of services. The results of the discussion are expected to be used as a reference for the establishment of policies for new Internet services in the future.



Key word

Win-win cooperation in the Internet ecosystem, intelligent information age, revitalization of 5G-based convergence service

A Study on Changes in Platform Environment and Plans to Strengthen Users' Rights and Interests

Researchers: Hyeon Soo KIM, Yeenkyu KANG, Hyungi HONG

● Purpose of Research

The dramatic rise of the status and influence of platforms in the ICT ecosystem is having a significant impact on users' work and daily life. The influence of these platforms and their dependence on users have been expanding in all industries as 5G services have spread and non-face-to-face convergence services have become more active since the outbreak of COVID-19. At the same time, fair competition and behavior that impedes user interests are diversifying on platforms, but since the current regulatory system of the Telecommunications Business Act focuses mainly on networks in a narrow sense, the extent to which a fair competition environment can be created in the platform service market and users' interests protected is limited. Therefore, this study proposes the enactment of a special act to create a fair competition environment in the online platform service market and protect users' rights and interests.

● Main Outcomes of Research and Policy Implications

This special act would regulate the relationships between platforms (P) and business users (B) and between platforms (P) and end users (C) in terms of multilateral transactions among business users, platforms, and end users. When it comes to regulating the relationship between platforms and business users, the act would minimize concerns over the hampering of competition and innovation by categorizing regulations into those applicable to platform businesses with an average of one million users or more per day and those applicable to large-scale platform businesses with an average of five million users or more per day.

Regarding the relationship between platforms and business users, the act would require platform businesses over a certain size to provide specific reasons for any refusal, delay, suspension, or restriction of transactions and provide business users with information related to sales and settlement. It would also prohibit platforms from using information obtained from the intermediary market to compete with business users and impose an obligation to establish an internal complaint handling system and inform users of alternative dispute resolution systems.

In the relationship between platforms and business users, prohibited acts applicable only to large-scale platform businesses would include: refusal, delay, suspension, or restriction of transactions without justifiable reasons; preferential treatment of the platforms' own services; tying; request for top-notch treatment; imposition of restrictions on counterparties; and unfair discrimination between business users. Also, large-scale platform businesses would be required to disclose the key criteria they use to determine the order and method of information exposure, such as search results and recommendations, and provide the option for personalized criteria.

In the relationship between platforms and end users, prohibited acts applying to platform businesses over a certain size would include: providing services in a way different from the way outlined in the terms of use, either not explaining to the user or notifying the user of important contract-related matters or doing so falsely without justifiable reasons, changing important details of or terminating the contract without justifiable reasons, misleading users by unduly providing advertising and non-advertising information without clearly distinguishing the two, and imposing excessive penalties without justifiable reasons. According to the act, platform businesses would be required to establish procedures whereby a user or third party designated by the user can receive the data generated by the user when data transmission is requested by the user. Regarding payment and refund for content, the act would impose a duty to prevent damages to users and protect users' rights and interests as prescribed by Presidential Decree.

**Key word**

Online platform, fair competition, prohibited acts, pre-regulation, post-regulation

4

Broadcasting
& Media
Research
Division

KOREA INFORMATION SOCIETY DEVELOPMENT INSTITUTE

The future of Korean broadcasting and internet video industry: considering changes in the demographic structure of Korea

Researchers: Kyoung Eun KIM

● Purpose of Research

Changes in Korea's population structure, such as aging, are expected to have a direct impact on various fields, including macroeconomic policy, industrial structure, and food. Although studies are actively being conducted on the impact of such changes, very few of such studies are being done in the field of broadcasting and media. In this study, we focus on population aging, among various demographic changes, and predict how demand for broadcasting and Internet video will change according to such change, with the scope of the study limited to demand. We also predict demand 10 to 20 years in the future, when the rate of population aging will have reached its peak.

● Main Outcomes of Research and Policy Implications

This study encompasses three main subjects. The first subject is changes in media use in line with the aging of the population, and the second and third subjects are the resulting changes in the use of broadcasting and Internet video services, respectively. For the first subject, media usage, media use bias, demand for real-time and interactive media are addressed as study questions. For the second subject, the use of real-time TV broadcasting and home shopping broadcasting are discussed, while for the third subject, the use of one-person broadcasting and subscription- and advertisement-type Internet video services are dealt with as study questions.

This study provides answers to each of the study questions presented above based on the results of in-depth expert interviews and user surveys. The policy suggestions derived from this study by summarizing the answers are as follows. First, at this point in time, when the demand for real-time media is decreasing and over-the-top (OTT) content viewing is expected to continue to increase despite the aging of the population, it is necessary to seriously consider the fundamental reason why real-time TV broadcasting, that is, the service provided by linear programming, should exist. This requires serious consideration. Second, as the demand for and supply of interactive media services are expected to increase with the aging of the population, support for the convenient use of interactive media services by the elderly is required. Third, as there is concern about an increase in user damages caused by single-person broadcasting or live commerce due to the increase in the use of interactive media services, more efforts should be made to protect users of these services. Fourth, since the use of subscription-type services is expected to increase and real-time TV broadcasting is expected to decrease despite the aging of the population, it is necessary to prepare a mechanism for protecting users from indirect advertisements by targeting content distributed through subscription-type media services.



Key word

Aging, broadcasting, Internet video, demand, prospect

A Study on the Audience Perception of Similarities between TV and OTT Video Services

Researchers: Nam-Doo KIM

● Purpose of Research

Recently, as the use of over-the-top (OTT) video services is increasing, different opinions on legal regulation methods have emerged in the realms of politics and academia. At the core of such differences lies a difference in perception of the degree of similarity between OTT services and TV broadcasting. This study, which targets the general public, aims to: 1) measure the perceived similarity of each major OTT service to traditional TV broadcasting, 2) examine the relationship, either direct or indirect, between this perceived similarity and the attitudes that it is necessary to apply a public interest standard to such services and that government regulation of the content of OTT services is necessary, and 3) empirically identify what common attributes lead to the perception that OTT services are similar to TV broadcasting.

● Main Outcomes of Research and Policy Implications

This study provides answers to three research questions. The first question relates to the degree to which the general public perceives OTT services and TV broadcasting as being similar, and what factors can affect such perceived similarity. The second question is what impact the perceived similarity of OTT services and TV broadcasting would have on other perceptions and attitudes toward OTT services, particularly the “perceived social impact” of OTT services, “consensus on the necessity of a public interest standard,” and “consensus on the necessity of content regulation,” either directly or indirectly. The third question relates to the media properties of traditional TV broadcasting and major OTT services, respectively, and which properties are related to the perceived similarity of OTT services to TV broadcasting.

This study answers the aforementioned research questions by analyzing online survey responses of the general public. The OTT services that were evaluated are YouTube, Afreeca TV, Netflix, and Wavve. Regarding the first question, in all OTT service cases, the frequency of TV broadcast viewing and OTT service use had a positive relationship with the perceived similarity of the relevant OTT service to TV broadcasting. In relation to the second question, it was observed that the perceived similarity of OTT services to TV broadcasting had a positive effect on the “consensus on the necessity of a public interest standard” for the relevant OTT service, but did not have a significant effect on the “consensus on the necessity of content regulation.” Regarding the third question, on “responsibility-based professionalism,” among several properties of media, traditional TV broadcasting scored higher than OTT services, and it was observed that the property had a positive correlation with the perceived similarity to TV broadcasting in all OTT service cases.

These analysis results are meaningful in that they clearly show how the general public perceives the degree of similarity between OTT services and TV broadcasting, which has been controversial, and what implications this perception has. In particular, an increase in the perceived similarity of OTT services to TV broadcasting may lead to an increase in demand for a public interest standard for OTT services; however, the analysis result demonstrating that this change does not necessarily translate into increased demand for the regulation of OTT service content provides useful insights from a policy perspective.



Key word

OTT service, perceived similarity to TV broadcasting, content regulation

A Study on the Multidimensional Evolution of OTT Curation and the Change of OTT Content Usage Behavior in AI Media Environment

Researchers: Hongjin SHIM, HyunKyung KO

● Purpose of Research

Recently, the over-the-top (OTT) service market has been undergoing rapid change, along with various technological and environmental factors. In terms of technology, communications technology, such as 5G, that enables the convenient streaming of large amounts of video content has been commercialized. In terms of the market environment, the competition for survival in the domestic OTT service market is intensifying due to the rearrangement of the OTT service landscape triggered by the legacy media's introduction of OTT services and entry of foreign OTT services into the domestic OTT ecosystem. Such changes in the environment have also induced various changes in service recipients. In particular, AI curation services recommend content that meets users' tastes and preferences, satisfies OTT service users' usage patterns and personalized needs, and provides users with an optimal OTT service experience.

Based on this background, this study has three purposes. First, it aims to explore the overall OTT service usage pattern. Second, using the Communications Infrastructure-Structure-Action (CISA) model (Kim, 2020) as a theoretical framework, it analyzes the norms of OTT service usage, the functional efficacy of OTT services, and the newly discovered usage patterns and experiences of OTT services. Third, it reviews the feasibility of introducing AI multi-curation and discusses how the OTT service usage norms, efficacy, and usage pattern suggested by the CISA model and various curation systems are organically linked and operated.

● Main Outcomes of Research and Policy Implications

This study confirms that new norms have emerged among users due to the increase in OTT service use and looks at the various changes made possible through the use of OTT services, unlike TV-oriented consumption. To be more specific, it reviews the characteristics of viewing and consumption behavior revealed in OTT service viewing behavior, methods of selecting OTT content for consumption, problems of the curation system currently applied to OTT services overall, and users' intention to accept AI multi-curation services. In addition, it analyzes the sustainability of AI multi-curation and the various characteristics and advantages that AI multi-curation services need in order to be accepted by active users while discussing issues to be considered for the establishment of AI multi-curation. Finally, various policy implications that the use of AI multi-curation services can have in relation to the proactive consumption of OTT service users are presented.



Key word

OTT service, content, AI, usage pattern, curation

Analysis of Policy Trends on Global Digital Companies

Researchers: Dong Kyun KWAK, Min-Sun SONG

● Purpose of Research

This study was conducted as one of the tasks of the “Analysis of Digital Tax-Related Legislative Trends in Major Overseas Countries” project carried out by the Korea Legislative Research Institute. It aims to help the parent project derive significant implications for institutional improvement by accurately identifying and analyzing the response of the stakeholders to the digital economy. Specifically, it was designed to provide policy suggestions by analyzing the policy trends of major countries, including Korea and the EU, in response to the digital economy. To this end, the study looks at the global expansion of major global ICT platforms such as Google, Amazon, and Apple, and attempts to analyze such expansion from the perspective of government policy.

● Main Outcomes of Research and Policy Implications

This study is divided into two parts. The first part identifies the policy trends of each government in line with the expansion of the digital economy, while the second part analyzes the latest trends of the platform strategies of the digital companies, referred to as “GAFA” (Google, Amazon, Facebook, Apple), that are prompting government policy responses.

The result of the study shows that there are somewhat different views among EU member states, but a significant number of them are improving their systems in order to actively accept the Digital Service Tax announced by the European Commission in March 2018.

France, Italy, Spain, the United Kingdom, and Hungary, among others, are in favor of introducing a digital tax at the EU level and are currently taking active measures to that end, while the Netherlands, Ireland, and Luxembourg, which have relatively low corporate tax rates, are opposed to the introduction of a tax or taking a passive stance toward it.

Meanwhile, the results of the analysis of the platform strategies of digital companies showed that global digital companies such as Amazon, Facebook, Apple, Google, and Netflix are trying to expand into the media sector based on their large subscriber bases, massive capital, and ability to utilize user data.



Key word

Digital tax, global platform, GAFA, FAANG

The Study on ‘Cost-in, Cost-out’ System for KCC Regulations in 2020

Researchers: Yusun HWANG, Nam-Doo KIM, Kyoung Eun KIM, Min-Sun SONG, Hojung KIM

● Purpose of Research

This study analyzes the regulatory costs required for broadcasting and communications laws enacted and amended in 2020. It reviews the benefits and costs arising from each amendment and examines whether cost reduction effects were generated through the differential application of regulations to SMEs. The purpose of the review and analysis of this study is to facilitate the Korea Communications Commission's effective management of regulatory costs.

● Main Outcomes of Research and Policy Implications

Among the enacted or amended bills relating to the Korea Communications Commission in 2020, the Act and Enforcement Decree on Broadcast Advertising Sales Agencies, etc., the part related to sponsorship notification in the Broadcasting Act), Internet Multimedia Broadcast Services Act, Telecommunications Business Act, the part related to the Broadcasting Dispute Mediation Committee in the Broadcasting Act, and public notice of assistance in combined sales of broadcast advertising were not included as subjects of regulatory cost review under the regulatory cost management system, as it was believed that they did not result in significant direct regulatory costs or benefits. The amendment to the Enforcement Decree of the Telecommunications Business Act related to the prevention of distribution of illegally filmed materials set forth that certain types of value-added telecommunications service providers shall implement technical and administrative measures to prevent the distribution of illegally filmed material, which incurs direct costs. However, if the obligation is applied in a differential manner based on the size of the business operator, the regulatory costs would be reduced.

