

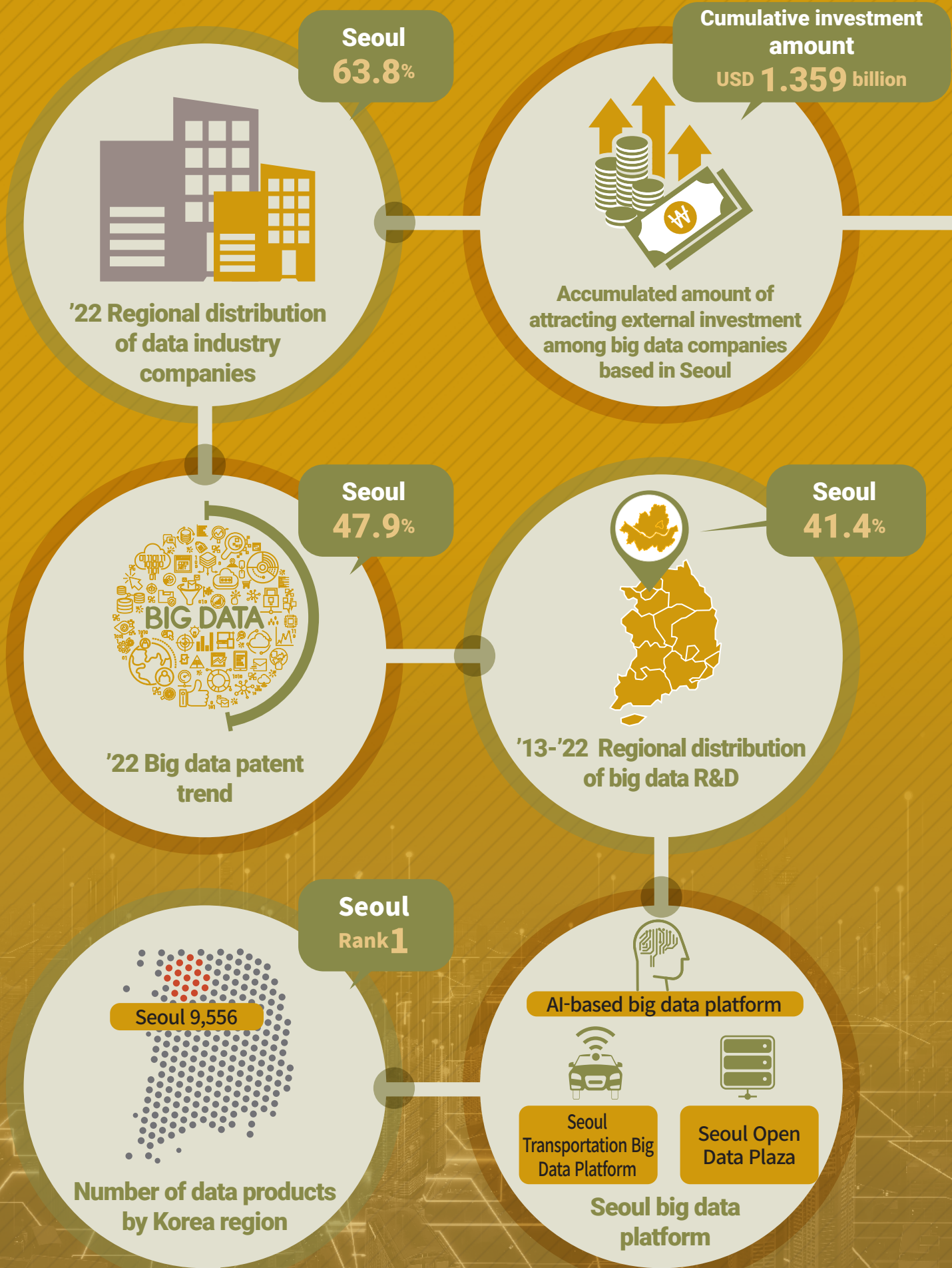


Seoul leads Digital
Innovation Economy
with **Big Data**

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I. Overview of Seoul's data industry



II.

Dynamic Seoul's data industry

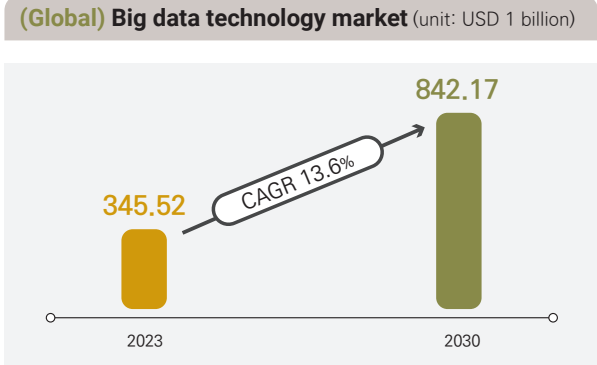
1. Domestic and international data industry status

Data is the core infrastructure for digital transformation and innovation in industry/economy. By properly producing, accumulating, analyzing, and utilizing data, we can not only secure national, industrial, and economic competitiveness, but also create new added value. In particular, in the 4th Industrial Revolution and the intelligent information society, data is a key element ¹⁾ along with artificial intelligence and algorithms (learning, analysis).

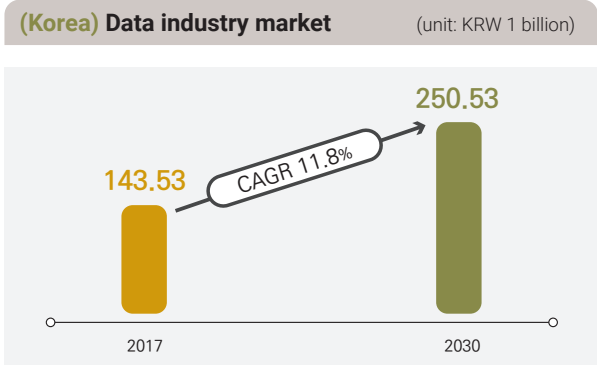
Globally, the data market is expected to continue to grow significantly. According to Fortune Business Insights²⁾ the global big data technology market was valued at USD 309.4 billion and USD 345.5 billion in 2022 and 2023, respectively. It is expected to grow at an average annual rate of 13.6% and reach USD 842.2 billion in 2030. The results of analysis shows that exponential increase of the amount, generation, and collection speed of data, advancement of analysis technology, increase of introduction of data-based business predictions and decision-making, etc. are playing a vital role in leading the growth of data market.

