accenture | aws

Realizing a cloud-enabled economy in South Korea:

How cloud drives economic and societal impact through micro, small, and medium-sized businesses

2023

By 2030, MSMEs can deliver greater societal value in a cloud-enabled South Korea

Across key sectors[i] this opportunity is expected to represent:

₩7.5 trillion combined annual productivity benefits unlocked through cloud-enabled MSMEs in healthcare, education, and agriculture

This represents a 153% increase on current levels

2.5 million people in South Korea (9% of the workforce) employed by cloud-enabled MSMEs within healthcare, education, and agriculture

2 million school students engaging in online learning via cloud-enabled MSMEs
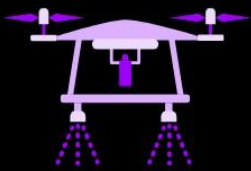
1 in 3 farms using cloud-enabled precision agriculture technologies supported by MSMEs

MSMEs is the abbreviation of micro, small, and medium enterprises.
Current values are annual 2022-2023 values based on the latest available data.
i. Key societal sectors are healthcare, education, and agriculture.

Overview

Micro, small, and medium enterprises (MSMEs, businesses and startups with between 1 and 250 employees)[1] are a major driver of economic performance. In South Korea, MSMEs collectively account for about 99% of all firms, 82% of jobs, and about 61% of Gross Domestic Product (GDP).[2,3] MSMEs are also a major source of innovation and disruption in the economy, leveraging both old and new technologies to fill gaps in the current market, and bringing new products and services to bear.

By allowing users to procure on-demand, scalable IT products and services over the internet or a private network, cloud technology has driven economic and societal benefits by creating new business models, reducing costs, and supporting new opportunities for entrepreneurs and startups. According to the Organisation of Economic Cooperation and Development (OECD), 28% of all businesses across South Korea now utilize at least some basic form of cloud technology, although adoption rates of more advanced cloud applications remain low – less than 3% of South Korean businesses use artificial intelligence (AI). Cloud technologies have most profoundly impacted MSMEs by allowing them to start, operate, and scale their organization more effectively.

The use of cloud technology by MSMEs is expected to become increasingly widespread, advanced, and mature. With continuous advancements in technology and the decreasing costs of cloud services, MSMEs will have access to an even wider range of scalable and cost-effective technology solutions across functions, occupations, and industries. We refer to this potential future state as the "cloud-enabled economy," a future characterized by high levels of overall cloud adoption across South Korean businesses. It is anticipated that under this scenario, 90% of all businesses would adopt at least a basic level of cloud technology.[4,5] For many businesses, however, this represents only the beginning of their cloud technology journey. The escalating sophistication in cloud technology beyond basic applications will be a pivotal driver for economic growth in the future. As MSMEs tap into advanced cloud functionalities, such as AI, big data analytics, and serverless computing, they can foster innovation, streamline operations, and customize consumer experiences at global scale. These advanced uses can unlock new revenue streams, catalyze the birth of novel business models, and enhance global competitiveness, collectively underpinning the future of the digital economy.

By 2030, a cloud-enabled, South Korean economy is expected to deliver even greater societal impact by supporting MSMEs to produce novel solutions or augment existing operations. In certain societal sectors, namely health, education, and agriculture, this annual contribution is expected to reach ₩7.5 trillion. Not only that, but by 2030, cloud-enabled MSMEs are expected to support two million school students to access online education and one in three farms access more efficient and sustainable farming practices in South Korea. Cloud-enabled MSMEs are also heavily involved with developing solutions to transition the economy towards more a more sustainable future and designing digital finance solutions (through 'fintechs') that are helping to support better financial inclusion and wellbeing.

---

[1] The term 'MSME' is used instead of small-to-medium businesses (SMBs), a term commonly used to refer to similar sized businesses, in order to more explicitly include micro and startup business in the definition. MSME terminology is used by both the Organization for Economic Cooperation and Development (OECD) and the United Nations (UN).
[2] Ministry of SMEs and Startups (2023), Status of Korean SMEs
[3] OECD (2021), Korea SME and entrepreneurship outlook 2021
[4] Gartner (2022), The future of cloud computing in 2027: From technology to business innovation.
[5] Gartner (2021), Gartner says cloud will be the centerpiece of new digital experience.

While these benefits are substantial, the opportunities of the cloud-enabled economy will not eventuate without action. To unlock this potential, South Korean businesses and governments will need to collaborate to foster the continued adoption and maturity of cloud technology usage. Businesses can achieve this by:

- identifying how cloud technology can help them scale and deliver global impact
- investing in embedding cloud technology into their strategy; and
- developing a migration plan, and training employees to leverage the benefits of cloud technology.

South Korean governments can support businesses in achieving a cloud-enabled economy by:

- prioritizing cloud education across all levels
- investing in digital infrastructure to ensure innovation can continue unimpeded; and
- and leading by example through promoting cloud technology adoption across all levels and divisions of government.

1 The cloud-enabled economy

Cloud technology has changed the way many businesses operate, particularly for MSMEs (businesses with between 1 and 250 employees)[6], by enabling them to scale quickly, reduce costs, reach global markets, and access a range of technology resources that were previously unattainable.

1.1 Cloud technology enables the digital economy

Cloud technology refers to the provision of on-demand IT products and services delivered over the internet or a private network.[7] This involves housing digital resources from centralized servers owned and operated by cloud service providers, reducing the need for individual businesses to procure and maintain physical hardware. Outsourced technology provides greater flexibility to support MSMEs through the early stages of the business lifecycle by:

- reducing overheads and time to market
- providing greater ability to scale up or down depending on business demands
- offering specialized technology solutions
- increasing computational power of ordinary devices; and
- enhancing security and resilience.[8]

The Accenture societal impact survey of cloud-enabled MSMEs conducted for this report indicates that the ability to reduce overheads, enhanced computational power, and improved security and resilience are the features of cloud technology that are most impactful to MSMEs (see Figure 1).
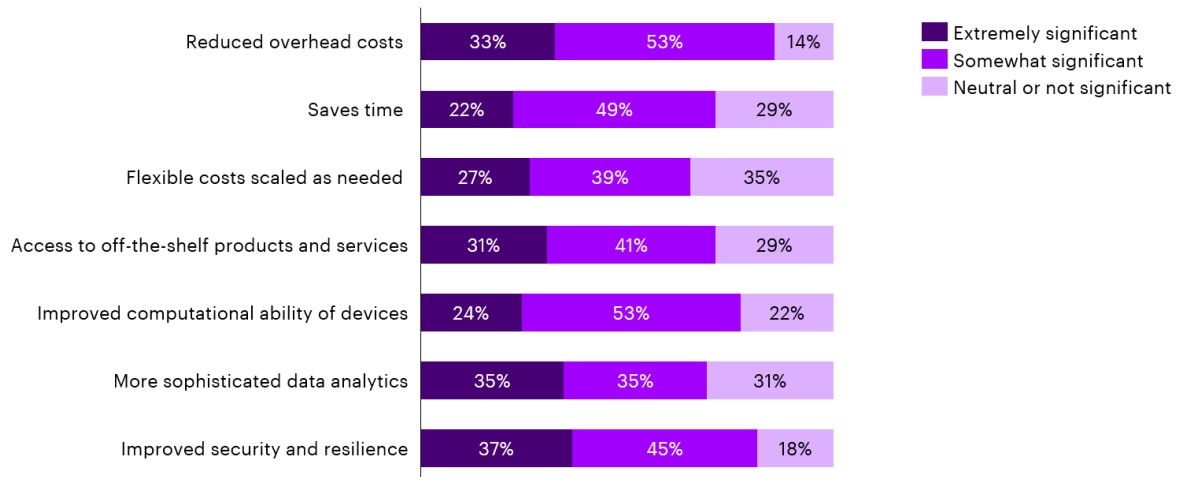
---

[6] The definition of MSME used in this report is taken from the OECD (2023) and covers enterprises with businesses between 1-250 employees.
[7] AWS (2023), What is cloud computing?
[8] Accenture societal impact survey (2023), n = 562.