This study provides specific and practical examples of regulatory cost analysis on laws and regulations in the broadcasting and communications sector, based on which it suggests ways to reduce regulatory costs. In this way, this study is expected to increase the utilization of the regulatory cost management system manual and contribute to the improvement of regulatory quality in the broadcasting and communications sector in the long term.



Key word

Regulatory cost management system, cost-benefit analysis, broadcasting and communications industry, analysis of regulatory impact

Study of the Effective Regulations on Television Programming in a Converged Media Environment and Comparison of the Oversea Cases

Researchers: Hongjin SHIM, Eunjean JUNG

● Purpose of Research

Over-the-top (OTT) services are entering all areas of the broadcasting ecosystem. In particular, the invigoration of OTT services at home and abroad, including Netflix and Wavve, are bringing changes in the core system of standardized broadcast programs, which in turn raises questions about the effectiveness of the existing programming regulations. To be more specific, as the current programming system is built and implemented based on the existing broadcasting paradigm, there are structural limitations that occasionally lead to failure to reflect emerging changes in the broadcasting environment due to the invigoration OTT services. Against this backdrop, this study is mainly composed of three parts. First, it diagnoses the factors and issues that hinder the effectiveness of the current programming regulations. Second, it takes a close look at the status of domestic and international regulations on and the promotion of OTT services and analyzes the sectors that receive relative regulatory benefits compared to legacy media. Through this, it predicts the outcomes of applying various regulations to OTT services and identifies the point where regulatory equity is improved compared to legacy media. Third, it proposes effective programming regulations in consideration of regulatory equity and changes in the broadcasting media environment and presents policy improvement directions that should be noted in the future.

● Main Outcomes of Research and Policy Implications

This study diagnoses the current status and problems of regulations related to broadcast programming regulations, analyzes pending issues, and provides suggestions for effective improvement. The main content of this study includes: (1) analysis and diagnosis of the broadcast programming data, (2) identification of problems and analysis of pending issues, and (3) suggestions for improvement and in-depth discussion of alternative plans (reform bill, etc.). In particular, this study is expected to enhance the effectiveness of the regulations on programming and facilitate equity among the regulations on different media so that they can keep up with the rapidly changing broadcasting and communication media environment by suggesting improvements for the regulations on the ratio of general programming broadcasters' entertainment programs, ratio of outsourced programs, and ratio of domestic animation programs.



Key word

Program regulation, OTT, outsourced production, animation, entertainment

A Study on the Policies for Promoting Terrestrial UHD TV Services

Researchers: Nam-Doo KIM, Jong Won LEE, Hongjin SHIM, Cheong-Hee KIM

● Purpose of Research

In 2015, as the government established and implemented policy measures for the introduction of terrestrial ultra-high-definition (UHD) television broadcasting, terrestrial UHD broadcasting began to be offered in metropolitan areas and cities. However, due to the aggravating financial difficulties of terrestrial broadcasters and insufficient benefits for viewers of new broadcasting services, a re-evaluation of the 2015 policy measures is necessary. Against this background, this study was conducted for the purpose of analyzing the performance and problems of the 2015 policy measures and improving and correcting them. Specifically, this policy study: (1) analyzes changes in the broadcasting service use environment, industrial structure, and technological conditions that have occurred since 2015 and assesses the performance and limitations of the 2015 policy measures, (2) draws up a modified roadmap for the nationwide expansion of UHD broadcasting and amendments related to the gradual increase of the UHD programming quota in consideration of the financial difficulties suffered by broadcasting companies, and (3) establishes plans for diversifying terrestrial UHD broadcasting-based services by utilizing the advantages of the UHD broadcasting technical standards (ATSC 3.0-based standard) and presents policy measures for revitalizing UHD broadcasting.

● Main Outcomes of Research and Policy Implications

For this purpose, this policy study: (1) analyzes the performance of the 2015 policy measures and the problems that have emerged thus far (increasing financial difficulties of broadcasters, increasing financial burden of the conversion from HD to UHD broadcasting, insufficient viewer accessibility to UHD broadcasting, etc.), (2) examines the progress and policy implications of overseas UHD broadcasting or similar next-generation services, and (3) reviews the progress of new service development utilizing the advantages of ATSC 3.0, the technical standard for terrestrial UHD broadcasting, and assesses the possibility of service diversification based on UHD broadcasting.

Based on this, the research team suggests the following policy directions and action plans. First, a schedule adjustment plan for the nationwide expansion roadmap for terrestrial UHD broadcasting is proposed based on comprehensive consideration of the interests of viewers, domestic and foreign market conditions, and investment priorities. Second, by taking into consideration various conditions, such as the circumstances of program production and need for the promotion of UHD broadcasting, an amendment to the schedule for raising the minimum UHD program programming ratio is proposed. Third, to improve viewer accessibility to terrestrial UHD content, policy directions for improving the direct reception environment for terrestrial UHD broadcasting (improvement of

shared viewing facilities, more effective PR for viewers, survey on terrestrial UHD broadcasting viewing, etc.) and securing alternative viewing channels (promotion of pay broadcasting retransmission, etc.) are presented. Fourth, taking into account the progress of digital service technology related to the ATSC 3.0 standard, plans to allow and support the introduction of mobile broadcasting, multi-mode broadcasting, and broadcast-communication convergence services using UHD broadcast frequencies are provided.



Key word

UHD (ultra-high definition), ATSC 3.0, terrestrial broadcasting

Regulatory and Financial Reform for Strengthening the Public Interest and the Market Competitiveness of Broadcasting

Researchers: Jong Won LEE, Joonho HWANG, Nam-Doo KIM, Eun Jung ROH

● Purpose of Research

This study is a follow-up measure for the Korea Communications Commission's "Policy Proposal for Mid- to Long-Term Broadcasting System Improvement (March 10, 2020)" aiming to strengthen the public interest in broadcasting, estimate the status of public finances and costs of realizing publicness, and present the direction for improving the regulation on ownership and management with the aim of strengthening the competitiveness of terrestrial broadcasting.

● Main Outcomes of Research and Policy Implications

First, this study reviews the concept of broadcasting remits and provides a theoretical discussion on how this concept works. It also investigates the systems that major countries have used to achieve broadcasting remits as well as the structure of their terrestrial broadcasting systems and the broadcasting remits stipulated by laws and regulations.

By using the above theoretical discussion as a basic framework, this study re-established broadcasting remits with reference to the universality and particularity of overseas cases and estimated the costs required to implement a reasonable and effective system (agreement and evaluation) for remits. In addition, to consider the changes in the broadcasting media environment, it reviews various factors hindering the competitiveness of terrestrial broadcasting, including the purpose and validity of the regulation on cross-ownership, and proposes ways to improve the current regulations, such as enhancing their effectiveness.

This study can be directly used to establish detailed directions for the policy tasks presented in the "Policy Proposals for Mid- to Long-Term Broadcasting System Improvement" of the Korea Communications Commission's Mid- to Long-Term Broadcasting System Improvement Team. It is also expected to be used to analyze policy demand in the National Assembly and carry out policy affairs in the relevant ministries.



Key word

Publicness of broadcasting, Broadcasting Act, broadcasting regulation, broadcasting finance

A study on the role of government to build a sustainable broadcasting and communications ecosystem in the digital age

Researchers: Wook-Jei SUNG, Yongjae KWON, Jae-Young LEE, Hojung KIM

● Purpose of Research

This study aims to find out what the government should do to build a sustainable broadcasting and communications ecosystem in the digital era. More specifically, in order to maintain (the sustainability of) the broadcasting and communications ecosystem (or digital media ecosystem), in line with the changes in the digital environment, the study prioritizes what the government should or can do.

● Main Outcomes of Research and Policy Implications

In consideration of major policy issues in major countries, environmental changes in the broadcasting and communications sector, major government policy tasks related to broadcasting and communications, and requests from participants in the broadcasting and communications ecosystem, this study presents five policy goals and 15 tasks. The first policy goal is to create fair competition and a win-win environment. Detailed tasks for achieving this goal include deregulation in the terrestrial broadcasting sector, stronger investigation of unfair practices in the broadcasting/communications/Internet markets, and elimination of reverse discrimination against domestic and foreign operators. The second policy goal is to minimize the harmful effects of the intelligent information society. To this end, detailed tasks are presented, such as stronger action to fight against digital sex crimes, greater restriction of the spread of false information and illegal spam, and enhancement of the capability of digital media communications. The third policy goal is to develop a safe and inclusive society. To achieve this goal, this study proposes a stronger disaster response system, improved access to broadcasting for people with disabilities, stronger roles of public broadcasting (KBS, EBS), and comprehensive plans to revitalize local broadcasting. The fourth policy goal is to protect the rights and interests of communications service users. To this end, a variety of detailed tasks are suggested, including improving the terminal distribution structure/reducing household communication costs, expanding the provision of information on communications services, facilitating communication-related dispute mediation, and preparing damage relief standards. The fifth policy, and final, goal is to expand opportunities to enjoy new services. For this, tasks such as promoting terrestrial UHD services and domestic OTT services are presented. The results of this study provide a basic direction and framework based on which the 5th session of the Korea Communications Commission can determine what actions to take to build a broadcasting and communications ecosystem. It should be made clear that the omission of any tasks from this study does not mean that such tasks are not important, but that they were excluded because this study focuses mainly on selecting tasks that are differentiated from the existing tasks of the Korea Communications Commission.



Key word

Digital, broadcasting and communication ecosystem, 5th session of the Korea Communications Commission

Report on distribution and consumption of video content over the Internet

Researchers: Broadcasting & Media Research Division

● Purpose of Research

This study is designed to improve the currently poor understanding of the use of over-the-top (OTT) video services despite the increasing use of video content through OTT. In particular, this study aims to overcome the limitation of the fact that there have been no attempts to examine the use of video content distributed through OTT video services, although some research is being conducted on the external features of OTT video services.

This study attempts to take a closer look at the areas that existing broadcasting service-oriented research failed to grasp at a time when OTT-based media services are rapidly expanding.

As part of a series of projects that started in 2018, this study presents the results of the 2020 project, which is the third-year project. The purpose of this study is as follows. First, it roughly identifies the frequently used content provided by domestic OTT video services. Second, it uses a user survey to look at the content consumption of domestic OTT video service users by platform.

● Main Outcomes of Research and Policy Implications

This study examines the status of major OTT video services available in Korea by categorizing them based on business model, service method, and main content, and then selects specific services that require in-depth research in consideration of their frequency of use and influence. It also looks at the status of content provided by individual services, with a focus on popularity, and compares the characteristics of content by service.

As a result of examining the popular content by type provided by the major OTT video services available in Korea, entertainment/variety show or drama genres had the highest share of the “real-time content” list and “popular TV VOD” list of OTT services (Wavve, Tving, KT Season, U+Mobile TV) of broadcasters and telecommunications companies. Meanwhile, on Naver TV's real-time content list, the sports/game genre ranked first in market share, while on YouTube's popular content list, entertainment ranked first, as did the game and talk/cambang genre (broadcast from a webcam or a mobile device) on Afreeca TV's real-time content list and popular VOD list.

The results of a survey of users of four services (Wavve, Tving, Netflix, and YouTube) show differences between platforms: that is, movies on Netflix and entertainment/variety shows on the other three services have the highest viewing rates.



Key word

OTT video, Internet video, video content, content preference

2020 Global Broadcast Market Analysis

Researchers: Jong Won LEE, Eunjean JUNG, Hojung KIM, Min-Sun SONG

● Purpose of Research

The purpose of this study is to conduct in-depth analysis of the market trends of terrestrial broadcasting, pay TV, and over-the-top (OTT) video services in major countries and provide implications for Korea. This study aims to accumulate professional and reliable market research data every year in order to allow accurate analysis of past and current changes in the broadcasting markets of major countries and objective comparisons between the markets of those countries with the domestic market of Korea.

● Main Outcomes of Research and Policy Implications

This study selected six major overseas countries (USA, UK, France, Germany, Japan, and China) and examined their broadcasting markets. First, this study looked at the structure of the terrestrial TV and pay TV markets (subscription fees and advertisements), followed by an analysis of the business and financial status of major broadcasters in each market. In addition, it examined the OTT market, major OTT service operators, and their business and conducted a multi-country survey on the media usage behavior of consumers in major countries. Lastly, in response to a current policy concern, this year's study conducted an ad-hoc analysis of the types and amounts of financial resources of broadcasting markets, including in the public and private sectors, of the selected major countries.