Korea's data industry is also growing rapidly. Korea's data industry market was valued at KRW 14.353 trillion in 2017, but grew at an average annual rate of 11.8% to KRW 25.0527 trillion in 2022. In addition, data industry sales (direct sales) also increased by an average of 19.2% per year from KRW 6.5642 trillion in 2017 to KRW 15.8076 trillion in 2022. The number of data workforce is also increasing at an average annual rate of 12.6% from 109,320 in 2017 to 197,802 in 2022.³⁾

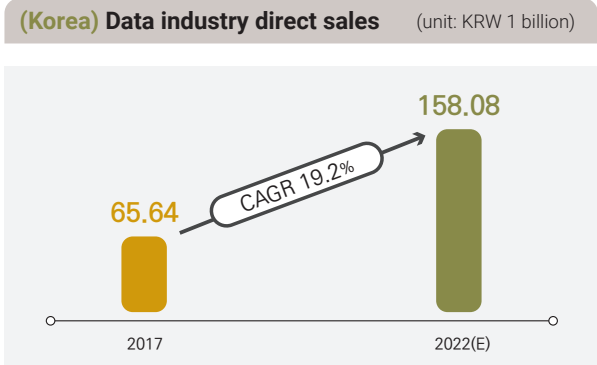
1) In the analog era, the factors of production are land, capital, and labor.
 2) <https://www.fortunebusinessinsights.com/industry-reports/big-data-technology-market-100144>
 3) Ministry of Science and ICT, Korea Data Industry Promotion Agency (2022), "2022 Data Industry Status Survey"



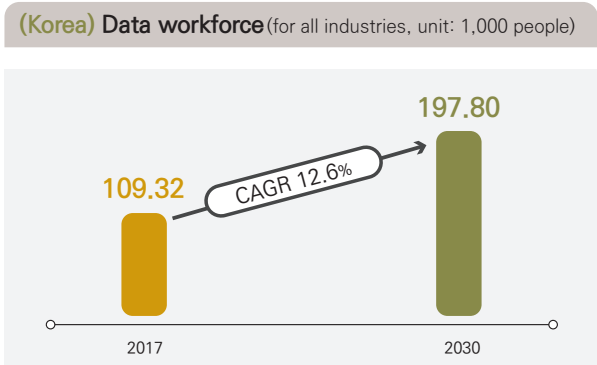
Source: Fortune Business Insights



Source: Ministry of Science and ICT, Korea Data Industry Promotion Agency



Source: Ministry of Science and ICT, Korea Data Industry Promotion Agency

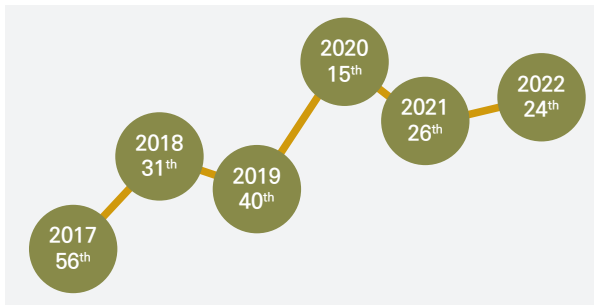


Source: Ministry of Science and ICT, Korea Data Industry Promotion Agency

Korea stands out not only in terms of the size of the data industry, but also in data analysis and utilization. According to IMD⁴⁾ Korea ranked 24th in big data and analysis usage ranking in 2022, 32 steps up from 56th in 2017 in five years. In addition, the competitiveness of the data industry is continuously increasing, with the big data adoption rate of Korean companies⁵⁾ steadily growing from 15.5% in 2020 to 20.6% in 2022.

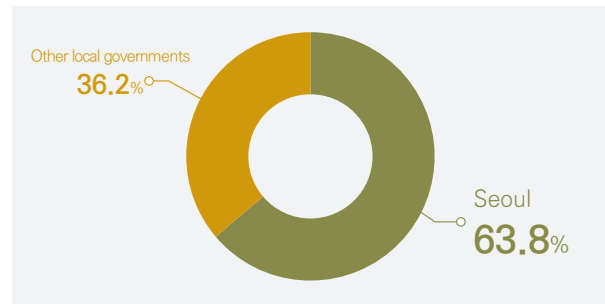
of the data industry. Among Korea's 17 metropolitan municipalities, the majority of data companies are located in Seoul. Among 8,940 Korean data companies⁶⁾ 5,705 companies (63.8%) are located in Seoul⁷⁾. And, among 1,495 small and medium-sized businesses that provide big data-related products and services, 806 companies (53.9%) are also located in Seoul⁸⁾. This shows the concentration of data-related companies in Seoul is very high.

(Korea) Big Data and Analytics Ranking



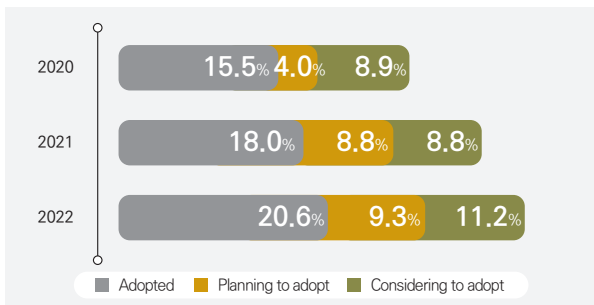
Source: IMD (each year), World Competitiveness Ranking

(Korea) Regional distribution of data industry companies (based on number of companies)