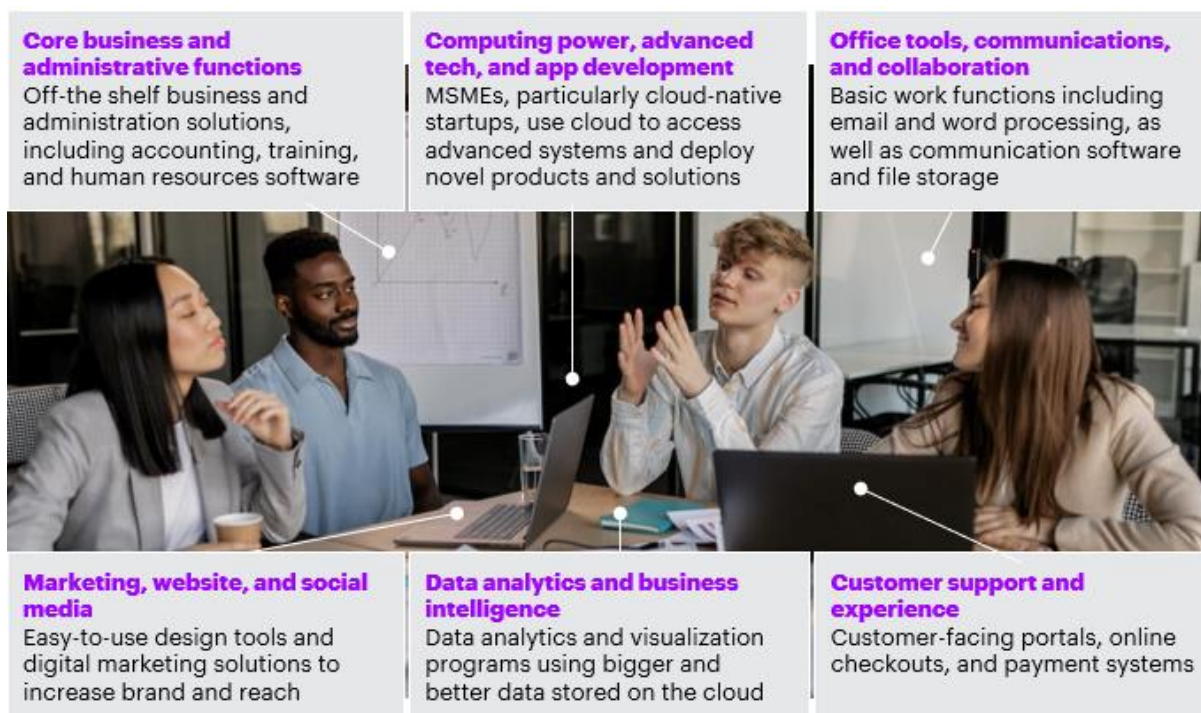## Figure 1: The most significant benefits of cloud technology for MSMEs

Average % of cloud-enabled MSMEs across several industries in South Korea that find cloud somewhat or extremely significant in providing a particular benefit

Benefit	Extremely significant	Somewhat significant	Neutral or not significant
Reduced overhead costs	33%	53%	14%
Saves time	22%	49%	29%
Flexible costs scaled as needed	27%	39%	35%
Access to off-the-shelf products and services	31%	41%	29%
Improved computational ability of devices	24%	53%	22%
More sophisticated data analytics	35%	35%	31%
Improved security and resilience	37%	45%	18%

Source: Accenture societal impact survey (2023), n = 51. 'Neutral or not significant' includes responses of neutral, somewhat insignificant, and not significant at all.

By promoting shared resources, cloud technology has fundamentally changed the way that individuals and businesses interact with technology, with the number of potential applications of cloud technology far eclipsing simple, remote data storage. Most applications, platforms, and smart products have some functionality facilitated by cloud technology as shown in Figure 2. Having access to on-demand functionalities supports MSMEs to start, operate, and scale their business more efficiently and effectively.
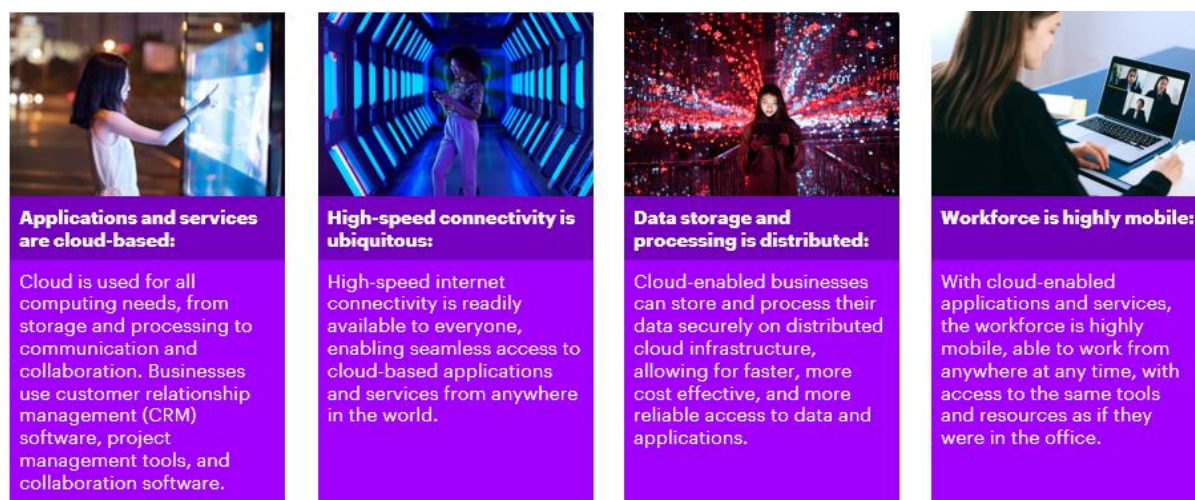
Figure 2: End-to-end cloud applications for MSMEs

Core business and administrative functions
Off-the shelf business and administration solutions, including accounting, training, and human resources software

Computing power, advanced tech, and app development
MSMEs, particularly cloud-native startups, use cloud to access advanced systems and deploy novel products and solutions

Office tools, communications, and collaboration
Basic work functions including email and word processing, as well as communication software and file storage

Marketing, website, and social media
Easy-to-use design tools and digital marketing solutions to increase brand and reach

Data analytics and business intelligence
Data analytics and visualization programs using bigger and better data stored on the cloud

Customer support and experience
Customer-facing portals, online checkouts, and payment systems

Source: Accenture

1.2 Achieving a cloud-enabled economy can unlock significant societal and economic potential

With continuous advancements in technology and the decreasing costs of cloud services, economies will continue to experience a wave of digital disruption and productivity as businesses find more ways to produce novel, new products and solutions or augment their existing operations. We refer to this potential future state as the "cloud-enabled economy," a future characterized by high levels of cloud adoption; based on an assessment of cloud industry forecasts, this report expects 90% of all businesses will adopt at least a basic level of cloud technology in a cloud-enabled economy. As cloud technology applications mature, a cloud-enabled economy would increasingly involve digital applications and services being cloud-based, high internet speed and connectivity, cloud-enabled data storage and processing, as well as a mobile workforce (see Figure 3).

