

Digitalization: A Government-Driven, Infrastructure-First Approach

Policy Brief

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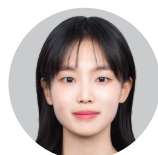
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Keywords:

digitalization, digital infrastructure, inclusive growth

INTRODUCTION

In the twenty-first century, digitalization has become a critical factor for economic growth, as new economic activities and products are created and productivity is increased through digitalization. Digitalization has become a necessary task for economic actors to remain competitive in the market. In light of this, individuals, businesses, and countries are exploring pathways on how to promote digitalization. Based on the case of South Korea, this paper seeks to explore the implications of digitalization strategies.

South Korea has been striving to gain momentum for economic growth recovery through digitalization by pursuing the policy approach of “government-driven, infrastructure-first” for digital transformation. This aims to lower entry barriers to digitalization, enabling all citizens to participate in the socialization of innovation and inclusive growth, regardless of individual economic conditions. Further, the policy also aims at increasing the efficiency of the public sector through innovation, leading digitalization, and spreading innovative effects to society. As a result, South Korea has been evaluated as being ahead of the world in terms of digital infrastructure. However, the effect of innovation and growth engines is still limited to large and high-tech companies, leaving Small and Medium-sized Enterprises (SMEs) behind in terms of digitalization and utilization. Therefore, it is necessary to implement policies at a micro level to encourage as many economic actors as possible to participate in digitalization. The next task is to develop policies tailored to specific groups through software development that meets demand, human resources training, and

government digitalization. Nevertheless, the South Korean “government-driven infrastructure-first” strategy is regarded as having formed the basis for positioning South Korea as a pioneer of digitalization.

DIGITALIZATION AND DIGITAL INFRASTRUCTURE

Digitalization is the process of converting analog information into a digital format. This enables faster and more efficient economic development through higher productivity, innovation, and increased trade between economic actors (Brynjolfs-son, 2011; Katz & Koutroumpis, 2013). A number of scholars and international organizations offer policy frameworks to achieve digital transformation. The Organization for Economic Cooperation and Development suggests seven domains: Access, Use, Innovation, Jobs, Society, Trust, and Market openness (OECD, 2020). The European Commission's Digital Economy and Society Index (DESI) also provides five dimensions: Connectivity, Human Capital, Internet Use, Information Technology Integration, and Digital Public Services. The IMD World Digital Competitiveness Report measures data using the dimensions of knowledge, technology, and future readiness (IMD, 2022). Although there are differences in title of dimensions, the detailed indicators can be grouped into five broad categories: digital infrastructure, investment in digital development, ICT use, human capital, and legal and regulatory framework (Table.1). However, there is no specific guideline that determines which policy area should come first. The need to prioritize a specific policy area must be considered for better and more efficient policy implementation.

Categories	OECD Going Digital Toolkit	ITU Digital Ecosystem Development Index (Based on the study by Raul L. Katz)	European Commission Digital Economy and Society Index (DESI)	IMD World Digital Competitiveness
Digital Infrastructure	Access - Communications infrastructures and services that underpin the use of digital technologies.	Infrastructure - Degree of connectivity via digital infrastructure, including fixed and mobile broadband connections	Connectivity - Supply and demand of fixed and mobile broadband	Technology - Regulatory framework, capital concentration on ICT development, usage of digital services and infrastructure
Investment	Innovation - Investment to ICT development	Digitization of production chain - Usage of digital services within production chain	Connectivity - Supply and demand of fixed and mobile broadband Information Technology Integration - ICT integration in businesses and e-commerce	Technology - Regulatory framework, capital concentration on ICT development, usage of digital services and infrastructure Knowledge - Concentration on the education and training
ICT Use	Market Openness - Proportion share of businesses involved in e-commerce, e-trading, including regulations to prevent the industry Society - Use of internet and digital services Use - The power and potential of digital technologies and data for stakeholders depends on their effective use	Household digitization - Affordability of digital services, including e-government, healthcare, and social services Connectivity - Digital penetration and service users Competitive intensity - Competitions within the market Digital industries - Revenues created by digital market Factors of digital production - Capital used for developing ICT	Information Technology Integration - ICT integration in businesses and e-commerce Digital Public Services - Technology usage for public activity such as e-Government	Future readiness - Adaptive attitudes of users, business agility and IT integration with social and economic services
Human Capital	Jobs - Job development, including education, training and social protection	Household digitization - Affordability of digital services, including e-government, healthcare, and social services Institutional and regulatory - Measurement to guarantee the privacy and data protection while using ICT	Human Capital - Internet user skills	Knowledge - Concentration on the education and training
Legal and Regulatory Framework	Trust - Trust on privacy protection and ICT security		Information Technology Integration - ICT integration in businesses and e-commerce	Future readiness - Adaptive attitudes of users, business agility and IT integration with social and economic services

Table 1. Category of Digitalization Policy Domains (Source: OECD Going Digital Toolkit, ITU Digital Ecosystem Development Index, European Commission Digital Economy and Society Index, IMD World Digital Competitiveness)

Although there is no concrete global toolkit that sets policy priorities for the digitalization process, studies and surveys show that accessible digital infrastructure is essential for accelerating digital development. (World Bank, 2018; World Bank, 2022) Digital infrastructure is the digital ecosystem that connects society. Digital infrastructure includes fixed and mobile broadband connections, internet backbones, satellites, software platforms, other devices and software that support the Internet of Things, and data and cloud computing facilities (ITU, 2020). Recently, publicly available open-source software (OSS) and hardware (OSH) are also playing a role in infrastructure development. According to a study on open-source services as a public good, the EU's GDP would increase by 0.4% if the EU increased its contributions to OSS and OSH by 10% (Blind et al., 2021).