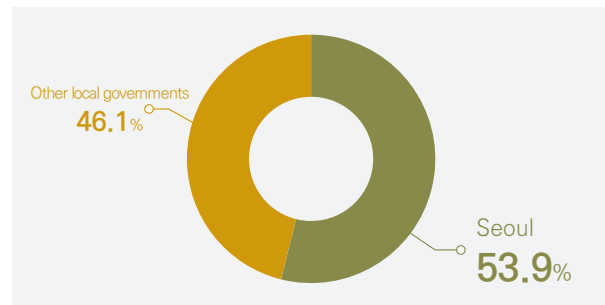
Source: Ministry of Science and ICT, Korea Data Industry Promotion Agency (n=8,940)

(Korea) Corporate big data adoption rate



Source: Ministry of Science and ICT, Korea Data Industry Promotion Agency

(Korea) Regional distribution of small and medium-sized businesses providing big data-related products



Source: Ministry of SMEs and Startups (Small and Medium Business Status Information System) (n=1,495)

2. Seoul, the center of growth and innovation in Korea's data industry&economy

Seoul is the center of Korea's data industry, technology, and infrastructure, and companies located in Seoul are the driving force fueling the growth and innovation

4) International Institute for Management Development, 「World Competitiveness Ranking」
 5) Ministry of Science and ICT, Korea Data Industry Promotion Agency (2022), 「2022 Data Industry Status Survey」 (Survey of companies in 12 domestic industries. n=1,248 in 2020, n=1,234 in 2021, n=1,221 in 2022)

6) 10 mid-category companies in three major categories: development and supply of data processing and management solutions, data construction and consulting services, and data sales and provision services. (Ministry of Science and ICT, Korea Data Industry Promotion Agency, 「2022 Data Industry Status Survey」. Refer to 2022 Data Industry Classification System)
 7) Ministry of Science and ICT, Korea Data Industry Promotion Agency (2022), 「2022 Data Industry Status Survey」 Statistical reference table
 8) Ministry of SMEs and Startups, Small and Medium Business Status Information System (<https://sminfo.mss.go.kr/>). Search main product categories as of November 10, 2023

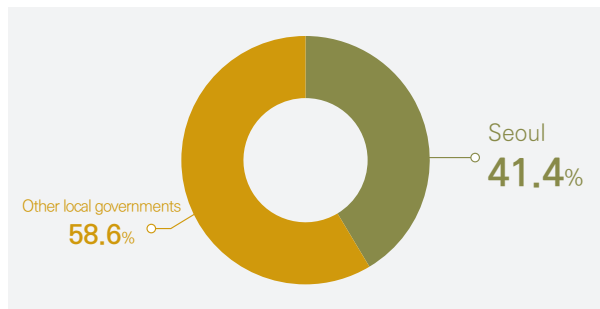
● ● ● **Seoul Leads Digital Innovation Economy With Big Data**

Seoul is the center of Korea's data industry research and development, leading evolution and innovation. Of the total 10,527 big data national R&D projects from 2013 to 2022,⁹⁾ 4,357 (41.4%) were performed by companies located in Seoul¹⁰⁾. And, of the total research budget of KRW 4.0858 trillion, KRW 1.6151 trillion (39.5%) was implemented in Seoul. Additionally, Seoul-located companies are also prominent in the field of big data patents. Of the total 1,899 big data patents applied from 2013 to 2022¹¹⁾, for 10 years, a

total of 932 patents (49.1%) were filed by companies located in Seoul¹²⁾.

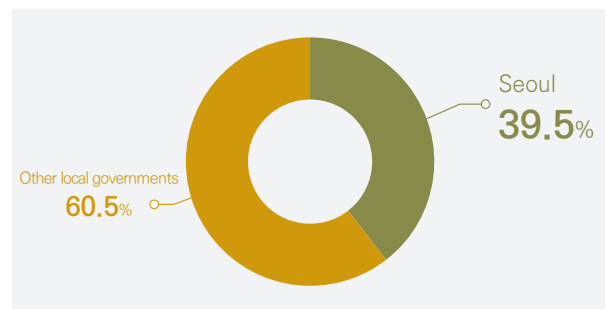
In the data resource sector, which is the core of the data industry, Seoul has a much higher share than other metropolitan cities. Among a total of 61,811 data products provided in the public and private sectors, Seoul's data products account for 9,556 (15.5%), which is a much higher share than other local governments.¹³⁾

(Korea) Regional distribution of big data R&D



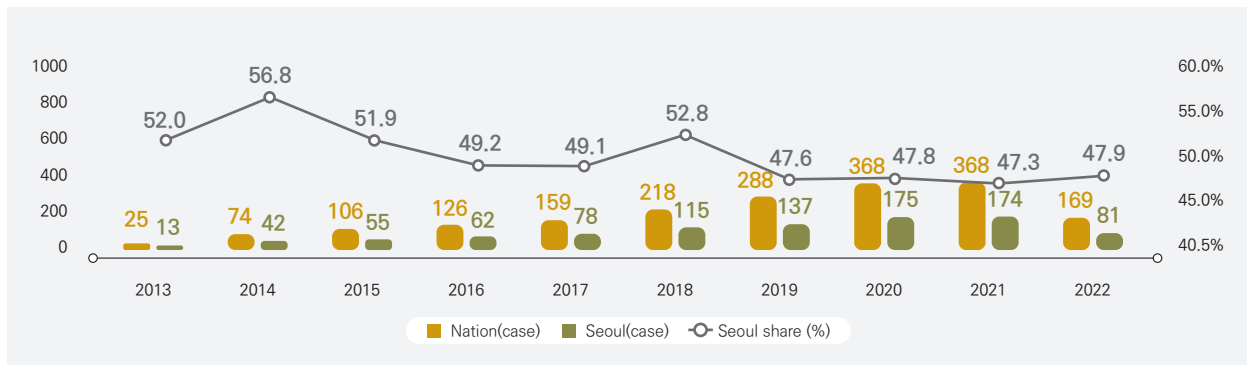
Source: National Science and Technology Knowledge Information Service (Project performed from 2013 to 2022, n=10,527, based on big data title)

(Korea) Regional distribution of national big data R&D research funds



Source: National Science and Technology Knowledge Information Service (Project performed from 2013 to 2022, n=10,527, Total research fund: KRW 4.0858 trillion, based on big data title)

(Korea) Big data patent trend (nationwide vs. Seoul)



Source: Patent Information Search Service (www.kipris.or.kr), (based on big data patent title)

9) National Science and Technology Knowledge Information Service (www.ntis.go.kr). A project with 'big data' in the title.