Figure 3: Characteristics of a cloud-enabled economy

Applications and services are cloud-based:
Cloud is used for all computing needs, from storage and processing to communication and collaboration. Businesses use customer relationship management (CRM) software, project management tools, and collaboration software.

High-speed connectivity is ubiquitous:
High-speed internet connectivity is readily available to everyone, enabling seamless access to cloud-based applications and services from anywhere in the world.

Data storage and processing is distributed:
Cloud-enabled businesses can store and process their data securely on distributed cloud infrastructure, allowing for faster, more cost effective, and more reliable access to data and applications.

Workforce is highly mobile:
With cloud-enabled applications and services, the workforce is highly mobile, able to work from anywhere at any time, with access to the same tools and resources as if they were in the office.

Source: Accenture

1.2.1 The spectrum of cloud adoption

The definition of cloud technology adoption used in this report is consistent with the OECD, and refers to the share of businesses that purchased cloud services[9] as a proportion of all businesses, across all levels of maturity.[10] However, cloud technologies have a range of applications across a suite of business functions that mean that the use of cloud technology can be considered on a spectrum of maturity or sophistication as shown by the figure below, which includes:

- **Basic adoption:** user-friendly solutions designed for everyday tasks. These solutions typically do not require specialized technical knowledge to operate and primarily serve to simplify and enhance common digital activities. These include simple cloud-based storage solutions, web-based email services, and collaborative office suites.

- **Intermediate adoption**: applications and platforms that cater to more specialized needs but still largely consist of off-the-shelf products with intuitive interfaces. Such tools include customer relationship management, enterprise resource planning, project management tools, developer platforms, and cloud-based databases.

- **Advanced adoption**: highly specialized cloud applications and cutting-edge technologies tailored for expert tasks. This category encapsulates machine learning and AI platforms, big data analytics tools, internet of things (IoT) platforms, serverless computing, container management systems, and advanced security and compliance tools.

As the global economy increasingly digitizes, the need for MSMEs to increase their cloud maturity is becoming increasingly pertinent. MSMEs that fail to leverage the scalability of cloud solutions may not only forfeit the ability to compete more effectively with fewer fixed IT costs, but may also pass up more sophisticated data analysis tools, more secure safeguards for digital assets, streamlined compliance with international regulations, and advanced technology applications (such as artificial intelligence, see Section 1.2.2). For many MSMEs to maintain their competitive edge in a dynamic, cloud-enabled economy, the sophistication of

---

[9] Cloud computing as part of this definition includes information and communications technology (ICT) services that are provided over the internet or a private network to access servers, storage, network components and software applications
[10] OECD (2023), OECD Going Digital Toolkit

their adoption will need to evolve and adapt with the technology according to their specific needs.

Figure 4: Spectrum of cloud maturity and example applications
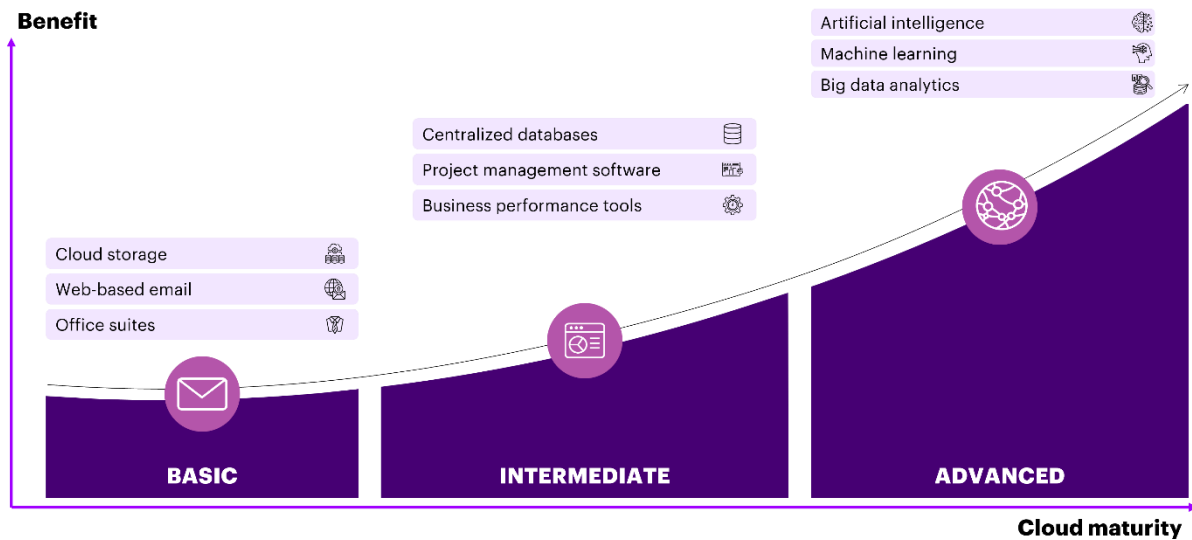
Note: Applications above are examples of types of uses for each of the levels of maturity. The lists are not exhaustive.
Source: Accenture

1.2.2 Advanced cloud usage unlocks the potential for emerging and innovative technologies

Embracing advanced cloud adoption also allows businesses to select from a variety of innovative and cutting-edge technologies to meet their unique business needs and secure a competitive edge in the market. Cloud has increased the viability and proliferation of a wide range of tools, business models, and technologies that, together with cloud, generate societal and economic impact. Advanced applications of cloud include:

- artificial intelligence (AI), encompassing generative AI
- machine learning (ML)
- internet of things (IoT)
- quantum computing; and
- edge computing.

These examples form a growing list of advanced technologies that have become accessible to a wider base of users though cloud (see Appendix D of the global report for a full description of each technology supported by cloud).[11] Of these technologies, generative AI is experiencing the most rapid and dramatic growth; over the next 10 years generative AI is expective to grow at an annual average rate of 27%.[12] Although the technology has only recently been adopted by the wider public, generative AI is already disrupting and enhancing businesses' processes, accelerating innovation, and facilitating greater speed and creativity across a variety of industries. Businesses and employees are already experimenting with generative AI to create content that supports a range of tasks from writing text and code to generating images.[13] As shown in Figure 5, 67% of South Korean MSMEs across several industries identified AI (including generative AI and natural language processing (NLP)) and

---

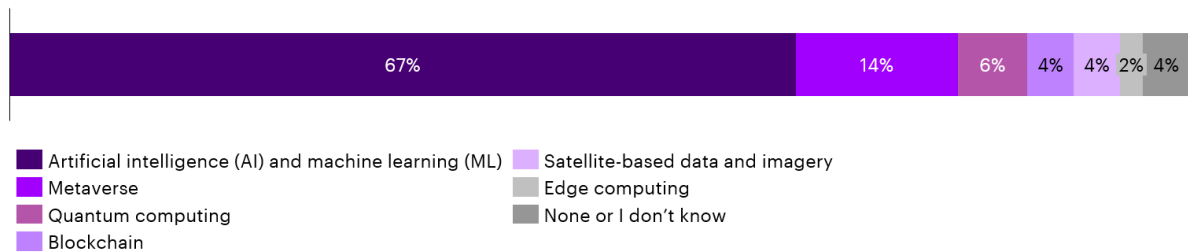[11] Damian Mazurek, (2023), Leveraging Cloud-based AI/ML Services to elevate your business.
[12] Precedence Research (2023), Generative AI Market size to hit USD 118 Bn by 2032
[13] AWS (2023), Generative AI on AWS.