To compare the broadcasting markets of the six countries, the same database was used for each indicator item (e.g. PWC, Omdia, and Glance), and official data issued by each government institution (e.g. FCC and Ofcom) were used as well. In addition, the researchers worked closely with academic experts to conduct an advanced analysis of major issues and collected global survey data on consumers' media usage behavior through a market research organization.

The country-by-country analysis of this study will serve as basic data that government authorities and academics can use to analyze broadcasting market trends. Also, the results of the ad-hoc analysis of the financial resources of public and private broadcasting markets in major countries will contribute to benchmarking global trends and better understanding the domestic broadcasting market and policies.



Key word

International broadcasting market research, media usage behavior, terrestrial broadcasting, pay TV, OTT, financial resources of broadcasting markets

2020 International Co-Production Market and Regulatory Environment Survey – Russia, Brazil, United Arab Emirates, UK, Australia –

Researchers: Joonho Hwang, Sunghee JOO, Hayun KANG, Seungmin KIM, Eun Jung ROH, Hyunjin BAE

● Purpose of Research

The Korean government has been trying to enter into broadcasting co-production agreements with other countries in order to export domestic broadcasting content and enhance international exchanges and cooperation. In addition to the nine broadcasting or audiovisual co-production agreements signed as of 2019, inter-government negotiations on co-production agreements are still underway with China, Canada, Thailand, and Turkey as of 2020.

This study is designed to provide reference materials that can be used in concluding such co-production agreements while also securing basic data for strengthening exchanges and cooperation with countries that have already signed agreements with Korea. Considering the export status of Korean broadcasting content and business demand, Brazil, Russia, and the United Arab Emirates were selected as three promising countries for exporting Korean broadcasting content along with the UK and Australia, which have already signed agreements with Korea.

● Main Outcomes of Research and Policy Implications

In addition to surveying the overall broadcasting industry and related regulatory system in the aforementioned promising countries and co-production partner countries, this study examines media usage behavior, perception of Korean broadcasting (aka Hallyu) contents and international co-production programs. In this process, in addition to general literature research, various research methods, such as a local broadcasting content survey conducted through overseas monitoring agents and local user survey are used. These diverse research methods produce highly reliable results differentiated from the existing overseas broadcasting market research.

Based on the survey results, domestic broadcasters and production companies explore the possibility of co-production with overseas operators and establish effective strategies for entering the overseas market. The government can use the results as a reference for negotiating with partners. Furthermore, this study is expected to serve as a basis for facilitating exchanges between countries according to the media and content usage behavior of overseas viewers and contribute to establishing a policy agenda for securing the global competitiveness of the broadcasting industry.



Key word

Co-production agreement, co-production, broadcasting content, Hallyu, Korean Wave content

2020 Broadcasting Market Competition Assessment

Researchers: Yusun HWANG, Dong Kyun KWAK, Kyoung Eun KIM, Jong Won LEE,
Yongjae KWON, Hojung KIM, Min-Sun SONG, Cheong-Hee KIM

● Purpose of Research

There is a need for objective analysis and assessment of the competition in the broadcasting market in order to establish a rational regulatory system for effectively responding to market changes, technological development, and legal and institutional changes in the broadcasting industry as well as draw up policies on competition. The purpose of this study is to clearly define the broadcasting market and analyze and assess the competition in the market through various and subdivided assessment indicators.

● Main Outcomes of Research and Policy Implications

The total revenue of the broadcasting business in 2019 was KRW 17.7 trillion, showing an increase of 2.1% compared to the previous year, and the growth rate decreased by 2.7%p compared to the previous year, although it did exceed the nominal GDP growth rate. With IPTV continuously growing, revenue increased by 12.2% (or KRW 420.8 billion) compared to the previous year, and comprehensive PP (Program Provider) revenue also increased by 2.6% (or KRW 21 billion) compared to the previous year. Despite the rapid growth of online shopping, PP's home shopping broadcasting revenue increased by 6.2% year-on-year. Terrestrial TV revenue decreased by 7.4% (or KRW 279.7 billion) compared to the previous year, market share continued to decrease (26.8% in 2015 → 22.3% in 2017 → 19.9% in 2019), and SO (System Operator) revenue decreased by 3.2% (or KRW 67.1 billion) compared to the previous year, with both the market share and revenue continuing to decline.

It was found that the market concentration, which had been easing due to mergers and acquisitions in the pay TV market, as well as the increased influence of general programming providers and CJ affiliates, among others, increased compared to the previous year, except for the advertising market. However, excluding the pay TV market, the overall market concentration was low. In the pay TV market, market concentration increased following the mergers and acquisitions of LGU+ & CJ Hello and SKB & T-Broad, and the reorganization of the market structure was accelerated by the three leading companies. Although the number of pay TV subscribers was still rising, the VOD sales of pay TV operators declined for the first time in 2019, showing that the pressure of competition was starting to appear due to the growth of OTT video services.

Through mergers and acquisitions, pay broadcasters, who are consumers in the broadcast channel trading market, could possibly improve their bargaining power over pay TV channels. At the same time, however, there is a possibility that the negotiating power of popular pay TV channels could be

strengthened as competition for key content between OTT services and pay TV channel providers intensifies due to the continuous growth of OTT services. Meanwhile, as the advertising sales of general PPs, which had recorded an increasing trend, decreased in 2019 and the total TV broadcast advertising sales in 2019 decreased by 7.2% compared to the previous year, the proportion of mobile advertisements in the overall advertising market surpassed that of broadcast advertisements.



Key word

Broadcasting market, pay broadcasting market, broadcasting advertisement market, channel trading market, analysis of competition situations, OTT video service

A Survey on the Transaction of Independent Production Programs 2020

Researchers: Hongjin SHIM, Jong Won LEE, Yusun HWANG, Kyoung Eun KIM, Cheong-Hee KIM, Yongjae KWON, Hojung KIM, Min-Sun SONG, Eunjean JUNG, Eun Jung ROH

● Purpose of Research

This study examines, in detail, the actual status of the outsourced production of broadcasting companies. It identifies differences in the perceptions of broadcasting companies and outsourcing producers arising from outsourcing production practices, and examines various unfair trade practices found in the process of the trade, distribution, contract, and production of outsourced productions. In addition, it aims to build basic policy data that can contribute to the creation of a mutually-beneficial environment for the broadcasting industry by enabling the identification of key issues and factors that influence the outsourcing production market, such as the COVID-19 pandemic.

● Main Outcomes of Research and Policy Implications

For this study, an online survey and in-person interviews were conducted concurrently of broadcasting companies that had experience with outsourcing production. The main contents of the survey were the: 1) number of outsourced broadcast programs and contract types, 2) contract details for outsourced broadcast programs, 3) status of the use of standard contracts, 4) prior consultation process before an official contract is entered into, 5) advance payment and production costs, 6) impact of the spread of the COVID-19 pandemic on the outsourcing of broadcast programs, 7) need and possibility of standardization of production costs, and 8) effect of the market entry of over-the-top (OTT) services on the bargaining power of outsourcing production.

This study contributes to establishing an effective outsourcing system and creating a fair trade environment in the outsourcing market by enabling an objective understanding of the actual conditions of unfair practices between broadcasting companies and outsourcing producers.



Key word

Outsourcing production, outsourcing production market, unfair trade, broadcasting company, production company, COVID-19

Broadcasters Programming Report 2020

Researchers: Hongjin SHIM, Cheong-Hee KIM

● Purpose of Research

The main purpose of this study is to track changes in the laws and regulations on broadcast programs in 2019 and research and analyze the current status of the broadcast programming of domestic broadcasting companies

● Main Outcomes of Research and Policy Implications

This study classifies broadcasting companies according to the current broadcasting laws, regulations, and administrative rules and summarizes the current status of the programming of broadcasting companies by major item of programming regulations (restrictions on the programming of entertainment programs by general programming providers, compulsory programming of the main programs of professional programming providers, restrictions on programming of other broadcasting companies, compulsory programming of purely outsourced programs, etc.).

This study also analyzes the policy on purely outsourced programs and self-produced programs of local broadcasters. It examines whether the policy goal of expanding the role and function of local broadcasters to foster local culture and form local public opinion by providing venues for public forums has been effectively realized. On top of this, it suggests ways to improve the programming policy of local broadcasters in consideration of changes in the management and market conditions of broadcasters.



Key word

Programming status, programming system, programming regulation

5

International
Cooperation
Research
Division

KOREA INFORMATION SOCIETY DEVELOPMENT INSTITUTE

A study on strategies for strengthening ICT multilateral cooperation in the Asia-Pacific region

Researchers: Sang-yirl NAM, Sung woong KIM, Jung Eun PARK, Byungwoo KIM

● Purpose of Research

The rapid development of information and communications technology (ICT) has an impact not only on economic structures, including business activities and industrial structures, but also on various aspects of society in general, such as employment and lifestyles. As these changes are not restricted by borders or temporal or geographical limitations, the need is growing for international cooperation on various issues, including data movement and information security, that are emerging with the digitization of society. Against this backdrop, various regional and international organizations are discussing the opportunities and challenges of digital transformation and seeking ways to engage in cooperation.

This study aims to draw up agendas for cooperation that Korea can spearhead at the 60th APEC Telecommunications and Information Working Group (TELWG) Meeting, which is to be held in Korea in October 2019, and seek ways for Korea to contribute to closer cooperation in the telecommunications sector through multilateral institutions.

● Main Outcomes of Research and Policy Implications

This study aims to establish a network that can strengthen cooperation in the Asia-Pacific region by identifying agendas for cooperation in the information and communications sector in the region, and using said agendas to promote carrying out projects involving cooperative tasks. Therefore, this study traces discussions being conducted in the information and communications sector by APEC, ASEAN, UN-ESCAP, and other cooperative and international organizations in the Asia-Pacific region and examines the trends and current status of related projects. This study also draws implications for future cooperation measures by taking a close look at the characteristics of each organization and the trends and current status of its projects. Chapter 3 of this study deals with three topics of discussion (5G networks, emerging digital technology regulations, and data utilization in the data economy) that were selected as major cooperation agendas for multilateral cooperation in the information and communications sector in the Asia-Pacific region, and analyzes related trends and policies in major countries in the region as well. In consideration of the priorities of the Korean government, APEC, APEC TELWG, and APEC member states, three main agendas were selected: (1) innovation and diversity of the 5G ecosystem, (2) regulatory governance for the utilization of emerging digital technologies, and (3) public-private partnerships in the data-driven economy to promote innovation. Chapter 4 presents suggestions on how to promote cooperation in the information and communications sector based on the agendas mentioned above.

This research can be used as a resource for policy-making to promote future multilateral cooperation in the Asia-Pacific region through the identification of cooperation agendas in the information and communications sector in the region and seeking of ways to promote cooperation. It is also expected to help Korea lead the ICT agenda in the international community and enhance its competitiveness in relevant sectors.



Key word

Information and communications technology (ICT), digital economy, APEC TEL, Asia-Pacific region, multilateral cooperation

A Study on Ways to Improve Effectiveness of ICT ODA through Establishment of Statistics Management System

Researchers: Deuk-Won KIM, Jong Hwa LEE, SeongHoon YOO, Youngmin SONG,
Na Yeon KIM, Ho KWON, Heejin LEE

● Purpose of Research

The UN Sustainable Development Goals (SDGs) serve as the largest joint milestones in the field of international development cooperation, emphasizing the importance of science, technology, and innovation. In the changing environment of international development cooperation, ICT is now in the early stages of commoditization and mainstreaming, making it necessary to strengthen basic research toward establishing the direction of ICT official development assistance (ODA) at a time when convergence between projects is being emphasized. In the domestic and overseas ODA statistical systems that have been developed thus far, the ICT sector has no representation or is represented by only nominal statistics, which makes it difficult to grasp the current status of ICT ODA. Accordingly, to enable systematic statistical management of ICT ODA, this study analyzes the elements of each project and makes policy suggestions for the further development of ICT ODA.

● Main Outcomes of Research and Policy Implications

This study was conducted with the purpose of presenting statistical standards for the analysis of ODA projects in Korea's ICT sector and increasing the effectiveness of the promotion of ODA projects in the ICT sector. The analysis of this research was conducted based on the Korean ICT integrated classification system, which was revised in 2020, from the perspective of ICT input factors for each ODA project using the ODA project list from the agenda of the 32nd Committee for International Development Cooperation (CIDC, 2019 Comprehensive Implementation Plan for ODA) as an analysis sample. It is necessary to analyze the budget items for each input factor in order to understand the proportion of ICT investment in ICT ODA projects. However, it was difficult to identify the detailed budget due to limitations of the available data.

The analysis results of this study are expected to serve as a basic resource for establishing the ICT ODA concept and improving the ICT ODA statistical management system, as they provide valid classification criteria that fully consider the characteristics of ICT. The results are also expected to revitalize ICT ODA and strengthen cooperation between ministries through the dissemination of ICT ODA information and suggest the development direction for ICT ODA in Korea.