10) Based on research fund execution area.

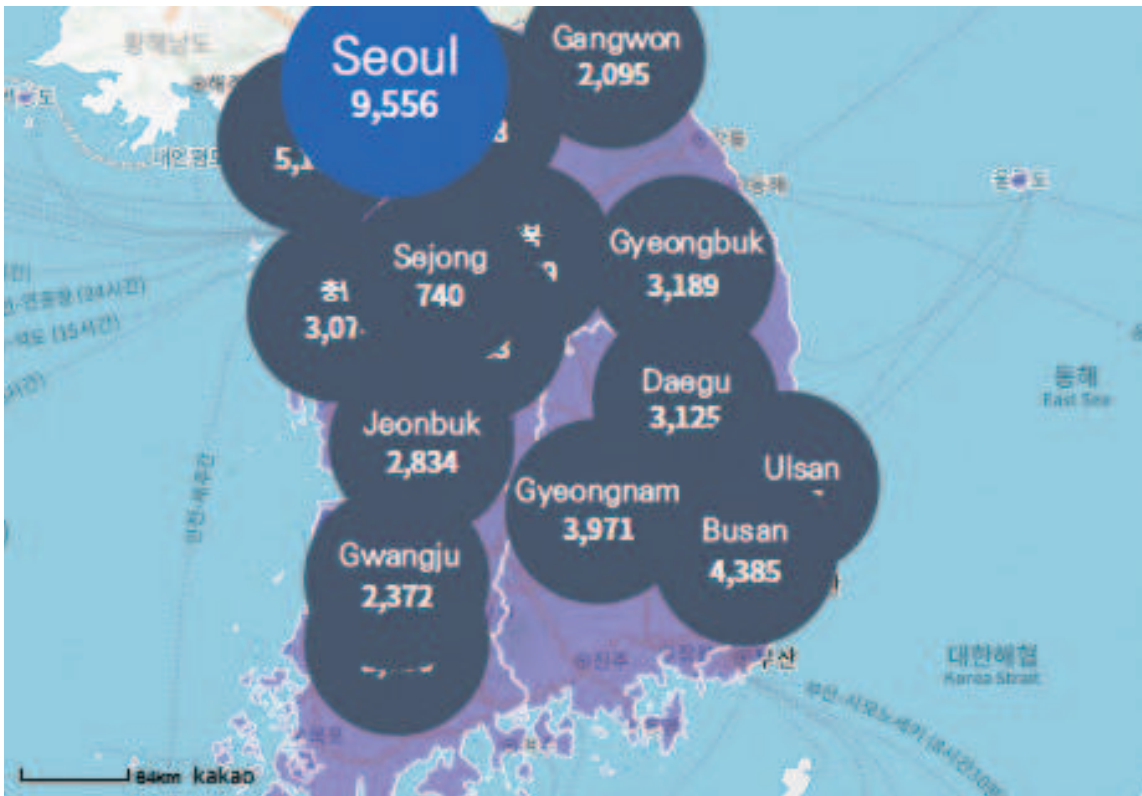
11) Based on the inclusion of 'big data' in the patent title.

12) Based on the location of the applicant.

13) Korea Intelligence Information Society Agency (NIA), Integrated Data Map (https://www.bigdata-map.kr/dashboard). Nov. 15, 2023

(Korea) Number of data products by region

(unit: case)



Source: Korea Intelligence Information Society Agency (NIA), Integrated Data Map (<https://www.bigdata-map.kr/dashboard>)

3. Seoul focusing on creating a data ecosystem and revitalizing the data economy

Seoul is focusing on creating a data ecosystem and revitalizing the data economy by establishing and implementing the “Smart City and Informatization Basic Plan (2021-2025)” with the vision of ‘future smart standard city leading digital transformation.’ In order to create the innovation foundation for a future smart city, Seoul is focusing on creating open big data and pursuing the following detailed tasks: ▲ Providing

data analysis services based on a big data service platform, ▲ Expanding the use of IoT city data to provide sustainable citizen-experienced services, ▲ Establishment of Seoul statistics integrated platform for conversion to non-face-to-face statistical surveys, ▲ Entrepreneurship and talent development through data opening.

For a data-driven smart city, Seoul plans to activate a data-based ecosystem by collecting various data, storing data, and opening data to citizens and companies. So, Seoul expects to invest a total budget of KRW 4.6881 trillion by 2025.

Seoul Policy Budget for creating open big data (Unit: KRW 100 million)

Category	2021	2022	2023	2024	2025	Total
Providing data analysis services based on big data platform	1,034	3,913	12,723	3,000	3,000	23,670
Expanding the use of IoT city data	868	1,850	1,850	2,200	2,500	9,268
Establishment of Seoul statistics integrated platform	2,000	450	1,000	1,600	600	5,650
Entrepreneurship and talent development through data opening	1,495	1,565	1,715	1,744	1,744	8,293
Total	5,397	7,778	17,288	8,544	7,874	46,881

Source: Seoul, Smart Seoul Portal

Current status of Seoul's open big data creation policy

Providing data analysis services based on big data platform

- Establishing a big data platform that provides three-dimensional data analysis results and natural language-based search services in a metaverse environment (2022~)
- Three-dimensional analysis and visualization of data, including data analysis using natural language processing technology of artificial intelligence

Expansion of IoT city data to provide sustainable citizen-experienced services

- Expanding the use and construction of city data sensors (S-DoT), improving functions (by 2024)
- Creation of urban infrastructure to support verification and commercialization of corporate new products (2024~)