ML as the technologies likely to be most significant in creating societal impacts in 2030.[14],[15] Generative AI could be used by cloud-enabled MSMEs for a wide variety of applications, such as helping medical professionals analyze patient data and testing results to inform decision making, or generating practice exam questions and content with instant feedback available to support individualized learning pathways.

Figure 5: Technologies supported by cloud creating the most significant societal impacts in 2030

Average % of cloud-enabled MSMEs across several industries in South Korea that believe a technology supported by cloud will be the most significant in creating societal impacts in 2030

67%	14%	6%	4%	4%	2%	4%

- ■ Artificial intelligence (AI) and machine learning (ML)
- ■ Metaverse
- ■ Quantum computing
- ■ Blockchain
- ■ Satellite-based data and imagery
- ■ Edge computing
- ■ None or I don't know

1.2.3 A more productive, cloud-enabled economy offers societal as well as economic benefits

While the opportunity to scale and grow businesses has a clear impact on economic activity (see Chapter 2), in many cases businesses can also create a positive societal impact. Cloud has opened up a range of emerging technologies that are underpinning a new wave of digitally-led innovation to address some of society's most pressing, global issues. Cloud technology offers MSMEs new ways to produce and commercialize technological solutions that generate positive societal benefits, in addition to economic benefits, across a range of industries. Although this list of industries is not exhaustive, the estimation of the societal impact of cloud technology is focused on the following industries:

- healthcare
- education
- agriculture
- finance; and
- sustainability and disaster response.[16]

While these industries are not the only ones that are impacted by cloud technology, these industries face increasingly complex challenges that could lead to less equitable societal outcomes if they do not adapt and harness the benefits offered by cloud technology. These industries are also directly linked to the UN Sustainable Development Goals (SDGs), particularly the overarching objectives of improved healthcare (Goal 3), education (Goal 4), and economic prosperity and equality (Goal 9 and 10).[17] Figure 6 demonstrates through a

---

[14] Accenture societal impact survey (2023), n = 51. 67% of South Korean MSMEs is consistent with the 78% of MSMEs globally out of a sample of 562 who identified AI and ML as the technologies likely to be most significant in creating societal impacts by 2030.
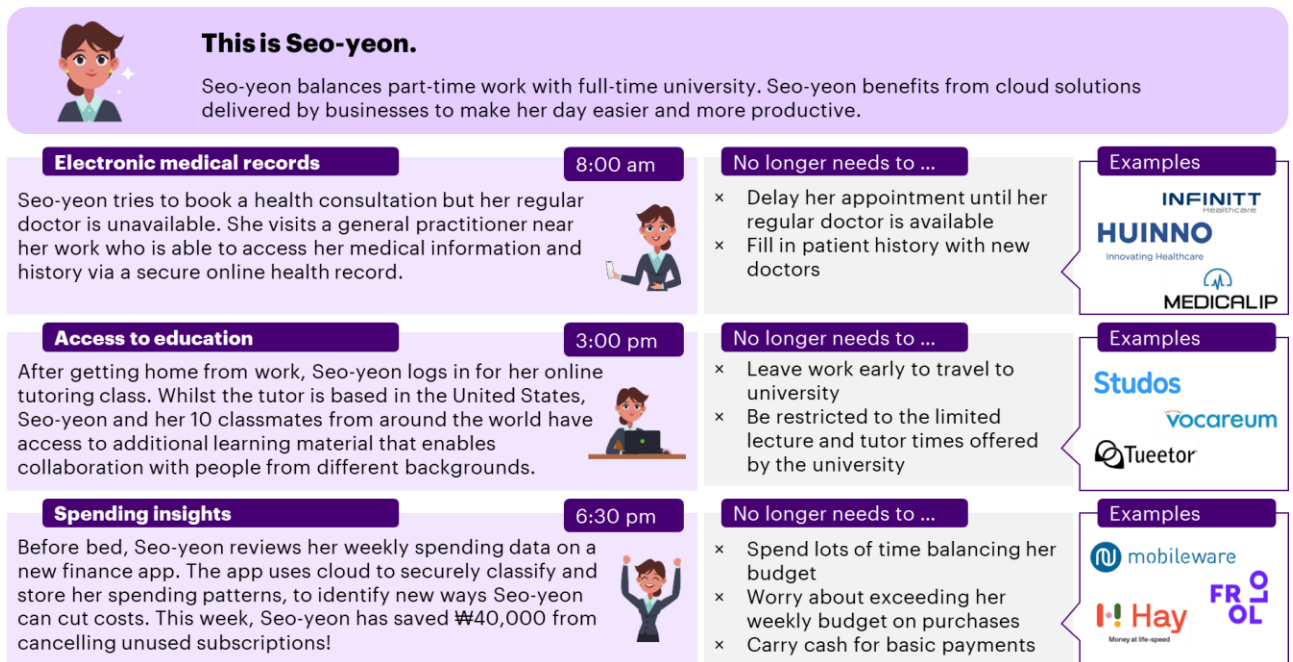[15] Survey responses were from MSMEs working in healthcare, education, agriculture, finance, and sustainability.
[16] The report chose to focus on these industries since most societal impact case studies reviewed fell into one or more of these industries. These labels also benefit from matching the economic modelling data as they are taken directly from the International Standard Industrial Classification (ISIC).
[17] United Nations (2023), Sustainable development goals.

stylized cameo how cloud technology supports access to these industries for individuals through digitization.

Figure 6: The impact of cloud-enabled MSMEs on individuals

This is Seo-yeon.

Seo-yeon balances part-time work with full-time university. Seo-yeon benefits from cloud solutions delivered by businesses to make her day easier and more productive.

Electronic medical records — 8:00 am

Seo-yeon tries to book a health consultation but her regular doctor is unavailable. She visits a general practitioner near her work who is able to access her medical information and history via a secure online health record.

No longer needs to ...
× Delay her appointment until her regular doctor is available
× Fill in patient history with new doctors

Examples
INFINITT
HUINNO Innovating Healthcare
MEDICALIP

Access to education — 3:00 pm

After getting home from work, Seo-yeon logs in for her online tutoring class. Whilst the tutor is based in the United States, Seo-yeon and her 10 classmates from around the world have access to additional learning material that enables collaboration with people from different backgrounds.