To establish a strategic ICT ODA statistical management system, it is necessary to accumulate data and continue research toward identifying trends, and joint research with other ministries, related institutions, and experts for in-depth analysis of convergence projects will be required as well. ICT

is considered as an important factor that enables the development and application of technology that increases performance in all sectors. However, the application of ICT as a means of achieving goals may be overlooked. In this sense, the introduction of an ICT ODA marker can be viewed as a way of substantiating the performance of ICT ODA in Korea, and it will be necessary to discuss plans for this in a follow-up study.



Key word

ODA, ICT ODA, ICT ODA statistics, statistics management system, ICT integrated classification system

Research on ICT Cooperation and Strategy with Multilateral Development Banks

Researchers: Sang-yirl NAM, Sung woong KIM, Jung Eun PARK, Byungwoo KIM

● Purpose of Research

To achieve inclusive growth in the digital transformation of society, it is important to bridge the digital divide. For this reason, various efforts are being made to narrow the digital divide in the international community. To promote inclusive growth around the world, Korea is also contributing to global ICT development cooperation through various channels. Among these channels, investment in ICT through multilateral development banks has been increasing, and cooperation with such banks has continued to expand. Accordingly, this research aims to identify ways of enhancing ICT cooperation through multilateral development banks and further seek ways for the Korean government and companies to expand Korea's ICT cooperation activities.

● Main Outcomes of Research and Policy Implications

Chapter 2, Section 1 of the main body of this study provides an overview and outlines the organizational structure, business operation, and financing of the World Bank (WB), Asian Development Bank (ADB), Asian Infrastructure Investment Bank (AIIB), and Inter-American Development Bank (IDB), which are the major multilateral development banks of which Korea is a member and through which Korea is able to promote ICT cooperation. In addition, the status of financial support by sector and region is investigated. In Section 2, the project procedures and bidding methods of multilateral development banks are introduced.

This study is designed to derive plans for ICT development cooperation through multilateral development banks. Chapter 3 of this study examines ICT- and digital economy-related programs and strategies promoted by multilateral development banks. It also investigates ICT-related programs and projects in which Korea is participating with multilateral development banks as well as the current status of funds in operation.

Chapter 4, Section 1 of this study reviews the current state of the digital economy and ICT-related policies of Korea in order to discover the ICT sectors in which Korea has strengths and examines ICT projects promoted by Korea in international organizations and regional cooperation entities. In Section 2, the key areas of response of the multilateral development banks are analyzed, with a focus on the digital-related projects promoted by the World Bank, and the ICT agendas with which Korea can cooperate are identified by deriving response measures for Korea in key areas. Finally, Section 3 looks at the activities of the multilateral development banks in response to the outbreak of the COVID-19 pandemic. In the conclusion, this study presents plans for ICT cooperation between Korea and the multilateral development banks based on the aforementioned investigations and

analysis.

The ICT cooperation measures derived in this study are expected to be applied to Korea's new ICT-related projects and used to raise funds for such projects. Also, given how the COVID-19 situation has highlighted the importance of ICT, the measures can be used for international cooperation after the COVID-19 situation is resolved. Last but not least, we expect that they will be used as a reference material for identifying agendas, organizing programs, and deriving detailed cooperation plans for the biennial Korea-Latin America ICT Ministerial Meeting.



Key word

Multilateral development bank, international cooperation, information and communications technology, digital economy, ICT cooperation

Study on international cooperation on 5G in Asia-Pacific region

Researchers: Sang-yirl NAM, Sung woong KIM, Jung Eun PARK, Byungwoo KIM

● Purpose of Research

Since 5G networks have higher speed and lower latency than existing communication networks, they are expected to enable various data-based services in a variety of ways, such as speeding up data transmission and allowing the transfer of massive amounts of data. Therefore, through its application to the development of economic and social solutions and promotion of innovation, 5G is expected to emerge as a new engine of economic growth. In April 2019, Korea became the first country in the world to commercialize 5G services, and many countries are still pursuing or completing commercialization now. The purpose of this study is to prepare plans for promoting cooperation in the Asia-Pacific region by utilizing Korea's leading technology and policy experience in the field of 5G, given the increasing importance of building 5G networks and ecosystems.

● Main Outcomes of Research and Policy Implications

This study consists of five chapters. Chapter 1 (Introduction) summarizes the background, necessity, and methodology of the research, while Chapter 2 reviews the roles of various international organizations, consultative bodies, and associations conducting discussions on 5G, such as the OECD, ITU, 3GPP, 5G-ACIA, and 5GAA, as well as the content of such discussions. Chapter 3 examines 5G network construction, policy, and regulatory trends in major APEC countries as well as 5G-related policies and regulatory trends in Korea, while Chapter 4 explores the direction of 5G cooperation in the Asia-Pacific region by giving an overview of the APEC Digital Innovation Sub-Fund and presents specific cooperative projects (drafts) that can be promoted in the 5G sector. Lastly, Chapter 5 summarizes the previously discussed content and draws implications for the promotion of 5G cooperative projects in the Asia-Pacific region.

The main implications of this research are as follows. First, since policy priorities and strategies for 5G vary by country in the Asia-Pacific region due to differences in the level of 5G network development and spectrum band utilization, such differences need to be considered. Second, as discussed in relation to global trends, 5G differs significantly from existing mobile communications technologies. This is why the participation of various stakeholders is more important than ever, and the discovery of new services through the convergence of 5G and existing industries, such as vertical industries, is emerging as an important topic. Therefore, it is necessary to consider expanding the scope of cooperation in which various actors, such as telecommunications companies and standardization organizations, are participating.

As this study seeks ways to pursue cooperation on 5G in the Asia-Pacific region using the APEC Digital Innovation Sub-Fund, it is expected to be utilized for the promotion of APEC cooperation projects. It is also expected to be used as reference material by a number of international organizations, including APEC, in promoting cooperative projects in the future.



Key word

APEC, Digital Innovation Sub-Fund, international cooperation, information and communications technology, digital economy, ICT cooperation

2020 Report on Survey of Actual Usage Status of North Korea Broadcasting and Communications

Researchers: Hayun KANG, Jihyun PARK, Dong-Min YIM, Soyoung SEO

● Purpose of Research

The purpose of this study is to conduct a survey on North Korea's use of broadcasting and communications in order to effectively promote inter-Korean exchange and cooperation in broadcasting and communications, respond to the policy demands in the North Korean broadcasting and communications sector in line with changes in inter-Korean relations, and provide basic data that can contribute to bridging the information gap between the two Koreas. To this end, four detailed goals were set for the methodology of this research based on the reality that it is impossible to survey North Korean residents. The first and second goals are conducting a literature review and joint research. To be more specific, these goals involve reviewing publications of institutions at home and abroad and North Korea and promoting cooperation with overseas universities, research institutes, and NGOs that are working with North Korea. The third goal is conducting a survey on the use of broadcasting and communications in North Korea. However, since it is impossible to conduct a direct survey of North Korean residents, we surveyed North Korean defectors. The last goal is analyzing the Korean Central TV schedule, which involves examining broadcasting times, programming, and changes to analyze the current state of North Korean broadcast programming and trends using the Korean Central TV schedule from 2006 to 2019.

● Main Outcomes of Research and Policy Implications

According to the aforementioned purpose, the content of this study is as follows. First, in Chapter 2, a literature review is conducted to identify demand by analyzing previous research in Korea, academic papers published in North Korea, and policy trends in relation to broadcasting and communications. The review covers mainly domestic and foreign literature published at home and abroad as well as in North Korea. Through the domestic literature review, the types of existing documents related to inter-Korean broadcasting and communications exchange and cooperation in the past are analyzed, and the status of the broadcasting and communications policies in North Korea is derived. For the review of North Korean literature, about 40 research papers and 20 patents related to broadcasting and communications in North Korea from the period between 2015 and 2019 are analyzed. Chapter 3 analyzes the current state of the North Korean broadcasting market as well as its ideology, history, and media and identifies recent changes based on consultations with experts. Also, by investigating the broadcasting time, programming status, and changes based on the schedule of Korean Central TV from 2006 to 2019, the status of North Korean broadcast programming is analyzed in cross-section and time series. Chapter 4 provides details on the survey that was conducted to understand the reality of North Korean broadcasting and summarizes the survey results. Finally, Chapter 5 draws implications from the analysis of the current state of North

Korea's use of broadcasting and proposes policy directions for revitalizing inter-Korean broadcasting and communications exchange in the future.

Given the changes in inter-Korean relations, interest in North Korea's use of broadcasting and communications is increasing, and demand is also increasing in terms of policy. However, under the ongoing sanctions against North Korea, it is nearly impossible to make direct contact with North Koreans and very difficult to receive permission to conduct surveys from the North Korean authorities.

This study uses the schedule of Korean Central TV to generate statistical data within the scope that is permitted given the sanctions against North Korea. It also suggests strategic survey methods to enable subsequent studies to efficiently conduct surveys on the use of North Korea's broadcasting and communications in the long term. The survey on the use of broadcasting and communications in North Korea conducted for this research is meaningful in that it can provide basic data for drawing up policies and seeking ways to revitalize inter-Korean exchange and cooperation. In particular, using the survey results as basic data will make it possible to find ways to establish policies and promote private-sector exchange and cooperation.



Key word

North Korean broadcasting and communications, North Korean media, North Korean broadcasting policy, status of North Korean broadcasting, inter-Korean cooperation in broadcasting and communications

ICT Development Consultation Program in 2020

Researchers: Jong Hwa LEE, Sangwon KO, Deuk-Won KIM, Dong-Min YIM, SeongHoon YOO, Youngmin SONG, Na Yeon KIM, Soomi JEONG, Yunjeong JANG, Gayeon HONG

● Purpose of Research

In 2015, the UN presented the Sustainable Development Goals (SDGs) with the aim of ending poverty and inequality, which are major global problems, and emphasized the role and use of information and communications technology (ICT) as a means of achieving these goals. However, the gap in ICT capabilities between developed and developing countries has not significantly narrowed, with developing countries continuing to need help from developed countries.

Through ICT, Korea has experienced rapid economic development, allowing it to move beyond its former status as an aid recipient country to a donor country. For this reason, it is expected that Korea will engage in substantial cooperation for international development. To this end, the Ministry of Science and ICT of the Republic of Korea is planning and conducting various ICT-related official development assistance (ODA) projects.

In particular, the “ICT Development Consultation” project aims to help the governments of developing countries introduce and utilize ICT-related policies in order to drive their national development. To achieve this goal, the project is carried out in a way that is tailored to the circumstances of each recipient country. While taking into consideration the needs of and expected effects on individual beneficiary countries, detailed issues are selected, and policy measures that can be effectively applied to such issues are considered together, thereby strengthening the rational process of policy decision-making in partner countries.

In addition, this project is expected to have the effect of promoting the joint development of Korea and the beneficiary countries. By sharing Korea’s experience and know-how and forming an intimate network, it is possible to create a policy environment similar to that of Korea and lay the foundation for the overseas expansion of Korea’s ICT industry. Ultimately, the project will allow Korea to fulfill its responsibilities and obligations as a model country for the international community and strengthen its position in the fields of ICT and ODA.

● Main Outcomes of Research and Policy Implications

With the support of the Ministry of Science and ICT, KISDI has been making continuous efforts since 2002 to bridge the information gap of developing countries through the ICT Development Consultation project. In 2020, four detailed consultation projects were carried out (consultation on ICT standardization policy in Laos, policy for spectrum allocation and efficient use in Ecuador, establishment of cyber security system in Nepal, and policy for spectrum allocation and pricing in Moldova) by classifying the four projects according to the type of business operation (inter-

institutional linkage/collaboration model, multilateral development bank participation model, model for preemptive response to ICT issues, and performance management/follow-up action model).

In 2020, the method of operation of the ICT Development Consultation project was changed to online consulting, instead of holding on-site consultations and study visit consultations, due to the spread of the COVID-19 pandemic. The consulting group, which is composed of experts from industry, academia, research institutions, and government, conducts three or four online consulting workshops to introduce Korea's information and communications broadcasting policies and present policies and strategic directions suitable for the information and communications broadcasting environment of partner countries.

Most of the ICT Development Consultation projects are expected to be reflected in the laws or policies of the partner countries in the near future, and the development of the information and communications broadcasting sectors of the partner countries will greatly strengthen the ties between those countries and Korea in the future. In particular, the spread of a Korean-style policy platform is expected to significantly contribute to cooperation between the private sectors of Korea and its partner countries.