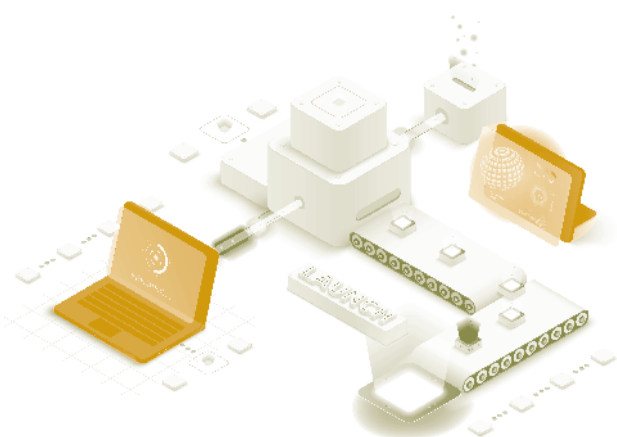
Establishment of Seoul statistics integrated platform for conversion to non-face-to-face surveys

- Establishment of planning and production processes by establishing a statistics integrated platform for non-face-to-face surveys in line with socioeconomic changes (2021-2022)
- Establishment of data management system by standardizing the statistical data production process

Entrepreneurship and talent development through data opening

- Expand the openness of public data to enhance data quality and use it as basic data for Seoul policy
- Improving big data accessibility and strengthening collaboration with similar data centers to promote data use and management and establish entrepreneurship/employment linkage plans

Source: Seoul (2021), 「Smart City and Informatization Basic Plan (2021-2025)」



III.

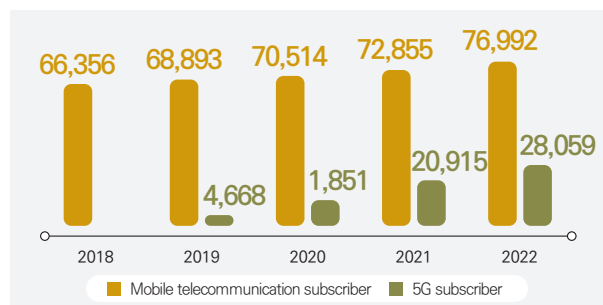
Seoul data market trends

1. Information and communication (ICT)

1) Communication service

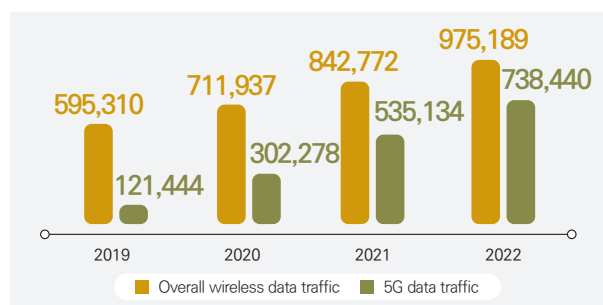
The number of mobile communication subscribers in Korea increased from 66.36 million in December 2018 to 76.99 million at the end of 2022. Among these, 5G service subscribers were 28.06 million as of the end of 2022. As a result, wireless data traffic is also rapidly increasing. Monthly wireless data traffic increased by 63.8% from 595,310TB in December 2019 to 975,189TB in December 2022. In particular, wireless data traffic through 5G services increased by 508.0% during the same period.

Mobile communication/5G subscriber trend (unit: 1,000)



Source: Ministry of Science and ICT (2023)

Monthly wireless data traffic generation trend (unit: TB)



Source: Ministry of Science and ICT (2023)

Major telecommunication service companies (e.g. SK Telecom, KT, LGU+) are seeking opportunities in the domestically oriented telecommunication service market. So, they are pursuing new growth businesses in corporate businesses such as artificial intelligence, cloud, and big data, and in non-telecommunication areas such as media/content (OTT, entertainment, etc.), platforms, and subscription services. Accordingly, the demand for data centers is increasing exponentially¹⁴⁾, and telecommunication service companies are focusing on expanding data centers and operating them efficiently and stably. Telecommunications service companies are equipped with big data analysis platforms to explore new non-telecommunications business opportunities, and are actively using the analysis results for real-time decision-making support, new product/service development, and target marketing.

2) Software & IT services

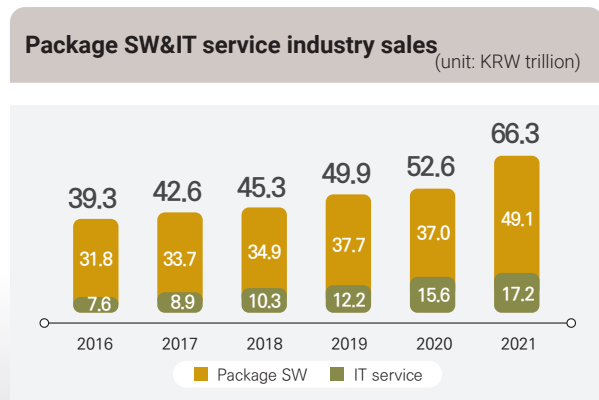
Software and IT services are at the core of Korea’s industrial innovation and digital economy. The size of Korea’s software and IT industry (based on sales) grew at an average annual rate of 11.0% from KRW 39.3156 trillion in 2016 to KRW 66.2922 trillion in 2021. The number of employees in applicable field also grew at an average annual rate of 5.1% from 240,700 in 2016 to 308,800 in 2021.

In the case of the software & IT service industry, as digital transformation accelerates due to the 4th Industrial Revolution, demand for the collection, storage, analysis, and utilization of big data has increased, and the big data platform industry linked to artificial intelligence and cloud is being strengthened accordingly. Korea’s leading IT companies, such as Samsung SDS and LGCNS, support differentiated customer experiences and decision-making by analyzing and predicting big data from various angles in various fields such as finance, manufacturing, distribution, logistics, services, and public sector based on big data platforms. Through this, they are improving business capabilities and efficiency.