No longer needs to ...
× Leave work early to travel to university
× Be restricted to the limited lecture and tutor times offered by the university

Examples
Studos
Vocareum
Tueetor

Spending insights — 6:30 pm

Before bed, Seo-yeon reviews her weekly spending data on a new finance app. The app uses cloud to securely classify and store her spending patterns, to identify new ways Seo-yeon can cut costs. This week, Seo-yeon has saved ₩40,000 from cancelling unused subscriptions!

No longer needs to ...
× Spend lots of time balancing her budget
× Worry about exceeding her weekly budget on purchases
× Carry cash for basic payments

Examples
mobileware
Hay Money at life-speed
FROOL

Notes: Examples include MSMEs and startups using cloud solutions from AWS case studies
Source: AWS[18]

---

[18] AWS (2023), Customer Success Stories.

2 Unlocking ₩7.5 trillion in productivity benefits within key societal sectors

MSMEs are a major driver of economic performance in South Korea, accounting for about 99% of all firms, 82% of jobs, and about 61% of Gross Domestic Product (GDP).[19] Cloud technology is helping to create and scale MSMEs (see Chapter 1), the impact of which can be identified in overall, aggregate economic performance. The impact of further cloud adoption and maturity on aggregate economic output is estimated with a novel economic model, based on analyzing current data that captures the relationship between adoption and economic activity.

> **Box 1: Modelling the economic potential of a cloud-enabled economy**
> This research estimates the impact of cloud on economic productivity at the country level using data from the OECD to capture the relationship between cloud adoption rates and GDP (controlling for capital and labor inputs). A full explanation of the modelling approach, data, and outputs can be found in Appendix A of the global report.

The OECD reports that the share of all South Korean businesses using at least basic forms of cloud technology in their business operations is at 28% as of 2021, comparatively low for developed economies in the OECD.[20] Adoption of even more sophisticated types of cloud technology is even lower in South Korea with less than 3% of South Korean businesses using AI.

Through successful transition to a cloud-enabled economy, MSMEs in the healthcare, education, and agriculture industries within South Korea is expected to unlock ₩7.5 trillion in combined annual productivity benefits by 2030, a 153% increase from ₩3.0 trillion. Under this scenario, it is estimated that 2.5 million people would work at cloud-enabled MSMEs in these industries, which would be 9% of the total jobs in South Korea, an increase from 3% currently.

Annual productivity benefits unlocked by cloud-enabled MSMEs in key societal sectors are expected to reach ₩7.5 trillion by 2030

2.5 million people in South Korea are expected to be employed by cloud-enabled MSMEs in key societal sectors by 2030

South Korea has the potential for significant growth in unlocking the potential of cloud, given it is still at a nascent stage of adoption compared to other markets. Cloud revenue as a proportion of GDP in mature markets like the United States is around two times higher than South Korea.[21] However, South Korea's cloud expenditure and adoption is experiencing growth, with the public cloud market revenue growing at 17%, higher than the global rate of 14%.[22]

---

[21] Statista (2023).
[22] Statista (2023).

13

3 The societal impact of the cloud-enabled economy

MSMEs that harness cloud have the potential to create significant societal impact in South Korea. We define "societal impact" in reference to the positive changes and improvements in outcomes facilitated by cloud technology in areas such as healthcare, education, and agriculture. By leveraging cloud technology, MSMEs can enhance the efficiency, affordability, and accessibility of services in these industries, enabling advancements such as streamlined healthcare, online education, precision agriculture, financial access and autonomy, and sustainable technology. These solutions will lead to improved social wellbeing and development.

3.1 Driving innovation and improving access to healthcare and life sciences

Approximately 19% of South Koreans live rurally, which imposes additional barriers to accessing healthcare.[23] Cloud is helping to overcome these barriers by enabling MSMEs to make healthcare easier to access whilst also driving efficiency in healthcare delivery and supporting decisions around patient healthcare. Through remote monitoring of health indicators, cloud technology can help make healthcare more accessible to underserved communities throughout South Korea. If South Korea were to achieve a cloud-enabled economy, MSMEs in healthcare are expected to unlock ₩3.2 trillion in annual productivity benefits by 2030.

Impact of MSMEs on healthcare in the cloud-enabled economy, by 2030

₩3.2 trillion in annual productivity benefits unlocked through cloud-enabled MSMEs in the healthcare sector, an increase from ₩1.3 trillion currently

Note: Current values are annual 2022-2023 values based on the latest available data.

Healthcare providers can also use cloud technology to support informed patient healthcare decisions, helping providers to collaborate and easily share patient information, and assisting them to take insights from large amounts of data to make treatment personalized and tailored. Technologies supported by cloud, particularly generative AI, also have significant potential to change the healthcare industry, from the delivery of healthcare to administrative functions. While generative AI is still a nascent technology, MSMEs can use it to support clinical decision making, helping medical professionals analyze data more accurately, along with supporting efficiency in research and development.[24]

---

[23] World Bank (2022), Rural population.
[24] WE Forum (2023), How will generative AI impact healthcare?

3.2 Improving access to engaging and personalized education

Despite comparatively high rates of enrolment and other aggregate educational outcomes, the South Korean school system is still considered particularly inequitable given a high reliance on private education.[25] MSME education services which utilize the cloud can support in remediating some of these issues. Cloud technology can make education more equitable and accessible by providing new learning opportunities for a wider audience, including remote communities or adults with limited time who are looking to boost or diversify their skills. These students and adults will be able to learn in a more collaborative environment, as cloud supports them to interact and share content more readily. Under a cloud-enabled economy, MSMEs in education are expected to unlock ₩3.1 trillion in annual productivity benefits by 2030. Through supporting the education industry, cloud-enabled MSMEs are expected to facilitate two million school students and 10 million adults in South Korea to receive online learning by 2030.

Impact of MSMEs on education in the cloud-enabled economy, by 2030

₩3.1 trillion in annual productivity benefits unlocked through cloud-enabled MSMEs in the education sector, an increase from ₩1.2 trillion currently

2 million primary to high school students using online education via cloud-enabled MSMEs, a 100% increase from 1 million students currently

10 million adults accessing education via cloud-enabled MSMEs, a 25% increase from 8 million adults currently

Note: Estimates for the number of students and adults accessing cloud-based education produced through market size estimates (see Appendix C of the global report) and are calculated separately to the GDP contribution. Current values are annual 2022-2023 values based on the latest available data.

Cloud-enabled MSMEs are also introducing advanced analytics into the classroom, helping to personalize learning. Personalized content and feedback can help students with different learning styles work at their own pace, not to mention reduce the administration burden on teaching staff. Educators are also utilizing cloud-based learning analytics to monitor the quality, safety, and security of online learning environments. AI, and in particular, generative AI has the potential to be particularly useful in helping educators provide differentiated learning pathways based on the needs of individual students.[26,27]

---

[25] Reuters (2023), South Korea aims to curb private education spending, axe 'killer questions'
[26] World Economic Forum (2023), Can AI improve education? Here are 4 potential use cases.
[27] Stanford University, Human-Centered Artificial Intelligence, (2023) AI Will Transform Teaching and Learning. Let's Get it Right.