Key word

Information and communications broadcasting, ICT Development Consultation, developing countries, development cooperation, ODA, SDGs

A Study on ICT ODA Framework Development in 2020

Researchers: Jong Hwa LEE, Deuk-Won KIM, SeongHoon YOO, Youngmin SONG,
Soomi JEONG, Yunjeong JANG, Na Yeon KIM

● Purpose of Research

In Korea, the importance of inter-ministerial, inter-agency, and inter-sector convergence has emerged in relation to enhancing the effectiveness of ODA, as it has been pointed out that the effectiveness of aid has declined due to the fragmentation of official development assistance (ODA) projects in Korea. Information and communications technology (ICT) is a cross-cutting factor that can be applied to all fields of ODA, such as medical care, education, and agriculture, and it can have a significant impact on convergence between sectors. In particular, it is important to go beyond simply supporting other sectors (computer system development, etc.) to discover projects that can actively demonstrate Korea's expertise in and innovation of ICT. There are various concepts related to convergence, such as convergence by region, sector, stage, and input element, but in this study, convergence refers to only inter-ministerial convergence projects. In other words, this study aims to propose a joint project between the Ministry of Science and ICT (MSIT), which is the national ICT department, and other ministries. Focusing on the subject of multi-ministerial convergence projects, this study identifies areas to be fostered, such as open data/big data and the ICT start-up ecosystem, and presents a convergence project plan. In the future, the data generated by this research will be used to identify the interests of developing countries, discover partner countries, and discuss funding and specific project types with partner countries and domestic institutions. In summary, the goal of this study is to establish project specifics in as much detail as possible in order to persuade decision makers in developing countries to actively participate in ODA convergence projects for the purpose of realizing their policy goals.

● Main Outcomes of Research and Policy Implications

This study examines the concept and types of ODA convergence projects, describes the process through which ODA convergence projects are promoted, and analyzes the convergence projects in the fields of science, technology, and ICT that have been discussed from 2019 and their future directions. It also derives two models of convergence projects: 1) development of open data/big data, and 2) multi-ministerial convergence projects to foster the ICT start-up ecosystem. According to the procedures of ODA projects, the first step is to identify demand of the relevant developing country and conduct feasibility studies before the project is adopted. Therefore, it is necessary for policymakers of the developing country to make it clear that open data/big data or the ICT startup ecosystem is in demand in order for them to be selected as a convergence project. In addition, even if policymakers are aware of the importance of the issue and agree to promote the project, an in-depth preliminary analysis and systematic approach that meet the needs and circumstances of the

developing country will be required.

In this context, an individual approach by each country cannot be ruled out, but it would be more effective if international organizations (ITU, etc.) or multilateral development banks (ADB, IDB, AfDB, etc.) lead the project, in terms of publicity and ripple effect. In this way, discussion on data-related standardization and personal information protection would be more effective, and it would be easy to follow the principle that only those areas in which the private sector finds it difficult to perform should be provided with public funds in terms of support for start-ups. Therefore, Korea needs to actively raise these issues to multilateral development banks and international organizations that deal with developing countries. Through these efforts, we hope that developing countries will be able to achieve UN Sustainable Development Goal 8 (Decent Work and Economic Growth) in the early stage of their development through the fostering of the data industry and vitalization of ICT startups.



Key word

Information and communications broadcasting, policy advisory, developing countries, development cooperation, ODA, SDGs

Consultation on Establishing Cyber Security System in Nepal

Researchers: Sangwon KO, SeongHoon YOO, Wan S. YI, Hyung-Jong KIM, Hae Young LEE

● Purpose of Research

The consultation on the 2020 strategy for the establishment of Nepal's Computer Emergency Response Team (CERT) and information security was carried out as a part of the "ICT Development Consultation" Program. Delivering Co-Prosperity through ICT Development" project. Consultation activities were carried out through this project to identify the status of information security in Nepal and draw up a plan for establishing a CERT monitoring system and response governance.

● Main Outcomes of Research and Policy Implications

In Nepal, various types of cybercrime, such as jackpotting attacks targeting ATMs, website tampering, and data leakage, are on the rise. Nepal's laws on information security include the: 1) Electronic Transaction Act (2063) and Electronic Transaction Rules (264), which are the country's basic laws on cybercrime and digital signatures, 2) National ICT Policy, which covers cybercrime, cybersecurity, and capability-building, 3) National IT Emergency Response Team Directive, which involves the establishment of a national IT emergency response team, and 4) Digital Nepal Framework, which proposes the establishment of a national cybersecurity center, among 80 initiatives.

Nepal's Department of Information Technology (DoIT) and Ministry of Information and Communication Technology (MoICT) have proposed the establishment of a CERT under the MoICT to detect and respond to cyber threats and, together with the SOC team, support the establishment of regulations related to risk detection and cooperative response. In addition, in 2019, the Nepalese government issued the National IT Emergency Response Team Directive, which contains regulations on the operation of ITERTs and the National Security Operation Center. The establishment of the National ITERT is still in its infancy, and countermeasures against cyberattacks, information disclosure, and other national ITERT operating standards and guidelines have not been prepared yet. Installed within the premises of MoICT and jointly operated by the National IT Center and MoICT, the National Cyber Security Monitoring Center is responsible for monitoring critical ICT infrastructure, including network equipment and software applications of national importance. Within this fiscal year, the National Cyber Security Policy, of which the first draft has already been prepared, is expected to obtain Cabinet approval, and the IT bill under consideration by the National Assembly is also expected to be approved in the near future. To establish and operate a national CERT, clear legal guidelines on the prevention of cyber security incidents, initial response, and follow-up management are required. In these guidelines, the detailed roles and responsibilities of each agency should be categorized and defined, and cooperation with other stakeholders related to cyber security incidents should also be specified. The national CERT-related

legal framework should deal with the following four topics: network and system protection through the establishment and dissemination of countermeasures against cyber infringements, liability provisions for Internet/Information Service Providers (ISPs/NSPs), duty to provide notification of cyber breaches and incidents, and violation and prohibition of infringements on information and communication networks. The national ITERT must establish standard procedures for responding to all cybersecurity-related issues in Nepal, and these standard operating procedures must comply with global standards, given that the national ITERT is cooperating with overseas CERTs. In connection with this, this study proposes the establishment of procedures for responding to security issues in Nepal.

**Key word**

Nepal, information security, CERT, computer emergency response team, cyber threat

Consultation on ICT Standardization in Lao PDR

Researchers: Sangwon KO, Soomi JEONG, Min-Gyu HAN, Dae-Ki KANG, Suwook HA

● Purpose of Research

Consultation on the establishment of the 2020 Laos Standardization System was carried out as part of the “ICT Development Consultation” project. Through this project, consultation activities were conducted to assess the current standardization system of Laos and derive strategies for future development.

● Main Outcomes of Research and Policy Implications

ICT standardization is essential for the promotion and development of the overall ICT industry, as it ensures interoperability between systems and interworking between services, enhances consumer convenience and public safety and protection, and facilitates market entry. To this end, ICT standardization activities both in the public and private sectors, such as the establishment of an ICT standardization system and organization, must be revitalized. In Laos, ICT standardization activities in both sectors remain limited, and there is no official standardization system. Recently, as Laos' Ministry of Post and Communications (MPT) has been attempting to establish an ICT standardization system, the KISDI consulting group reviewed the lessons learned from the establishment of Korea's ICT standardization system, major overseas cases, and the current ICT situation in Laos. Based on this, the following consultation and policy suggestions are presented.

First, in the case of Korea, the National Radio Research Agency (RRA) is an institution that makes legal standards, and the Korea Telecommunications Technology Association (TTA) sets the de facto standards. The RRA was established by presidential decree, and the TTA was established by civil law. Therefore, there is a legal basis for ICT standardization in Korea. The RRA, as a regulatory body, provides EMI (electromagnetic interference), EMS (electromagnetic susceptibility), and wired/wireless ICT device testing services through its conformity assessment lab, while the TTA operates an ICT testing and certification lab and software testing and certification lab. The TTA also provides various programs that promote SMEs. Laos needs to establish a clear legal system for ICT standardization and put in place institutions (public and private) that are responsible for ICT standardization, as Korea has done. In particular, it needs to provide ICT-related testing and certification services.

Second, examples of national ICT standardization institutions and systems in the United States, European Union, Japan, and China are shared. In addition to the standardization system of each country, cases of local organizations and international organizations such as the ITU, ISO, and IEC, which are in charge of ICT standardization worldwide, are shared. Like many other countries, Laos must first conduct an assessment of available resources, such as development capabilities and

standardization-related human resources, as well as establish government policies and legal systems that reflect the government's strong will for standardization and gradually begin to participate in global ICT standardization activities.

Third, big data standardization is shared as a case study. With the paradigm shift from hardware- and software-based computing to data-based computing, the importance of big data is growing. Big data is widely used in the public and private sectors, and various standards are being established around the world to enable the efficient collection, storage, operation, and sharing of data. Big data and Internet data centers have the advantage of providing cloud-based capabilities enabling data sharing and analysis between institutions, and have great potential for use. Therefore, after a review of the current laws related to Internet data centers in Laos, this study provides suggestions on applicable big data standards and plans for establishing future big data standards.

Based on the results of the policy consultation, Laos' MPT plans to propose a draft bill on ICT standardization. Also, based on the policy consultation on the establishment and system/composition of a standardization organization, a standardization organization is currently planned to be established under the MPT. In addition, the results of the consultation on big data standardization will be used to revise data center management strategies and build a data platform in the future.



Key word

ICT standardization, conformity assessment, testing and certification, public standards, de facto standards, standards development, big data standard, data center

Consultation on Policy for Spectrum Allocation and Pricing in Moldova

Researchers: Jong Hwa LEE, Dong-Min YIM, Na Yeon KIM, Yunjeong JANG, Yongkyu KIM, Taehan KIM, Miseon RYU, Hyunjik KIM

● Purpose of Research

Consultation on the 2020 policy for spectrum allocation and pricing in Moldova was carried out as part of the “Policy Advisory on Information and Communications Broadcasting for Developing Countries” project. Through this project, policy recommendations were made to check the current status of spectrum management, identify challenges, and derive future spectrum management plans and strategies.

● Main Outcomes of Research and Policy Implications

Currently, in Moldova’s mobile communications market, Orange (French) occupies 62% of the market, followed by Moldcell (Swedish) at 34% and Moldtelecom (state-owned) at 4%. As Moldova follows the EU Directives (since it wants to join the EU), it cannot impose separate regulations on foreign companies. In addition, although the Moldovan government wants to secure a source of income through spectrum auctions, it is structurally difficult to do so because of the sufficiency of spectrum bandwidth, large asymmetry between operators in the market, and low competition, as described above. The Moldovan government has been promoting the “2021-2025 Moldovan Spectrum Management Program Act” (to come into effect in January 2021), and it requested policy recommendations from the Korean advisory group in the process of final establishment and approval of the program. As a result, the following consultation and policy suggestions are presented.

This first suggestion is related to spectrum allocation and assignment. In the case of spectrum allocation, it is necessary to measure the economic value of each spectrum-based service and carry out allocation more economically in consideration of various mobile services. Also, spectrum needs to be allocated more flexibly in consideration of the development of various frequencies, the updated National Spectrum Allocation Table (NTFA), and the securing of technology neutrality (already well implemented in Moldova), and preemptive allocation based on future spectrum demand, especially the long-term supply of spectrum for mobile services, is necessary. In addition, more flexible deployments are required, such as spectrum allocation, spectrum refarming, and secondary spectrum market activation, and deployment efficiency needs to be increased by taking into account the minimum spectrum guarantee to promote competition, inefficiency of spectrum blocks above technical standards, efficiency of broadband frequencies compared to the fairness of differentiated frequencies, and spectrum interference with neighboring countries, such as Ukraine.

Second, this study recommends that Moldova set the principles and goals of spectrum price calculation and policy. It would be possible to introduce the ITU’s spectrum pricing principles and

policy goals into the current Moldovan Electronic Communications Act. Like the UK, the Moldovan government could divide the current license into two categories: cost recovery rules and AIP rules. For licenses with no excess demand, the cost recovery rule would be appropriate, while for licenses with excess demand, the AIP rule would be appropriate. Also, in the case of Moldova, spectrum management costs are covered by taxes from various licenses and electromagnetic compatibility certification costs. Most countries collect license fees or radio wave fees to recover spectrum management costs, and Moldova could also consider adopting this method. Currently, there are three telecom operators in the Moldova market, and two of them occupy a relatively small proportion of market share, which may limit active auction bidding. Therefore, it will be necessary to set the lowest auction price at a reasonable level for telecommunications companies by referring to cases in Korea and other countries.

Finally, it is necessary to establish a clear legal framework (definition and procedure, etc.) for spectrum refarming, spectrum disposal, relocation, and compensation. A systematic and comprehensive analysis that addresses legal, technical, and economic aspects will also be required to collect opinions from the public, ensure spectrum efficiency, and minimize conflicts. In addition, it is necessary to consider the designation of an agency in charge of compensation services so that efficient spectrum refarming and relocation can be carried out.