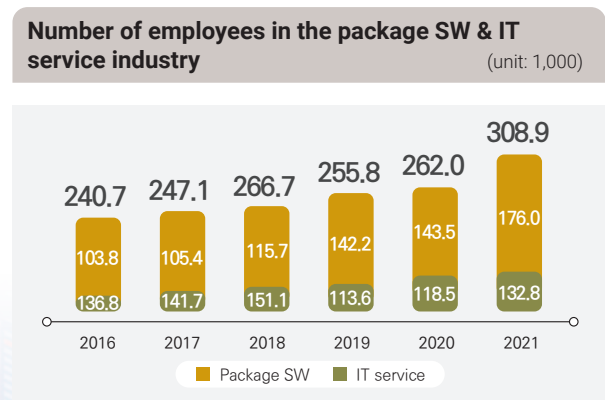
In response to the increasing demand for big data, companies in the software & IT service sector are developing big data platforms (systems, solutions) and various businesses such as platform management services and big data analysis services.

3) Current status of Seoul big data platform

Seoul is promoting various big data projects to strengthen data-based administration and improve corporate data capabilities, including: AI-based big data service platform, Seoul Transportation Big Data Platform (T-DATA), and Seoul Open Data Plaza.



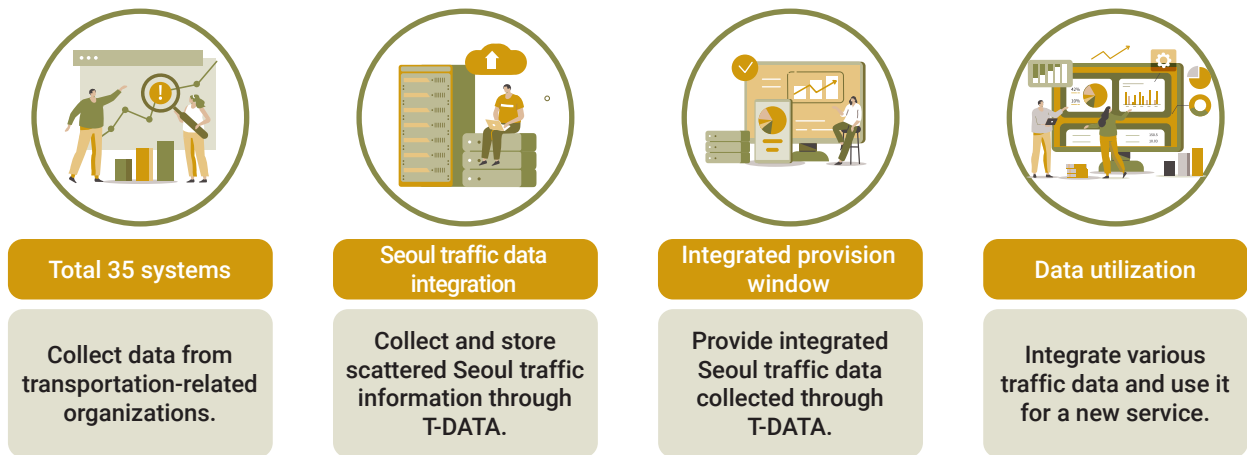
Source: Ministry of Science and ICT (2023)



Source: Ministry of Science and ICT (2023)

14) According to the Energy Efficiency Association under the Korea Data Center, the number of domestic commercial data centers is expected to increase from 40 in 2023 to 74 in 2027.

Seoul Transportation Big Data Platform (T-DATA)



Open Data Plaza in the public data field



AI-based big data platform supports AI analysis, interactive data search, and virtual convergence services based on Seoul's major policies and population-related administrative information. Seoul plans to promote predictive administrative services, innovation-based new administrative services, and data-based decision-making, and plans to continuously collect problem-solving data and various cases of using administrative data in order to promote data-based administration.

Seoul Transportation Big Data Platform (T-DATA) collects and stores data from 25 transportation information systems directly operated by Seoul¹⁵⁾, 8 external organizations¹⁶⁾, and 2 private companies

(mobility companies such as Kakao and T Map) to provide comprehensive transportation information. It collects and provides traffic statistics and real-time information such as buses, subways, public bicycles, road information, daily traffic volume, and public transportation status. In addition, it provides urban highways, ring expressway, traffic volume, fire, traffic accidents, unexpected information, weather information, fine dust, and intersection traffic based on the navigation system.

Seoul Open Data Plaza improves public interest, efficiency, and transparency by opening public data to the private sector, and creates new services and public value through the voluntary participation of citizens. It supports data-based administration and private business by providing over 6,000 cases of public data in fields such as health, culture/tour, industry/economy, environment, education, general administration, transportation, welfare, city management, safety, and housing/construction.

15) SEOUL TOPIS, Seoul Transportation Corporation (subway), Road Traffic Authority, Seoul Bicycle (Ttareungi), Seoul Public Transportation, Korea Transportation Safety Authority, National Taxi Association, Seoul Parking Information System, etc.

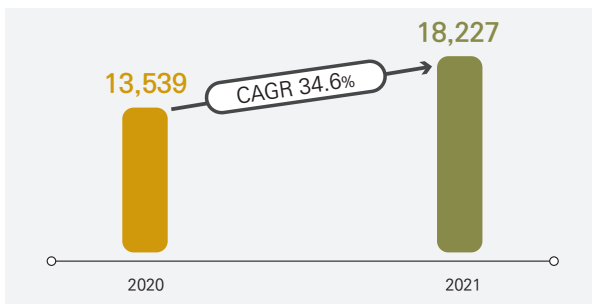
16) Seoul Emergency Operations Center, National Police Agency Urban Traffic Information Center, TBS (Traffic Broadcasting), Seoul Regional Construction and Management Office, Korea Meteorological Administration Weather Nuri, Seoul Facilities Corporation.