3.3 Developing smarter and more sustainable farming practices

South Korean agriculture faces a challenging future with a declining and aging agricultural sector combined with increasing urbanization that is placing greater pressure on South Korean agriculture to improve productivity within the sector.[28] MSME cloud services are being used by the agricultural industry in South Korea to support smarter, more sustainable farming practices. These technologies can assist agricultural decision making, by employing sophisticated monitoring devices that provide better, real-time data about crops, livestock health, and resource consumption (referred to as precision agriculture).[29] In addition to supporting the use of data or supply chain tools, cloud is also enabling automated vehicles and equipment which helps to improve the efficiency of agriculture. Under a cloud-enabled economy, MSMEs in agriculture are expected to unlock ₩1.1 trillion in annual productivity benefits by 2030. Precision agriculture technology supported by cloud-enabled MSMEs are expected to be in operation in one in three farms across South Korea by 2030.

Impact of MSMEs on agriculture in the cloud-enabled economy, by 2030

₩1.1 trillion in annual productivity benefits unlocked through cloud-enabled MSMEs in the agriculture sector, an increase from ₩0.5 trillion currently

1 in 3 farms using precision agriculture supported by cloud-enabled MSMEs, a 130% increase from 1 in 7 farms currently

Note: Estimates for the number of farms using precision agriculture produced through market size estimates (see Appendix C of the global report) and are calculated separately to the GDP contribution. Current values are annual 2022-2023 values based on the latest available data.

3.4 Improving financial access and wellbeing

Digitization of the finance sector has led to wave of disruption, increased competition, and new types of products and services that better service customers.[30] Alongside the rapid adoption of smart devices, a critical part of the proliferation of digital finance options has been cloud technology that supports fast and secure methods of transferring financial information and better access to information.[31] As such, cloud-native MSMEs in the finance industry (referred to as fintechs) represent one of the fastest growing markets in the world, expected to rise from US$134 billion in 2022 to US$557 billion by 2030 – more than a 400% increase.[32]

The rise of fintech apps has not only been seen an increase in the number of financial services companies, but also a boost in convenience and access, individual autonomy over financial

---

[28] OECD (2021), Agriculture Policy monitoring and evaluation 2021: Korea
[29] FAO (2022), Leveraging automation and digitalization for precision agriculture: Evidence from the case studies.
[30] OECD (2020), "Digital disruption in banking and its impact on competition".
[31] Ibid.
[32] Vantage market research (2023)

decisions, better access to information, and tighter security frameworks. According to the Accenture societal impact survey, by 2030, one in four people globally are expected to be using financial services supported specifically by cloud-enabled MSMEs.[33] Globally, 15% of cloud-enabled MSMEs working with the finance sector are expected to be helping budget-constrained customers or small businesses to better manage their finances.[34,35] AI has the potential to unlock even greater individual financial wellbeing in a cloud-enabled economy by allowing customers to automate more elements of personal finances.[36] While this technology is still nascent, the possibility of integrating AI to perpetually monitor and screen for better fees or financial products holds enormous potential to improve financial health.[37]

Impact of MSMEs on finance in a cloud-enabled economy by 2030

1 in 4 people globally using financial services supported by cloud-enabled MSMEs

Globally, **15%** of surveyed cloud-enabled MSMEs working with the finance sector help budget-constrained customers or small businesses better manage their finances

Source: Accenture societal impact survey (2023), n = 188. Based on global results across 12 countries.

For many countries, a cloud-enabled financial services sector is not far away, with many MSMEs already incorporating or exploring the use of cloud-supported technologies, such as AI and ML, to improve outcomes for consumers across a range of applications.[38] A sample of MSMEs operating in the financial services space globally indicated that the most common areas for these MSMEs to be active were in providing digital banking and budgeting or financial management tools.[39,40] The improvements in societal outcomes most often attributed to these MSMEs were increased affordability of services, improved financial literacy and education, and fraud detection.[41,42]

3.5 Designing a sustainable future

Developing the tools and technologies that will support a sustainable future is one of the most pressing global challenges, but also one filled with enormous economic potential. Cloud-enabled MSMEs can employ technology and digitization to directly reduce environmental impact through innovations such as more efficient resource usage and smarter waste management. According to the Accenture societal impact survey, by 2030, one in five businesses globally are expected to be using services provided by cloud-enabled MSMEs to directly address their climate and sustainability objectives, such as through energy or

---

[33] Accenture societal impact survey (2023), n = 188.
[34] Accenture societal impact survey (2023), n = 188.
[35] Based on the number of cloud-enabled MSMEs currently supporting this outcome.
[36] Crunchbase (2023) How the future of personal finance is self-driving money
[37] Crunchbase (2023) How the future of personal finance is self-driving money
[38] IMF (2021), Powering the Digital Economy: Opportunities and Risks of Artificial Intelligence in Finance.
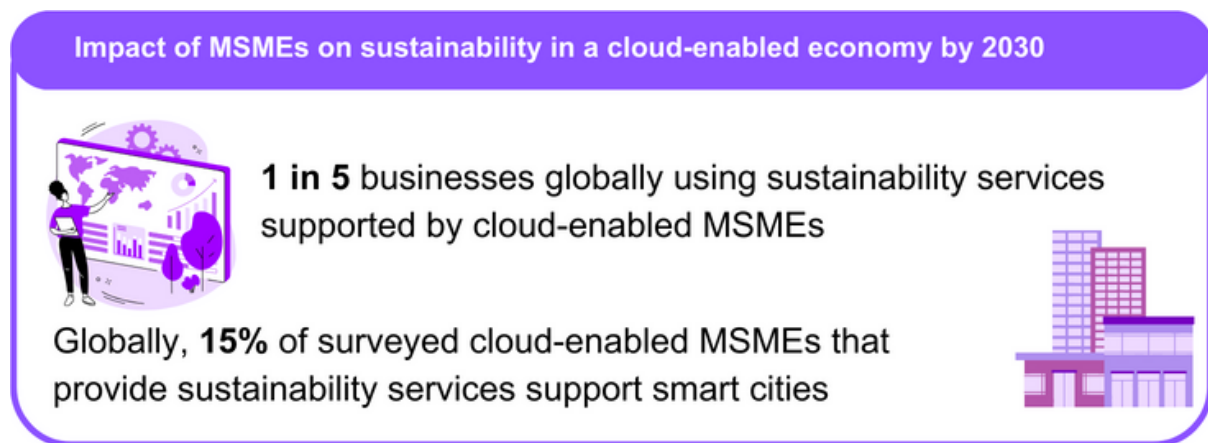[39] Accenture societal impact survey (2023), n = 188.
[40] Based on the services that cloud-enabled MSMEs are currently delivering.
[41] Accenture societal impact survey (2023), n = 188.
[42] Based on the number of cloud-enabled MSMEs currently supporting this outcome.

emissions monitoring and reduction.[43] And it's not only businesses using these services; across the world, cities and towns are increasingly turning to cloud-based technology solutions provided by MSMEs to achieve a range of sustainable outcomes.[44,45] Globally, 15% of cloud-enabled MSMEs providing services to achieve sustainability goals are expected to be supporting 'smart cities', such as through optimising traffic flows or making waste removal more efficient, and enabling the tracking or reduction of electricity usage.[46,47,48,49]

Source: Accenture societal impact survey (2023), n = 66. Based on global results across 12 countries.