The importance of digital infrastructure was clearly demonstrated during the COVID-19 pandemic. During the lockdown, all economic and social connections were made through digital platforms. Rural areas that lack digital infrastructure face productivity challenges because they have fewer economic transactions, poorer access to information, and fewer learning opportunities. The World Bank's projects to build accessible digital infrastructure in the Mashreq and Kosovo regions clearly demonstrate this. Increased accessibility to information has improved social life, as people have access to social services, including health care and education (World Bank, 2018; World Bank, 2020; IDB, 2020). Quality internet access and digital platforms are critical for remote working and learning, availing oneself of social

services, economic practices, and even social life.

Of course, digital infrastructure is not the only player in digitalization. Digital infrastructures such as fixed and mobile broadband contribute to economic growth, but there are diminishing effects and the

»Digital infrastructure is the digital ecosystem that connects society.«

impact of digital infrastructure deployment varies depending on regional characteristics. This suggests that infrastructure development should be accompanied by additional measures, which underscore the role of policy and institutions in promoting digitalization (ITU, 2020; Katz & Koutroumpis, 2013). Despite these shortcomings, the studies agree that digital infrastructure is the foundation for digitalization.

CASE OF SOUTH KOREA

Landscape of South Korea's Digital Infrastructure

South Korea is recognized to have one of the most universal and advanced digital infrastructures in the world. It ranked second among 176 countries in the International Telecommunication Union (ITU)'s 2017 ICT Development Index. In terms of internet and mobile penetration rates, 100% of urban and rural populations are fully covered by a 4G mobile network and have access to the internet at home (ITU,

»South Korea’s approach of “government-driven, infrastructure-first” has played a pivotal role in building a strong digital infrastructure.«

2021). South Korea was the first country to commercialize and ensure nationwide coverage of 5G networks in 2019, and it has since announced plans to pioneer 6G. The country is also among the world’s top performers in the digitalization of its public sector. According to the UN DESA’s 2022 E-government Index, South Korea is the leading country in Asia, and third worldwide in e-government development.

The digital infrastructure of South Korea has laid the foundations for it to become a major player in the global digital industry (ITU, 2020). Its digital infrastructures, such as affordable, high-speed broadband networks, served as breeding grounds for innovation. South Korean companies such as LG, Samsung, and SK have not only become household names in the consumer electronics industry worldwide, but they have also consolidated their dominance in the production of digital components, such as semiconductors and industrial batteries. The digital industry continues to be of pivotal importance to the South Korean economy, with research and development (R&D) expenditures accounting for

4.81% of GDP in 2020, making South Korea the second-largest R&D spender by GDP among OECD countries (KISTEP, 2022). In addition, the digital industry contributed significantly to the country’s overall economic growth, with the industry accounting for 11.4% of total GDP (USD 177.5 billion) in 2020 (Invest Korea, 2020).

GOVERNMENT-DRIVEN, INFRASTRUCTURE-FIRST

South Korea’s approach of “government-driven, infrastructure-first” has played a pivotal role in building a strong digital infrastructure. Based on this approach, the government implemented a series of top-down policies, with particular focus on the strategic implementation of telecommunications and broadband networks. As early as the 1970s and 1980s, the government recognized the importance of connectivity and invested nearly 1% of its GDP to construct a universal telecom network. This investment was followed by a \$620 million upgrade to infrastructure in the 1990s. Furthermore, the government also enacted laws to prohibit unreasonable rates for fiber line access and market monopolization. These efforts led to universal fiber access, faster speeds, and lower costs.

As the 2000s heralded the age of the internet, the government pushed to ensure broadband networks to provide universal internet access. South Korea quickly achieved nationwide broadband coverage by encouraging competition in the broadband market and providing rural broadband subsidies. To better coordinate its digital infrastructure efforts and policy-making, the South Korean government established the Ministry of Information and