2. Service

1) Healthcare

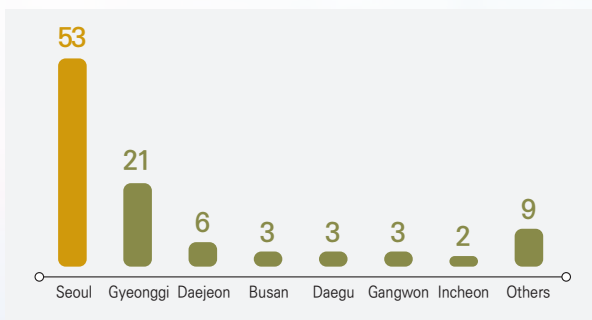
The size of Korea’s digital healthcare industry in 2021 is KRW 1.8227 trillion, an increase of 34.6% compared to the previous year.¹⁷⁾ The digital healthcare market is expected to continue to grow in the future as the demand for digital healthcare products and services increases as the medical paradigm changes to post-disease diagnosis, preemptive prevention, and health management. The global digital healthcare market¹⁸⁾ was valued at USD 233.5 billion in 2022, and is expected to grow at an average annual rate of 15.0% in the future, reaching a value of USD 981.5 billion in 2032.

Digital healthcare industry market (unit: KRW 100 million)



Source: Ministry of Trade, Industry and Energy (2023)

Regional distribution of digital healthcare companies (%)



Source: Ministry of Trade, Industry and Energy (2022)

In the healthcare field, big data is used in various fields such as precision medicine, clinical research, and new drug development. For precision medicine, big data is used to diagnose and predict diseases based on data such as patient history, symptoms, living conditions, and genetic information. For clinical research, data such as disease symptoms, patterns, and treatment responses are closely analyzed through big data to analyze clinical hypotheses, reduce resources and costs required for clinical research, and increase the likelihood of success. In the case of new drug development, customized new drugs are developed by analyzing big data on drug characteristics according to patient diseases.

Major healthcare service companies lead in developing differentiated solutions through advanced big data analysis along with building systems and platforms to analyze big data. **Infinite Healthcare** has launched a solution that integrates a medical imaging information integration platform (Vendor Neutral Archive) and AI technology, and is developing a solution that supports medical staff to provide customized diagnosis and treatment based on data and AI. **Carelabs(goodoc)** utilizes public health and medical data from the Health Insurance Review and Assessment Service to provide non-face-to-face hospital search, reception, and reservation services. **PHI Digital Healthcare** provides a various of services such as healthcare platform based on medical big data (digital therapeutics, healthcare big data platform), medical data mining service (AI analysis package, machine learning), healthcare consulting service (medical data curation and business model, Healthcare project consulting).

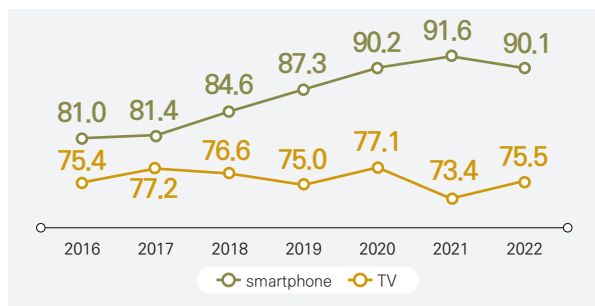
17) Ministry of Trade, Industry and Energy, Korea Digital Health Industry Association (March 2023), "2021 Digital Healthcare Industry Survey"

18) Global Market Insights (Mar. 2023)

2) Advertising/Marketing

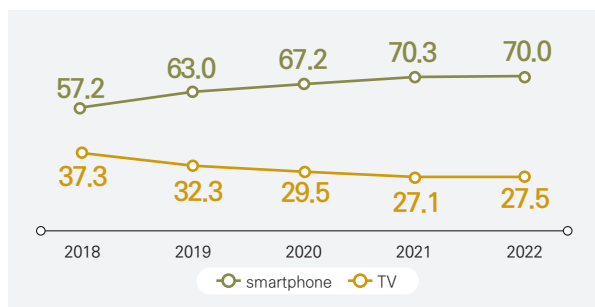
The value of the Korean advertising market in 2021 (based on amount and media advertising costs) totaled KRW 13.6552 trillion, an increase of 7.4% compared to KRW 12.7152 trillion in 2020. Among advertising media, Internet advertising such as computers and mobiles showed the highest share with 53.0%, showing a 9.7% increase from 2021 to 2022, a much higher rate than other media.¹⁹⁾ As the consumption of media and content such as smartphone-based video and OTT increases, advertising targets are analyzed to be focused on smartphone mobile advertising.

Frequency of use by media
(rate of use more than 5 days a week) (%)



Source: Korea Communications Commission (2022)

Importance by medium(essential media in daily life) (%)



Source: Korea Communications Commission (2022)

Big data is very important in the advertising industry. Because big data is based on the actual behavior of customers or users, it is easy to identify their consumption tendencies or patterns. In addition, by analyzing a large customer sample (population), it is possible to overcome the sampling error limit

of sample surveys, and by setting advertising and marketing targets based on detailed in-depth analysis, the accuracy of decision-making is increased, thereby maximizing advertising efficiency. Furthermore, it can be approached proactively to users as big data predicts the future behavior of customers or users based on the behavioral data, and create new business opportunities in preparation for future changes at the same time.

As the advantages of using big data are revealed in the advertising industry, major advertising companies are strengthening their businesses based on big data analysis such as online reputation and social buzz. Cheil Worldwide collects and analyzes digital data related to customer behavior in real time to find strategies, plans, and insights, carries out advertising through an automated marketing platform, and improves efficiency by readjusting strategies and insights based on the performance of measuring customer responses.

INNOCEAN Worldwide uses INNO-analytics, a self-developed big data in-depth analysis solution, to visualize overall customer behavior and develop data-driven marketing and advertising strategies and campaigns. HSAD uses CX CLINIC, a customer experience management model, to strengthen data-based customer experience analysis and explore new strategies and designs. In addition, HSAD is working on customer experience analysis consulting and social data analysis platform and service advancement projects with VAIV Company, a company specializing in social big data collection and analysis. And, it is strengthening the big data business capabilities by signing a big data research, development and commercialization agreement with Yonsei University.