According to the Accenture societal impact survey of global MSMEs, cloud technologies have already enabled these businesses to provide smarter resource management and usage, access to sustainable and renewable technologies, carbon footprint monitoring, and sustainability information.[50] Through these sustainable solutions, global MSMEs are helping to support wider sustainability goals including more efficient use of energy and water, improving waste management, supporting better air quality, and increasing the availability of renewable energy.[51] One South Korean MSME, Ecube Labs (see case study below), uses a cloud-based app to digitize and optimize garbage collection in major urban centers across the world.

---

[43] Accenture societal impact survey (2023), n = 66.
[44] IDC (2023), Smart Cities.
[45] IDC (2021), The Next Frontier: AI and Digital Twins in Smart Cities.
[46] Accenture societal impact survey (2023), n = 66.
[47] Based on the number of cloud-enabled MSMEs currently supporting this outcome.
[48] AWS (2023), Building Smart Cities with AWS Cloud.
[49] OECD (2021), Measuring smart city performance in COVID-19 times: Lessons from Korea and OECD countries.
[50] Accenture societal impact survey (2023), n = 66.
[51] Accenture societal impact survey (2023), n = 66.

Ecube Labs is helping to optimize public waste collection through cloud-enabled, smart bins that optimizes collection routes

ECUBE LABS

Industry: Sustainability

Size: Small (<50 employees)

Locations: The Americas, Europe, the Middle East, and Asia Pacific

Ecube Labs is a small, South Korea-based, sustainability business founded in 2011 with the objective of changing the way in which garbage is collected using a data-driven approach. As populations rise and residential areas move towards more high-density living, cities need to become smarter and employ technology to optimize delivery of basic public services. Overflowing waste from public bins increases street-level pollution, vermin, and reduces the appeal, usability, and perceived safety of public spaces. At the same time, the transport industry (including garbage trucks) contributes approximately 25% of all greenhouse gases in developed countries, posing the challenge of how local governments can collect higher volumes of waste using fewer trucks.

Ecube Labs has more than **9,000 products installed across 300 cities** and is helping to optimize and reduce the frequency of collection producing cloud-powered, smart bins. These bins come in two different types:

- CleanCUBE is a solar-powered, compacting bin that increases the capacity and **reduces collection frequency by up to 80%.**

- CleanFLEX is a fill-level sensor that can be retrofitted to existing bins and provides real-time data to councils and waste companies. CleanFLEX **improves the standard operational efficiency of collection by up to 50%.**

These efficiencies save time, money and effort, whilst taking trucks off the road, reducing emissions, and reducing space in landfill.

"Organized collection of waste is essential to the livability of modern, metropolitan cities. Ecube Labs makes the process of collecting waste more efficient, more eco-friendly, more reliable, and less costly by reducing the frequency with which bins need to be emptied and optimizing the collection routes based on need."
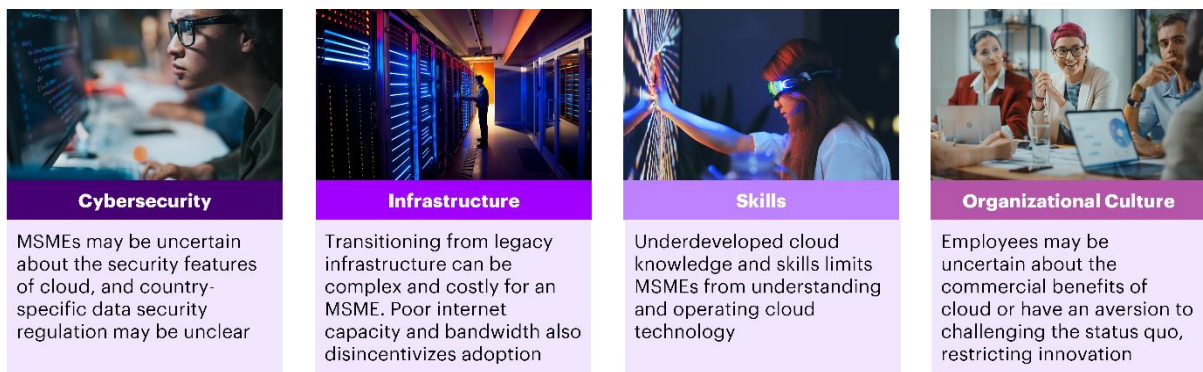
James Noh, Director

Although the bins are physical devices, the power of Ecube Labs comes from the cloud-based platform, CleanCityNetworks (CCN), that provides real-time analytics of CleanCUBE and CleanFLEX bins. CCN alerts collectors when a bin is nearing capacity, but also uses predictive AI algorithms, to generate optimized schedules and design the most efficient route. Ecube Labs also commercializes access to CCN as businesses can use the data as a useful proxy for foot traffic and human movement, helping other aspects of the cities to become smarter and data-driven. Without cloud, Ecube Labs indicated that they would simply not have been able to expand outside of Korea.

Sources: Accenture consultations; Ecube Labs (2023)

4 Achieving the cloud-enabled economy

The cloud-enabled economy offers significant potential in terms of both economic and societal impact. South Korea's path towards a cloud-enabled economy will primarily focus on increasing adoption rates. As adoption accelerates, the focus will then shift towards using cloud in new ways within firms who have already adopted to reach the full potential of the cloud-enabled economy. This will involve maturing cloud usage across more complex business functions and implementing more advanced technologies supported by cloud such as AI and ML.[52] Unlocking these opportunities by 2030 requires continued coordinated action from industry and the South Korean government to address the main barriers to uptake. The main persistent barriers to cloud are included in Figure 7.

Figure 7: Firm-level barriers to cloud adoption

Cybersecurity	Infrastructure	Skills	Organizational Culture
MSMEs may be uncertain about the security features of cloud, and country-specific data security regulation may be unclear	Transitioning from legacy infrastructure can be complex and costly for an MSME. Poor internet capacity and bandwidth also disincentivizes adoption	Underdeveloped cloud knowledge and skills limits MSMEs from understanding and operating cloud technology	Employees may be uncertain about the commercial benefits of cloud or have an aversion to challenging the status quo, restricting innovation

Source: Accenture[53]

4.1 Holistic strategies to overcome firm-specific barriers to cloud adoption

MSMEs can adopt a range of internal policies and actions to adopt cloud solutions across all business functions, thereby maximizing their productivity dividend overtime (see Figure 8).

---

[52] Technologies supported by cloud refer to technologies that are dependent on or are predominantly offered through cloud due to computational or data requirements. This includes AI, ML, Internet of Things (IoT), and quantum computing.
[53] Accenture (2023), The race to cloud: Reaching the inflection point to long sought

Figure 8: Steps for MSMEs to accelerate cloud maturity

Legend: ■ Cybersecurity ■ Infrastructure ■ Skills ■ Organizational culture

Steps	Description	Cybersecurity	Infrastructure	Skills	Organizational culture
1 Identify how cloud can streamline strategic goals	• Identify how cloud solutions can meet your goals • Identify a cloud partner that can help navigate the process • Examine case studies of how MSMEs have used cloud to transform their business and create impact • Interview employees to determine which barriers are preventing these systems and/or processes from being introduced or optimized at the firm level				✓
2 Evaluate industry and government support	• Examine the South Korean government's cloud policies and programs offered by industry to address firm-specific barriers and accelerate cloud maturity • This could include R&D tax credits from the South Korean government, or sponsorship programs for startups run by cloud providers such as AWS	✓	✓	✓	✓
3 Educate all employees	• Support employees to upskill in cloud, and utilize training from cloud providers where relevant • Identify specific skill shortages to focus their training	✓		✓	✓
4 Review data security arrangements	• Review data security arrangements from the cloud provider and determine whether additional internal policies are required • Review security features of cloud and best practice data policies • Simplify and harmonize policy across the business, with clear guidelines for different functional applications of cloud	✓			
5 Create a whole-of-business cloud migration strategy	• Evaluate the costs and benefits of alternative strategies to determine a whole-of-business solution that meets business goals • MSMEs should prioritize solutions which deliver the greatest net benefit in the medium to long term • Determine the scale and complexity of the cloud infrastructure required • MSMEs with less cloud experience could consider enlisting cloud partners such as consultants to achieve this	✓	✓	✓	✓