**Key word**

Moldova, spectrum, spectrum allocation, spectrum auction, spectrum management, spectrum pricing

Consultation on Policy for Spectrum Allocation and Efficient Use in Ecuador

Researchers: Jong Hwa LEE, Dong-Min YIM, Youngmin SONG, Hyungtaik AHN, Hoon JUNG, Sang Won LEE, Jaekyung PARK, Hyunjik KIM

● Purpose of Research

Consultation on the 2020 policy on spectrum allocation and efficient use in Ecuador was carried out as part of the “ICT Development Consultation” project. Through this project, consultation activities were conducted to assess the current state of Ecuador's spectrum management and derive future policies on spectrum management, universal service, and digital radio.

● Main Outcomes of Research and Policy Implications

In Ecuador, CNT, a state-owned company, has a monopoly in the wired communications market, while three companies (CNT, Movistar, and Claro) compete in the mobile market. Ecuador's mobile spectrum band uses 280MHz in the band below 3GHz, and Claro and Movistar, the private mobile operators, renewed their spectrum licenses for USD 700 million in 2008. CNT started to offer LTE service earlier than its competitors, thanks to government support, using 30MHz in the 700MHz band and 40MHz in the AWS (1700/2100MHz) band. As commercial mobile services become popular in Ecuador, pricing is required to promote the efficient use of frequencies. In particular, the spectrum price should be recovered from the operators by reflecting the opportunity cost of holding the spectrum and all management costs. In addition to the 280MHz already allocated, the Ecuadorian government has announced plans to allocate a 650MHz IMT band. In Ecuador, it is very positive that both wired and wireless Internet are included in the universal service range, and that technology-neutral views on regulations are maintained. Currently, Ecuador recognizes the need for the digital conversion of analog radio broadcasting and is making changes to that end. When the digital radio broadcasting method is adopted, the adoption may vary depending on the technical characteristics, such as DAB/DAB+, HD radio, and DRM/DRM+, as well as available services and terminal market conditions. Policy recommendations for efficient spectrum management are presented as follows.

First, it is very important to formulate additional spectrum deployment plans, for which the Ecuadorian government should provide a roadmap. The government implemented an effective competition policy that allocates LTE frequencies to CNT before two private competitors and exempts license fees to expand Internet connection. However, it is too early to conclude that the policy is successful, given that CNT's cost advantage primarily came from the reduced spectrum costs, and that Claro and Movistar were able to invest in 4G networks regardless of the competition policies. Therefore, it is necessary to reconsider the policy of “effective competition” and review possible ways of switching to the “fair competition” policy in preparation for the 5G era.

Second, although it may be difficult to introduce a spectrum auction in Ecuador's circumstances, the

government should use the AIP to calculate the initial license in order to reflect the opportunity cost of spectrum ownership and also consider administrative methods of calculating an initial license fee that is sufficient to recover all costs related to radio spectrum management and regulation.

Third, it is necessary to establish a minimum service provision rate because an appropriate service level for universal broadband service has not yet been established in Ecuador. In the case of wired Internet, it will be possible to provide wired and wireless technologies. Also, it is necessary to select a high-priority region as the target of universal service policy, and since there is no budget available for universal service in Ecuador, it is realistic to impose a universal service obligation as a condition of spectrum allocation.

Fourth, in addition to adopting a digital spectrum method for the conversion to digital radio broadcasting, initial system investment and costs for continuous system operation are required. Therefore, it is necessary to select the most effective method in consideration of all relevant factors. This study suggests that digital transformation be promoted after a specific transformation plan is established.



Key word

Ecuador, spectrum, spectrum management, spectrum pricing, universal service, digital radio

IV

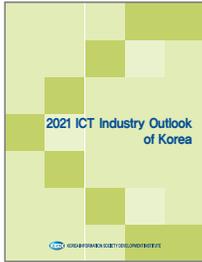


Research Activities in 2020

1. Publication of Periodicals
2. Domestic and International Exchange
3. Research on Related Events

1

Publication of Periodicals



2021 ICT Industry Outlook of Korea

- Analysis on the current status, prospects, and international competitiveness of each sector of the information and communications industry (written in English)
- Annual

December, 2020

Jeong-Eon Kim, Yuri Park, Oh Jung Sook

Part	Sector
PART I	CURRENT STATUS AND OUTLOOK FOR KOREA'S ICT SECTOR
PART II	INTERNATIONAL COMPARISONS OF COMPETITIVENESS IN THE ICT SECTOR
PART III	CORE TECHNOLOGY IN THE POST-COVID-19 ERA: VR/AR INDUSTRY AND REGULATIONS



Trends of the Information and Korea Communications Industry in 2020

- Recent trends of the information and communications industry at home and abroad and forecast of future development
- Annual

December, 2020

Chapter	Sector
Chapter 1	ICT and Media Equipment
Chapter 2	ICT and Media Service
Chapter 3	Software



ICT & Media Policy

- Analysis of Major issues on ICT and media policy at home and abroad and prompt provision of market trends
- Monthly

No.	Subject	Author	Date of Issuance
Volume 32, No. 1, Issue No. 696	Myanmar mid- to long-term Mobile Communications Frequency Supply Plan	Dong-Min YIM	Jan. 31, 2020
	VR/AR Market Prospects and Business Trends	Eun-Min LEE	
	Future Car-related Policies and Systems in Major Countries	Ka Nyeong SON	
	Open Banking: the Starting Point for a Leap Forward in the Fintech Industry	Eunjean JUNG	
Volume 32, No. 2, Issue No. 697	Publication of the White Paper on Facebook's Online Content Regulation and Analysis of the Response to COVID-19	Eunjean JUNG	Feb. 28, 2020
	Netflix's Domestic TV Content	Hojung KIM	
	Analysis of Foreign Direct Investment Trends in the ICT Sector after the Enforcement of the Foreign Investment Risk Review Modernization Act (FIRRMA)	Eunyoung LEE	
Volume 32, No. 3, Issue No. 698	African Tech Startup Market Trends	Soomi JEONG	Mar. 31, 2020
	How to Use Digital Signage to Build a Smart City	Yong Seok CHEON	
	Domestic and Foreign Market Trends of Future Cars	Ka Nyeong SON	
	AI Ethical Guidelines for User Protection in the UK: Focusing on "Understanding Artificial Intelligence Ethics and Safety"	SungHyuk BYUN	
Volume 32, No. 4, Issue No. 699	African Tech Startup Trends	Soomi JEONG	Apr. 30, 2020
	Judgment Criteria for Compatibility Assessment in GDPR and Examples of Application: Focusing on Comparison and Analysis with Domestic Laws	Chang Bum LEE	
	Trends of US food delivery platforms	Kyoung Nam LEE	

No.	Subject	Author	Date of Issuance
Volume 32, No. 4, Issue No. 699	Guidelines for Enterprises' Use of AI and Algorithms: Focusing on "Using Artificial Intelligence and Algorithms" of the US FTC	Gimun YANG	Apr. 30, 2020
	Digital Transformation Trends in the Mining Industry	Soomi JEONG	
Volume 32, No. 5, Issue No. 700	Key achievements of the Korean regulatory sandbox system and future legal challenges	Ga-yoon Kim	May. 31, 2020
	Trends of Discussions on IP-Based Network Transition in France	Jeongmin JIN	
	Analysis of Mongolia's ICT Environment	Youngmin SONG	
	2019 R&D Investment Status of Global ICT Companies	Jae Hoon JEONG	
Volume 32, No. 6, Issue No. 701	Frequency usage plan and policy implications for 5G vertical service	Sang Yoon LEE	Jun. 30, 2020
	Analysis Report on Artificial Intelligence Ethical Principles: Focusing on "Principled Artificial Intelligence" at the Berkman Center of Harvard Law School	Sunyoung HWANG	
	Huawei's entry into Africa	Soomi JEONG	
Volume 32, No. 7, Issue No. 702	Role of the Digital Services Act and Legislative Measures: Focusing on "Right Platform Regulation" by European Digital Rights Organizations	Hyun-jin AHN	Jul. 31, 2020
	Trends of AI Policing and AI Crime	Soomi JEONG, Dewy (DooLee) PARK	
	Analysis of Moldova's ICT Environment	Na Yeon KIM, Yunjeong JANG	

No.	Subject	Author	Date of Issuance
Volume 32, No. 8, Issue No. 703	Data utilization strategies of e-commerce platform operators	Jae Hoon JEONG	Aug. 31, 2020
	Growth prospects of the global PC market	Eun-Min LEE	
	African cryptocurrency usage trends	Soomi JEONG, Yunjeong JANG	
	Carbon Footprint of the ICT Industry	Soomi JEONG	

No.	Subject	Author	Date of Issuance
Volume 32, No. 9, Issue No. 704	Platform definition and type of each nation	Hyun-jin AHN	Sept. 30, 2020
	Data Utilization Strategies of App Distribution Platform Providers	Jae Hoon JEONG	
	Current status of female workforce and female users in the game industry	Soomi JEONG, Dewy (DooLee) PARK	
	Trends of African Blockchain Usage	Soomi JEONG, Yunjeong Jang	
Volume 32, No. 10, Issue No. 705	Trends of the European Union's Regulations Countering Illegal Hate Speech Online	Min Jeong KIM	Oct. 31, 2020
	2021 Strategic Technology Trends and Actions: Focusing on Gartner's "Top Strategic Technology Trends for 2021"	Yuri OH	
	Regulatory Barriers to the Overseas Expansion of the Broadcasting and Communications Sector and Difficulties and Implications	Minhee LEE, Hyunmok LEE, Yeonhee JUNG	

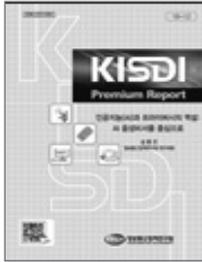


Postal Information Review

- Introduction of policies and theories, management techniques, and major issues related to Korea Post's services, such as postal and financial services
- Quarterly

No.	Subject	Author	Date of Issuance
Spring, 2020	A Study on the Use of Chatbots in Korea Post's Financial Services	Honglim KIM	Mar. 16, 2020
	Korea Post's VIP savings customer management plan using big data analysis	Jae-Seog PARK	
	Review of the possibility of using Korea Post's financial service windows following bank branch closures	Joo-youn OH	
	The status and implications of AI technology adoption in the logistics industry in terms of user experience (UX)	Jihye KIM	
Summer, 2020	Digital twin technology trend and application plans in postal logistics	Sangyi RYU, Minhyuk KIM	Jun. 15, 2020
	Korea Post's savings analysis and suggestions for a savings strategy model in the new financial environment	Nam-jin CHOI	
	Status of and Prospects for the Logistics Real Estate Market at Home and Abroad	Chan-Seok PARK	
	Blockchain technology adoption in the financial industry and implications for Korea Post's financial services	Min Jin KIM	
	Introduction of artificial intelligence (AI) technology in the financial industry and job changes	Myeong Ok AN	
	Use and development prospects of express delivery services	Joong Beom CHOI	

No.	Subject	Author	Date of Issuance
Autumn, 2020	Examples and implications of data value creation	Kyunggoo, YOON, Myeong Ok AN	Sept. 15, 2020
	Analysis of risk factors by generation and strategy for Korea Post's insurance products	Hee Won PARK	
	Korea Post's affiliate service promotion through consumer utility analysis	Jae-Seog PARK	
	A study on logistics robot trends and introduction of postal logistics robots	In-sup KIM, Sangyi RYU	
	Postal business management status and future tasks	Joonhwa JUNG	
Winter, 2020	Financial burden and service maintenance cost of universal postal service	Joong Beom CHOI	Dec. 15, 2020
	Trends and implications of life insurance product development	Ha-gak RYU	
	Korea Post's financial service development direction in response to the Fourth Industrial Revolution	Jae-Seog PARK	
	Status of Untact Last Mile Postal Delivery Service based on Unmanned Mobility Devices	Hoon JUNG, Eunhye KIM	



KISDI Premium Report

- In-depth analysis on timely issues in the ICT and media sector
- Monthly

No.	Subject	Author	Date of Issuance
20-01	Economics of Digital Platform I: Competition Issues in the Digital Market in the Era of Big Data and AI	Gae-lyong CHOI	Mar. 4, 2020
20-02	Economics of Digital Platform II: Regulatory Issues in the Digital Market in the Era of Big Data and AI	Gae-lyong CHOI	Mar. 13, 2020
20-03	(I) Response of the telecommunications sectors of major countries to the spread of COVID-19 (I)	Telecommu- nications & Spectrum Research Division	Apr. 21, 2020
20-04	Impact and implications of COVID-19 on the broadcasting and media industry	Jae-Young LEE and 3 researchers	Apr. 27, 2020
20-05	COVID-19 and False Information: Analysis and Countermeasures	Wook-Jei SUNG, Eunjean JUNG	May. 7, 2020
20-06	Personal Information Processing in Response to Infetious Diseases: Issues and Challenges	Seong Eun CHO	Jun. 5, 2020
20-07	Use of big data in the public sector and cooperation plans in Korea and developing countries	Jihyun PARK, Soomi JEONG	July. 30, 2020
20-08	Core Technologies in the Post-COVID-19 Era: VR/AR Industry and Regulatory Issues	Joonmo Kang, Eun-Min LEE	Aug. 28, 2020
20-09	Ripple effects of the Biden election and direction of ICT policy	Hoyeong LEE and 7 researchers	Nov. 27, 2020
20-10	Data sovereignty and data governance in the post-COVID-19 era	Yong Chan JUNG	Dec. 14, 2020
20-11	Main contents and implications of the European Union's Digital Services Act	Hyeon Soo KIM, Sung Ho JEON	Dec. 21, 2020
20-12	Main contents and implications of the trade rules related to the international movement of data in the RCEP	Seungmin KIM	Dec. 23, 2020