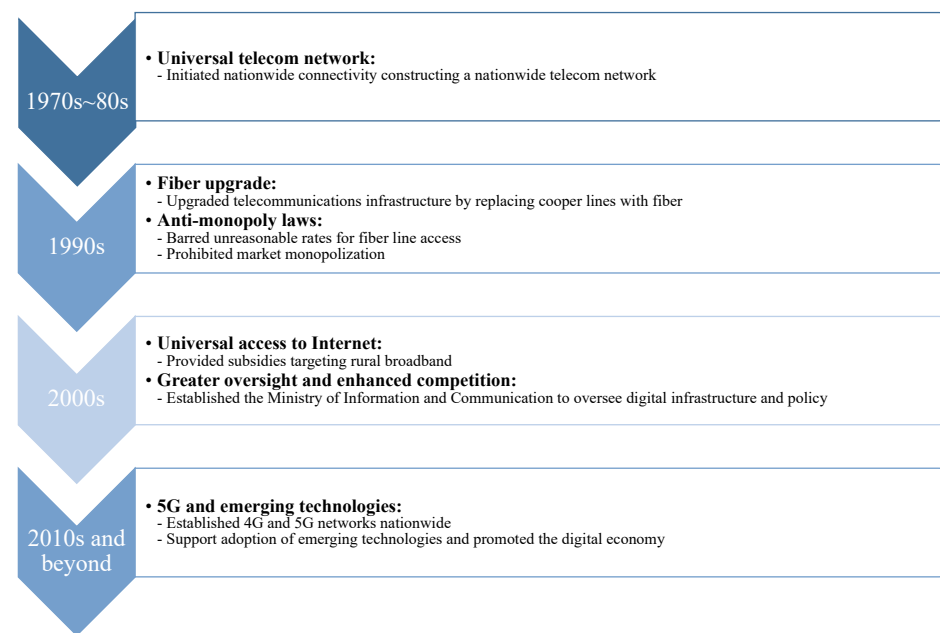


Figure 1. Major initiatives to build South Korea’s digital infrastructure

Communication. In the 2010s, the Korean government continued to invest in digital infrastructure, establishing a nationwide 4G network in 2011 and a 5G network in 2019. These networks have enabled widespread adoption of digital technologies like mobile payments and artificial intelligence and have played a significant role in bolstering South Korea’s digital economy.

Nonetheless, challenges such as market distortions, low digital adoption among small and medium-sized enterprises, and a digital skills gap remain. A 2021 OECD review of South Korea’s aggregate productivity growth revealed that the majority of its productivity growth was contributed by a small number of firms in a few industries. The computer, electronic, and optical

equipment industries had the highest productivity growth in South Korea between 2010 and 2018, with an annual average growth rate of 6.7%, while the construction industry had a much lower annual average growth rate of 0.1%. Furthermore, R&D investments continue to be concentrated on select companies in these limited industries. According to a report by the Korea Institute of S&T Evaluation and Planning, the top ten companies accounted for nearly half (47.1%) of the total R&D investment in the country in 2021. In response, the South Korean government needs to increase investments and provide incentives to foster innovation in various industries.

Furthermore, there must be increased support for SMEs as they face more diffi-

»Korea's policy aims to induce all economic entities, including consumers, to participate in digital transformation.«

culties in fostering digital competitiveness than their larger counterparts. According to a 2020 survey by the Korea Small Business Institute, only 23.9% of SMEs in South Korea had adopted digital technologies, and 57.7% cited a lack of information and knowledge as the main obstacle to adoption. This lack of adoption is further exacerbated by the fact that the digital skills gap between generations is highest in Korea among OECD countries. While 77% of adults in Korea have basic or above basic digital skills, only 25% have advanced digital skills, which is below the OECD average of 31%. Additionally, the share of older adults (ages 55-74) with basic or above basic digital skills was 52%, which was significantly lower than the OECD average of 65% (World Bank, 2016). To address this, the Korean government needs to support capacity building for digital literacy and skills among all citizens and provide incentives and support for SMEs for improved adoption of digital technologies.

CONCLUSION

In conclusion, digitalization poses both opportunities and risks for countries and

economic players worldwide. To address these, many countries, as outlined in the OECD Digital Economic Outlook 2020, have established national strategies that focus on enhancing the capacity to utilize digital technology, fostering manpower, supporting R&D investment, and raising consumer confidence. These policies are designed to strengthen supply capacity, build competitiveness at the industrial level, and promote the participation of individuals and households as consumers.

According to Klaus Schwab's book, *The Fourth Industrial Revolution* (2016), which is a guide on digital transformation, upgrading society in the digital world requires interaction among consumers, suppliers, leaders, and members of society, rather than relying solely on government or corporate top decision-makers. Hence, governments are increasingly implementing policies that support all members of society in participating and playing their roles in digital transformation.

In South Korea, the government has prioritized infrastructure development to facilitate the participation of all members of society in digital transformation. The South Korean government aims to lead the digital transformation by instilling trust about digital technology among social members and improving government efficiency. Unlike traditional industrial policies, which focus on supporting specific industries, South Korea's policy aims to induce all economic entities, including consumers, to participate in digital transformation. This policy also seeks to provide digital infrastructure at an affordable rate for everyone to use, reflecting the policy intention of achieving inclusive growth through participation in innovation.

Digital transformation is a nascent policy domain not only in South Korea but in all countries. In the long run, South Korea's "government-driven, infrastructure-first" policy is expected to contribute to addressing issues of the digital divide by promoting social innovation that alleviates inequality through preemptive expansion and open use of digital infrastructure. This policy is an example for other countries that are considering framing policy priorities in the digitalization process.

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