Source: Accenture

4.2 Strong policy support to address structural barriers and incentivize MSME cloud adoption

Despite South Korea's low uptake of cloud, the country has a significant potential for growth due to existing support for the broader digital economy, addressing multiple barriers identified in Figure 9. Most notably, South Korea has invested significantly into their local broadband network, which covers 98% of the population. 87% of those connections are high-speed optic fiber, which is a significant enabler of adoption. Reasons for low historic cloud adoption include strong data protection laws and concerns about cybersecurity, restrictions on cloud usage from government departments, and limits on the information that can be stored on the cloud.[54]

---

[54] Carnegie Endowment ([2021](#)), Korean Policies of Cybersecurity and Data Resilience.

Figure 9: Global best-practice examples of cloud adoption policies

Legend: ■ Cybersecurity ■ Infrastructure ■ Skills ■ Organizational culture

Policy	Key existing support	Future policy	International policy examples	Cybersecurity	Infrastructure	Skills	Organizational culture
Invest in digital infrastructure	South Korea has invested heavily in optic fiber, which accounts for 87% of broadband connections. 98% of the country is connected to the internet.	Continued investment into optic fiber and data centers to support cloud services.	🇸🇬 **Singapore optic fiber** accounts for 93% of broadband connections 🇹🇭 **Thailand optic fiber** accounts for 94% of broadband connections		✓		
Invest in cloud skills and training	An estimated 62% of South Korean workers apply digital skills, supported by strong maths and engineering education and programs such as the Cloud Professional Training program.	Continued collaboration with industry to deliver cloud training programs, especially for MSMEs.	🇦🇺 **Australia's National Cloud Computing Strategy** includes cooperation with industry and educators to enhance cloud training 🇧🇷 **Brazil's Digital Transformation Strategy (E-Digital)** includes partnerships with industry and educators to provide cloud training and certifications	✓		✓	✓
Harmonize data privacy policy across regions	While South Korea's Personal Information Protection Act (PIPA) received EU GDPR adequacy, it includes strict data portability rules that restrict cross border data flows.	Work with world leaders to harmonize policy in line with best practice, while promoting cross border data flows.	🇪🇺 **European Union's General Data Protection Regulation (GDPR, 2016)** improved clarity and consistency across the EU, promoting data flow within the EU	✓			
Create clear guidelines for industry	South Korea have industry specific regulation in telecommunications, finance and healthcare.	Work with experts to clarify industry guidelines on the specific application of cloud.	🇯🇵 **Japan's Data Protection Laws** include clear guidelines for the finance, healthcare and telecommunications sectors	✓			✓
Incentivize cloud adoption and maturity	South Korea have technology R&D tax deductions to promote innovation, which includes cloud services.	Continued ongoing support for MSMEs to reduce the cost of transitioning to cloud and encourage innovation.	🇺🇸 **United States' incentives** include cloud being fully tax deductible and tax credits for cloud-related investments		✓	✓	✓
Improve cloud-first policies	South Korea has established a cloud development plan every three years since 2015. In 2022, the Ministry of Science and ICT released a seperate three-year plan prioritizing the use of private cloud in the public sector, strengthening competitiveness of the cloud sector, and creating an ecosystem for cloud growth.	Continue evolving the clarity and relevance of policies, and consider the benefits of public cloud-first strategies in enhancing confidence.	🇬🇧 **United Kingdom's Cloud First policy (2013)** is a whole-of-government, public cloud-first approach that outlines clear guidelines and procurement policies for departments	✓	✓	✓	✓

Source: OECD,[55] World Bank,[56] Lim, S.,[57] Statista,[58] AlphaBeta,[59] Australian Government,[60] Federal Government of Brazil,[61] GDPR EU,[62] Coos, A.,[63] Mcguire Sponsel,[64] Ministry of Science and ICT,[65] UK Government[66], Digital Market Korea[67]

[55] OECD (2023), OECD broadband statistics update
[56] World Bank (2021), Individuals using the Internet (% of population)
[57] Lim, S. (2019), The city of the future: What will a full-fiber broadband city look like
[58] Statista (2021), Share of fiber optic internet connection in Thailand from the 3rd quarter of 2019 to the 2nd quarter of 2021
[59] AlphaBeta (2021), Unlocking APAC's Digital Potential: Changing Digital Skills Needs and Policy Approaches
[60] Australian Government (2013), The National Cloud Computing Strategy
[61] Federal Government of Brazil (2018), Brazilian Digital Transformation Strategy
[62] GDPR EU (n.d.), What is GDPR, the EU's new data protection law
[63] Coos, A. (2022), Data Protection in Japan: All You Need to Know about APPI
[64] Mcguire Sponsel (2020), Calculating cloud computing expenses
[65] Ministry of Science and ICT (2021), MSIT hosts the 14th Information and Communication Strategy Committee
[66] UK Government (2022), Government Cloud First policy
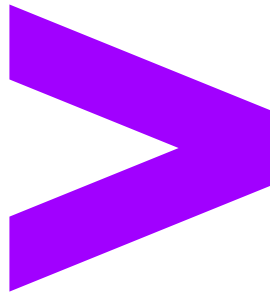[67] Digital Market Korea (2022), the 3rd cloud computing overview and policy direction

Disclaimer

This document is intended for general informational purposes only. The analysis in this report was commissioned by Amazon Web Services, Inc. and prepared by Accenture on behalf of Amazon Web Services, Inc. Views and opinions expressed in this document are based on Accenture's knowledge and understanding of its area of business, markets, and technology. Accenture does not provide medical, legal, regulatory, audit, or tax advice, and this document does not constitute advice of any nature. While the information in this document has been prepared in good faith, Accenture disclaims, to the fullest extent permitted by applicable law, any and all liability for the accuracy and completeness of the information in this document and for any acts or omissions made based on such information. Opinions expressed herein are subject to change without notice This document may make references to third party names, trademarks or copyrights that may be owned by others. Any third-party names, trademarks or copyrights contained in this document are the property of their respective owners.

About Accenture

Accenture is a global professional services company with leading capabilities in digital, cloud and security. Combining unmatched experience and specialized skills across more than 40 industries, we offer Strategy and Consulting, Interactive, Technology and Operations services—all powered by the world's largest network of Advanced Technology and Intelligent Operations centers. Our 506,000 people deliver on the promise of technology and human ingenuity every day, serving clients in more than 120 countries. We embrace the power of change to create value and shared success for our clients, people, shareholders, partners and communities.

Visit us at **www.accenture.com**.