KISDI STAT Report

- Various statistical analysis results related to broadcasting and media
- Biweekly

No.	Subject	Author	Date of Issuance
20-01	Summary of 2019 Korea Media Panel Survey	Korea Media Panel Survey Team	Jan. 15, 2020
20-02	Online Digital Contents and OTT Services Usage Behavior	Ji Hyung SHIN	Jan. 30, 2020
20-03	Adoption of Media Devices and Services Based on Individual Innovation Tendency	Dongnyok SHIM	Feb. 15, 2020
20-04	Analysis of Korean TV drama exports trend	Heeyoon RO	Feb. 28, 2020
20-05	Smartphone: A substitute or complement for TV?	Yong Chan JUNG	Mar. 15, 2020
20-06	Characteristics and Usage Patterns of OTT Service Users	Yoonsuk OH	Mar. 30, 2020
20-07	Characteristics of Newspaper Article Readers	Sae Ran KOH	Apr. 15, 2020
20-08	Wi-Fi Spread and Usage Characteristics	Yongwon KIM	Apr. 30, 2020
20-09	Comparison of Media Possession and Usage Behavior of People with or without Children	Do Kyeong YUN	May. 15, 2020
20-10	Trends in Smart Media Usage Behavior by Middle-aged People	Yoonhwa KIM	May. 30, 2020
20-11	Analysis of OTT Usage by Type of Pay TV Subscription	Sun-Hee LEE	Jun. 15, 2020
20-12	A study on behaviors of media consumers: Smart-device application and TV program cases	Heeyong NOH	Jun. 30, 2020
20-13	Analysis of TV revenues and advertising revenues trend	Heeyoon RO	July. 15, 2020
20-14	Analysis of Real-time and Non-real-time Broadcasting Programs Usage Behavior	Jihye CHOI	July. 30, 2020
20-15	Characteristics of OTT Paid Service Users	Dongnyok SHIM	Aug. 15, 2020
20-16	Analysis of E-commerce Usage Behavior	Ji Hyung SHIN	Aug. 30, 2020
20-17	Game Usage Analysis	Sae Ran KOH	Sept. 15, 2020

No.	Subject	Author	Date of Issuance
20-18	Trends in Smartphone-based Media Usage Behavior (2015-2019)	Wookjoon KIM	Sept. 30, 2020
20-19	Analysis of Changes in E-commerce Usage Patterns due to COVID-19: Focusing on Statistics Korea's "Online Shopping Trends"	Yoonsuk OH	Oct. 15, 2020
20-20	Digital Media Services Usage Behavior	Yoonhwa KIM	Oct. 30, 2020
20-21	Analysis of the trend of VOD and OTT Usage	Sun-Hee LEE	Nov. 15, 2020
20-22	Effects of Late-Night OTT Viewing on Sleep	Changjun LEE	Nov. 30, 2020
20-23	Personal Life Satisfaction and Media Consumption Patterns: Analysis Using a Structural Topic Model	Hyunhong CHOI	Dec. 15, 2020
20-24	Summary of 2020 Census of Broadcasting Industry	ICT Data Science Research Division	Dec. 30, 2020

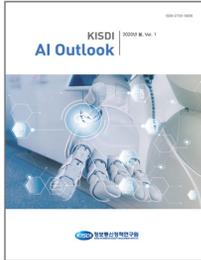


AI Trend Watch

- Information on major AI-related issues and the latest trends
- Biweekly

No.	Subject	Author	Date of Issuance
2020-01	Principles for Realizing a Human-centered AI Society in Japan	Myeong Ok AN	Feb. 28, 2020
2020-02	2020 World Human Resource Competitiveness Index	Kyung Eun LEE	Mar. 15, 2020
2020-03	Review of UK's Public Service Ethical Standards in the AI era	Min Jin KIM	Mar. 30, 2020
2020-04	AI Meets COVID-19: The Present and Future of AI Looking Back at COVID-19	Kyunghoon KIM and 8 researchers	Apr. 15, 2020
2020-05	Post-COVID-19 Employment and AI	Jihye KIM and 4 researchers	Apr. 30, 2020
2020-06	Japan's Information Bank Certification System and Data Distribution Service Model	Myeong Ok AN	May. 15, 2020
2020-07	The Impact of AI on Healthcare Workers and Medical Institutions	Kyung Eun LEE	May. 30, 2020
2020-08	Comparison of U.S.-China-Japan AI Talent Recruitment Policies and Implications	Min Jin KIM	Jun. 15, 2020
2020-09	Global Status of National Strategies for AI	Jihye KIM	Jun. 30, 2020
2020-10	Status of Creation of Overseas AI R&D Ecosystem	Myeong Ok AN	July. 15, 2020
2020-11	Research Trends of and Policy Alternatives for the Impact of AI on Jobs	Kyung Eun LEE	July. 30, 2020
2020-12	Edge AI Challenges to and Impacts on Cloud-Based AI	Min Jin KIM	Aug. 15, 2020
2020-13	The Role of AI in Crime Prevention and Response	Jihye KIM	Aug. 31, 2020
2020-14	The Prevalence of AI/data-based Marketing and Its Socioeconomic Impact	Joonbae LEE	Sept. 15, 2020
2020-15	DNA Ecosystem Revitalization Tasks to Promote Digital Transformation	Kyunghoon KIM	Sept. 30, 2020

No.	Subject	Author	Date of Issuance
2020-16	Implications of Artificial Intelligence Technology Development for Talent Nurturing Policy: The Case of AutoML	Eunyoung HAN	Oct. 15, 2020
2020-17	The Meaning of Homomorphic Encryption in the Development of Artificial Intelligence	Sungwook YOON	Oct. 31, 2020
2020-18	Artificial Intelligence Semiconductor Growth in Line with Artificial Intelligence Development	Young-Jong LEE, Minsik KIM	Nov. 15, 2020
2020-19	China's Digital Economy: Focusing on "Data," a New Production Factor	Wonjun CHOI	Nov. 30, 2020
2020-20	Development and Recent Trends of Federated Learning based on Mobile Cloud Computing	Jin-woo LEE	Dec. 15, 2020
2020-21	Reliable AI and Applications in Drug Development	Sung-ok RYU	Dec. 31, 2020



KISDI AI Outlook

- Journal of the latest AI-related issues
- Quarterly

No.	Subject	Author	Date of Issuance
Spring, 2020	Challenges and Technological Suggestions for the Industrial Application of AI	Hyoungseok CHU	May. 15, 2020
	A Study on the Use of AI and the Role of Humans in the Financial Industry	Joonbae LEE and 3 other researchers	
	Current Status and Future of AI Toward Overcoming COVID-19	Sungwon AHN	
	Data Economy and Data Trading Law	Sangyong LEE	
	Legal Issues Regarding Voice Information Processing of Artificial Intelligence Speakers	Wonjun CHUNG	
Summer, 2020	Artificial Intelligence, Consumers, and Suppliers: Introduction of Recent Research Trends and Implications	Minki KIM	Aug. 15, 2020
	[Column] Prerequisites for the Digital New Deal to Facilitate AI Convergence and Diffusion	Kyunghoon KIM	
	Data-Driven Decision Making: Estimation of Treatment Effect Using Big Data and Machine Learning	Eunyoung SHIM	
	Recent Research Trends in Self-learning Artificial Intelligence and Self-supervised Learning	Jeanhee SON	
Autumn, 2020	[Column] How to Promote the use of Artificial Intelligence in Companies	Wonyoung CHO	Nov. 15, 2020
	A Study on the Specification of Artificial Intelligence Norms	Heuiok LEE	
	Utilization of Artificial Intelligence in Human Resources	Sungjun KIM and 2 researchers	
	Personification of AI and Consumer Reactions: Theoretical Background and Implications	Seonghun YUN, Minki KIM	
	Deep Neural Networks and Interpretability: A Review of Recent Research Trends and Implications	Sang-gyun CHO	



Asian Journal of Information and Communications(AJIC)

- Academic journal on international discussion and future prospects of the information, communications, and media industries (English version)
- Biannual

No.	Subject	Author
Vol.12 No.1	Patent implemented time series algorithm for building stock portfolios in China A-shares	Yu-Jing Chiu, Kuang-Chin Chen, Hui-Chung Che
	The relationship between Youtube use and perceptions of social problems caused by fake news and deepfake in South Korea	Seok Kang
	A novel method of fuzzy topic modeling based on transformer processing	Ching-Hsun Tseng, Shin-Jye Lee, Po-Wei Cheng, Chien Lee, Chih-Chieh Hung
	A study of ICT for leader-member exchange that facilitates employee's innovative behavior: a moderated mediation analysis in the Taiwanese service	Hsin-Yu Chen, Chi-Tung Tsai, Yu-Ru Shen
	An application of the UTAUT2 model for understanding user intention adopting Google Chromecast in Taiwan	Liangchuan Wu, Yi-Fan Wu
	Machine learning applications for learning early warning system in Taiwan	Jyh-Jiuan Lin, Gwei-Hung Tsai, Ching-Hui Chang
	Utilization of Delphi method and analytic hierarchy process to conduct key factors of viral marketing to Taiwan's sports industry	Chia Huei Hsiao, Shih Teng Chiu
	Factors affecting repatronage intention of cashierless stores in Taiwan	Jui-Chun Chai, Hui-Chen Chang
Understanding the determinants of consumer impulse buying on online group buying websites in Taiwan: S-O-R approach	Serhan Demirci, Chien-Wen Chen, Jian-Yu	
Analyzing virtual reality glasses acceptance: an empirical study in Taiwan	Liangchuan Wu, Tsung-Han Yang	

No.	Subject	Author
Vol. 12 No. 2	Factors Affecting Continued Use of Food-delivery Apps: Analysis of Afghanistan O-to-O Market	Namjae Cho, Mohammad Reza Jawad
	The Determinant of Employee's Organizational Commitment: Empirical Study in Indonesia Social Security Administrator for Health	Asyraf Mursalina, Willy Abdillah
	Consumer Welfare from a Ridesharing Service in Korea	Joonmo Kang
	The Development of Cloud-based Project Management System using Kanban-like Approach	Kuo-Ching Ying, Jau-Shin Hon, Chen-Yang Cheng, Chi-Wei Shih
	Exploring the Determinants for Consumer Choosing Sharing Economy Services	Chih-Hui Huang, I-Ping Chiang, Kuen-Hung Tsai
	Structuring Practical Professional Abilities of E-Commerce: Curriculum Implementation and Learning Effectiveness in Taiwan	Hsien-Kuei Chiu
	A Multiple Mediation Model of Social Value in Taiwan's Online Tourism	Jean-Luc Pradel Mathurin Augustin, Shu-Yi Liaw
	Online Brand Community Participation in Taiwan: Examining the Relationship between Brand Community Participation and Brand Attitude from Multi-Level	Chia Huei Hsiao, Shih Teng Chiu
The Economic Impact of Smart Retailing Technologies in the US and China: An Empirical Study Using Patent-Economic Analysis	Charles Trappey, Amy Trappey, Chi-Cheng Luan	

2

Domestic and International Exchange

Conclusion of MOUs

Date	Details
Mar. 23, 2007	KISDI-NICT MOU Conclusion - Cooperation between the two organizations to promote the development and use of the Korea-Japan APII Testbed
Jun. 26, 2007	KISDI-KOSBI MOU Conclusion - Strengthening of the competitiveness of IT SMEs and discovery of policies through research cooperation with research institutes specializing in IT SMEs
Jun. 12, 2007	KISDI-Konkuk University MOU Conclusion - Contribution to academic and industrial development in the information and communications sector through the establishment of an organic cooperative system with universities for R&D and technology exchange
Sept. 18, 2007	KISDI-Yonsei University MOU Conclusion - Contribution to nurturing excellent human resources through the establishment of an organic cooperative system for academic research and information exchange
Sept. 18, 2007	KISDI-Hongik University MOU Conclusion - Contribution to nurturing excellent human resources through the establishment of an organic cooperative system for academic research and information exchange
Oct. 15, 2007	KISDI-Korea University MOU Conclusion - Contribution to nurturing excellent human resources through the establishment of an organic cooperative system for academic research and information exchange
Oct. 25, 2007	KISDI-Dankook University MOU Conclusion - Contribution to nurturing excellent human resources through the establishment of an organic cooperative system for academic research and information exchange
Oct. 26, 2007	KISDI-SRI MOU Conclusion - Establishment of mutual exchange and cooperation system for research cooperation in the postal sector of Korea and China and development of the postal business
Nov. 25, 2007	KISDI-Yeungnam University MOU Conclusion - Contribution to nurturing excellent human resources through the establishment of an organic cooperative system for academic research and information exchange
Nov. 18, 2008	KISDI-IDATE MOU Conclusion - Collection of the latest overseas trends quickly and efficiently and improvement of the utilization of policy by researchers, such as the collection of advice on policy establishment from researchers at partner institutions
Feb. 2, 2009	KISDI-KIM & CHANG Korea's Premier Law Firm MOU Conclusion - Collection of advisory opinions on the direction of the research project and design of detailed contents through mutual cooperation such as joint project execution and legal advice

Date	Details
Feb. 9, 2009	KISDI-OVUM MOU Conclusion – Acquisition of research methodologies from overseas specialized institutions through mutual cooperation and research exchange with OVUM, the largest telecommunications consulting company in the UK
May. 13, 2009	KISDI-CATR MOU Conclusion – Signing of an MOU with CATR of China for joint research promotion and exchange of research information and researchers
Jun. 10, 2009	KISDI-NRF Agreement – Strengthening of the business connections between related institutions, such as research foundations, universities, and research institutes, through an agreement on linking with Korean Researcher Information (KRI)
Sept. 1, 2009	KISDI-FMMC MOU Conclusion – Signing of an MOU with the FMMC in Japan for information and research personnel exchange in the broadcasting and communications sector and holding of academic events
Dec. 16, 2009	KISDI-KOSSDA Information Sharing Agreement – For the dissemination of research results, an information sharing agreement was signed with the Korea Social Science Data Archive (KOSSDA), and raw data and research reports collected by KISDI were donated and used for research and education.
Oct. 27, 2010	KISDI-ICTPA MOU Conclusion – Signing of an MOU with the ICTPA in Mongolia for cooperation in the field of broadband networks, policy, and regulatory advice
Nov. 28, 2011	KISDI-SPO MOU Conclusion – Signing of an MOU for the development of information and communications policies in the legal field through mutual cooperation
Oct. 25, 2012	KISDI-CTG MOA Conclusion – Signing of an MOA with the US Center for Technology in Government (CTG) to promote research exchange and joint research and development
May. 29, 2014	MOUs between Relocated Institutions (4 institutions, including KISDI) and Universities in Chungcheong Province (12 universities, including Konkuk University) – In accordance with the regional relocation of research groups and national research institutes, MOUs were signed to promote various forms of cooperation, such as human exchange with universities in Chungcheong province, research/education cooperation, and mutual cooperation network establishment through knowledge/information sharing, among others.
Dec. 8, 2014	MOU Conclusion among 7 Institutions, including KISDI-KETI – Signing of an MOU among 7 institutions, including KISDI-KETI, to promote the demonstration project through the operation of the IoT Project Promotion Team

Date	Details
May. 26, 2015	KISDI-KBS MOU Conclusion – Signing of North Korea–related program production agreement for inter-Korean broadcasting exchange
May. 26, 2016	KISDI-Ethiopia-Uganda MICT MOU Conclusion – Signing of agreement for cooperation on ICT development cooperation projects
July. 17, 2017	KISDI-GIST MOU Conclusion – Signing of an MOU on “National Science and Technology Development and Improvement of Research Capability” to promote the exchange of information and research personnel of the two institutions
May. 10, 2018	KISDI-Seoul National University ITPP Mutual Cooperation Agreement – Contribution to the development and improvement of research capabilities of each institution through the establishment of a foundation for mutual cooperation and activation of international cooperation and human resource exchange related to ICT international development cooperation
May. 24, 2018	KISDI-AfDB Aide Memoire – Establishment of a foundation for mutual cooperation with the African Development Bank (AfDB) and promotion of joint research and activities to contribute to the socioeconomic development of the African region
May. 28, 2018	KISDI-KPF Mutual Cooperation Agreement – As part of KISDI's revitalization of big data analysis research, it used data from “Big Kinds,” a news big data analysis system of the Korea Press Foundation, to publish an ICT trend analysis report and promote the use of Big Kinds.
Nov. 23, 2018	E-Government-Smart City Construction MOU between KISDI and WeGO – Provision of support for e-government and smart city construction in developing countries and global cities
Mar. 26, 2019	Support for Korea-Vietnam TV Program Co-Production Agreement – KISDI has been carrying out the Broadcasting Co-production Reinforcement Project of the Korea Communications Commission since 2016, through which it has supported the conclusion of broadcasting co-production agreements with foreign countries, including Vietnam, where the basis for the agreement was established through FTAs.
May. 30, 2019	KISDI-Chungbuk University MOU Conclusion – Contribution to fostering local talent and improving employment support through collaboration between former public institutions and local universities
Dec. 23, 2019	KISDI-KRX MOU Conclusion – Establishment of a mutual cooperative relationship, involving such tasks as professional evaluation, to help vitalize the listing of excellent companies on the KOSDAQ and KONEX markets

Date	Details
May. 26, 2020	<p>KISDI-RIG MOU Conclusion</p> <p>- Promotion of research in the information and communications sector, ICT and broadcasting and communications-related research, and exchange of research personnel and technology/information in Gangwon province</p>
July. 10, 2020	<p>KISDI-CRI-CBIST MOU Conclusion</p> <p>- Promotion of research in the information and communications sector and ICT and broadcasting and communications-related research and pursuit of the exchange of research personnel and technology/information in North Chungcheong province</p>
July. 14, 2020	<p>KISDI-MOEF-MOTIE-KOTRA MOU Conclusion</p> <p>- Provision of support for the overseas expansion of citizens and companies through the establishment of a basis for an integrated search for relevant knowledge and information</p>
Aug. 14, 2020	<p>KISDI-CNI MOU for Data-based Policy Joint Research and Information Exchange</p> <p>- Agreement to promote research and information exchange, joint research and agenda discovery, exchange of research reports, production of publications and research data, and exchange of research personnel in the field of data-based policy</p>
Nov. 27, 2020	<p>KISDI-KPE MOU Conclusion</p> <p>- Promotion of the purpose of using the Big Kinds API to improve the function of the media statistics portal and sharing of business results</p>

3

Research
on Related
Events

KRnet 2020 Conference

Event Date : Jun. 22-23, 2020

Venue : online conference (webinar)

Hosted by : Ministry of Science and ICT (MSIT)

Organizers : National IT Industry Promotion Agency (NIPA), Korea Information Society Development Institute (KISDI), Korea Institute of Science and Technology Information (KISTI), Korea Communications Agency (KCA), Korea Internet & Security Agency (KISA), Electronics and Telecommunications Research Institute (ETRI), Telecommunications Technology Association (TTA), National Information Society Agency (NIA), Open Standards and ICT Association (OSIA)

Theme : New Era of Digitalization through Intelligence and Autonomous Network

2020 Korea Internet Governance Forum (KrIGF)

Event Date : Aug. 21, 2020

Venue : online webinar

Hosted by : Korean Internet Governance Alliance (KIGA)

Organizers : Korea Information Society Development Institute (KISDI) and 13 other institutions

Theme : Internet Governance in a Pandemic Era: New Normal, Connectivity, and Safety

8th Korea Media Panel Conference

Event Date : Sept. 25, 2020

Venue : Seoul ELTower

Hosted by : Korea Information Society Development Institute (KISDI)

Theme : **Subject 1: New Media, New Generation**

Subject 2: Media Service, Concerns, and Privacy Gap

Subject 3: Media, Invitation to Daily Life

Subject 4: Statistical Approach to Media Data Analysis

Subject 5: Presentation of Excellent Theses by Graduate Students

Joint Forum on the Development Direction of the Digital New Deal and Green New Deal as a National Innovation Strategy

Event Date : Oct. 6, 2020

Venue : Korea Chamber of Commerce and Industry

Hosted by : National Research Council for Economics, Humanities and Social Sciences (NRC),
National Research Council of Science and Technology (NST), National Academy of
Engineering of Korea (NAEK)

Organizers : Korea Information Society Development Institute (KISDI), Korea Institute of Civil
Engineering and Building Technology (KICT)

Theme : Development Direction of the Digital New Deal and Green New Deal as a National
Innovation Strategy

Digital Triangle Initiatives 2020

Event Date : Oct. 23, 2020

Venue : online conference

Hosted by : Korea Information Society Development Institute (KISDI), Electronics and
Telecommunications Research Institute (ETRI), Software Policy & Research Institute
(SPRI)

Theme : AI Policies and Technologies for Digital Transformation

2020 ICT Venture Panel Research Workshop

Event Date : Oct. 29, 2020

Venue : Lotte Hotel World (Emerald Room, 3F)

Hosted by : Korea Information Society Development Institute (KISDI)

Organizers : Korea Information Society Development Institute (KISDI)

Theme : Explanation of ICT Venture Panel Open Data and Empirical Analysis of Data Utilization

ICT Industry Outlook Conference 2021

Event Date : Nov. 10-11, 2020

Venue : Korea Chamber of Commerce and Industry (online and offline)

Hosted by : Ministry of Science and ICT(MSIT)

Organizers : Korea Information Society Development Institute (KISDI) and 10 other institutions

Theme : The Age of Transformation, ICT Designs the Future!

Symposium on Policy Directions and Tasks for a Safe AI Society

Event Date : Nov. 13, 2020

Venue : livestream

Hosted by : Korea Information Society Development Institute (KISDI)

Sponsored by : Ministry of Science and ICT(MSIT)

Theme : Symposium on Policy Directions and Tasks for a Safe AI Society

2020 International Conference on Inter-Korean Relations in Broadcasting

Event Date : Nov. 13, 2020

Venue : livestream

Hosted by : Korea Information Society Development Institute (KISDI)

Sponsored by : Korea Communications Commission (KCC)

Theme : Exploring Ways Broadcasting and Telecommunications Can Contribute to Sustainable Development and Cooperation in Inter-Korean Relations

Briefing on Policy Measures for the Re-allocation of Mobile Communications Frequencies

Event Date : Nov. 17, 2020

Venue : COEX Conference Room (North), No. 2020

Hosted by : Ministry of Science and ICT (MSIT)

Organizers : Korea Information Society Development Institute (KISDI)

Theme : Briefing on Policy Measures for the Re-allocation of Mobile Communications Frequencies

2020 International Broadcasting Co-production Conference

Event Date : Nov. 24, 2020

Venue : livestream

Hosted by : Korea Communications Commission (KCC)

Organizers : Korea Information Society Development Institute (KISDI)

Theme : Exploring Ways Broadcasting and Telecommunications Can Contribute to Sustainable Development and Cooperation in Inter-Korean Relations

Public Hearing on "National Guidelines for AI Ethics" (draft)

Event Date : Dec. 7, 2020

Venue : Geomungo Hall C, The-K Hotel Seoul

Hosted by : Ministry of Science and ICT(MSIT), Presidential Committee on the 4th industrial revolution (4TH-IR)

Organizers : Korea Information Society Development Institute (KISDI)

Theme : Review of Projects in 2020 and Discussion of Future Plans

2020 ICT ODA Workshop

Event Date : Dec. 14, 2020

Venue : Conference Hall, Sheraton Seoul Palace Gangnam Hotel

Hosted by : Ministry of Science and ICT(MSIT)

Organizers : Korea Information Society Development Institute (KISDI), National IT Industry Promotion Agency (NIPA), Korea Radio Promotion Association (RAPA), Korea Internet & Security Agency (KISA), Educational Broadcasting System (EBS), National Information Society Agency (NIA)

Theme : Discussion on the Status of ODA Projects in the ICT Sector in 2020 and Future Plans

2020 Digital Economy and Inter-Korean ICT Cooperation Conference

Event Date : Dec. 16, 2020

Venue : 5th-floor meeting room, Shilla Stay Seocho (Zoom)

Hosted by : Korea Information Society Development Institute (KISDI)

Theme : 2020 ICT Trends in North Korea and Opportunities for Inter-Korean ICT Cooperation in the Post-COVID-19Era

2021 Future Outlook Conference

Event Date : Dec. 17, 2020

Venue : International Conference Hall, KFB Building, Seoul, Korea (livestream)

Hosted by : National Research Council for Economics, Humanities and Social Sciences (NRC)

Organizers: Korea Information Society Development Institute (KISDI)

Theme : Data, Meet the Future: 7 Indexes and the Republic of Korea

2020 ICT Media and International Development Cooperation Forum

Event Date : Dec. 22, 2020

Venue : Conference Hall, Sheraton Seoul Palace Gangnam Hotel

Hosted by : Korea Information Society Development Institute (KISDI), Korea Academic Association
for International Development Cooperation (KAIDEC)

Theme : A New Approach to Scientific Technology and ICT ODA Statistics