¹⁹⁾ Ministry of Culture, Sports and Tourism (2022), 『2022 Advertising Industry Survey (based on 2021)』

3. Finance

Major cities' financial competitiveness ranking (the Global Financial Centers Index 33)

Rank	Business Environment	Human Capital	Infrastructure	Financial Sector Development	Reputational & General
1	New York	New York	New York	New York	New York
2	London	London	London	London	London
3	Singapore	San Francisco	San Francisco	Singapore	Singapore
4	Hong Kong	Chicago	Luxembourg	Hong Kong	San Francisco
5	San Francisco	Los Angeles	Sydney	Seoul	Hong Kong
6	Los Angeles	Hong Kong	Boston	Shenzhen	Los Angeles
7	Shanghai	Singapore	Singapore	Amsterdam	Singapore
8	Chicago	Amsterdam	Los Angeles	Beijing	Boston
9	Boston	Boston	Amsterdam	Paris	Paris
10	Seoul	Seoul	Zurich	San Francisco	Seoul

Source: Z/Yen (Mar. 2023)

1) Seoul, one of the global top 10 financial cities

Seoul ranked 10th out of 130 cities in the global financial competitiveness ranking and has competitiveness as a global financial hub. By announcing its vision of becoming the 'Financial Center of Asia', Seoul is accelerating the financial industry to develop into one of the world's top five financial cities, and is focusing on improving regulations to create a financial investment environment that meets global standards.

Major financial institutions strengthen their business competitiveness by integrating their vast financial big data and external structured/unstructured big data and using it for customized service development, target marketing, asset management, credit evaluation, abnormal transaction detection, market forecasting, and risk management. In addition, they are creating financial super apps and life-friendly platforms (e.g. used car trading, real estate, healthcare, transportation, and commercial analysis), diversifying non-financial services, and building a customer lock-in effect based on big data.

MyData business is one of the businesses that domestic financial institutions are focusing on based on big data. MyData integrates and manages personal financial information (credit information) to provide

more convenient financial services to customers²⁰⁾, and a total of 74 financial institutions, information and communication, fintech, and certification organizations are participating²¹⁾. Of these, 59 companies are located in Seoul, showing the significant influence of Seoul-located financial institutions and companies.

2) Financial + industrial big data platform alliance and cooperation

Domestic financial institutions, including affiliates, are strengthening their own big data businesses while also expanding their big data businesses by affiliating and cooperating with companies in various fields such as finance, communications, medical care, restaurant, research, distribution, and public sector.



20) An integrated information service that collects personal financial information scattered across banks, cards, insurance, securities, communications and allows customers to view it at a glance. It presents available financial products based on an individual's current credit and financial status, recommends optimized financial products by comparing prices and benefits for each product in detail, and provides financial consulting support.

21) As of November 2023.

KB Financial Group's KB Kookmin Card has signed a big data partnership with Lotte Card, T Map Mobility, Lotte Duty Free, Danawa, and Topas Travel Information and is focusing on hyper-personalized marketing and new business by converging data. Woori Bank has established a data dam with Mirae Asset Securities, Kyobo Life Insurance, Woori Card, Hanwha Non-life Insurance, NICE Rating Information, and KT, and is providing about 450 types of data combining financial, credit rating, and telecommunication information.

In addition, it is focusing on strengthening the data industry and creating new revenue sources by establishing a data alliance with companies such as Shinhan Card, Samsung Card, and BC Card, which have been designated as data specialized institutions by the Financial Services Commission. Shinhan Card is promoting the GranData business with SK Telecom, Korea Credit Bureau, GS Retail, LG Electronics, and SK Broadband. Samsung Card has established a Data Alliance with CJ OliveNetworks, Naver Cloud, NICE Evaluation Information, and Lotte Members. And, BC Card has established a Data Alliance in which 14 companies from 8 industries, including telecommunications, medical, restaurant, research, distribution, solutions, insurance, and investment.

4. A big data company in Seoul attracting attention from global investors

Compared to other cities, Seoul has a rich pool of public and private data that can be used to develop data technology, products, and services, and large corporations and their affiliates with high data demand, such as information and communications, finance, distribution, logistics, medical, and professional services, are concentrated in Seoul²²⁾.

To survive in fierce market competition, Seoul-located companies are focusing on technology, products, services, and R&D based on well-established data infrastructure and customers, and their R&D

competitiveness is also excellent.²³⁾ In addition, they demonstrate high competitiveness in its business portfolio by providing optimized products and services across the entire big data field, including data solutions, construction, consulting, sales, and provision.

Seoul is providing companies with growth opportunities in conducting business and hiring human resources by promoting policies to create a data ecosystem and revitalize the economy. Seoul-located companies are enjoying opportunities to secure business capabilities and experience, improve expertise and competitiveness, which are greatly helpful in expanding their customer base and achieving growth and sustainable management.

They are conducting business in an optimal environment and actively pursuing growth and innovation. In addition, they are strengthening their business capabilities through fierce competition and active partnerships while creating a healthy industrial ecosystem.

Accordingly, investors and institutions are continuing to invest in promising data companies, and the investment ecosystem is becoming active, with investments worth KRW 100 billion being attracted from global investment institutions.²⁴⁾ The attractiveness of investing in Seoul-located companies with excellent data technology and capabilities is increasing.²⁵⁾



22) Small Business News (March 28, 2022). As of February 2022, among 40 Conglomerate Companies and 1,724 of their affiliates, a total of 908 (52.1%) are headquartered in Seoul.

23) From 2013 to 2023, the patent application share of Seoul-based companies (based on big data patent titles) has never fallen below 45%. In addition, the number of tasks and research funds for national research and development projects (based on the title of the big data project) have never fallen below 30%.

24) Korea Credit Data attracted KRW 100 billion worth of investment from Morgan Stanley Tactical Value (MSTV) in August 2023, and the cumulative investment amount was reported to reach KRW 260 billion.

25) Among the Korean big data companies registered on Crunchbase, the cumulative investment amount of 124 companies that have attracted external investment is a total of USD 1.726 billion. Of these, Seoul-located companies accounted for USD 1.359 billion (78.7%). In terms of the average investment amount per company, companies in Seoul have an investment amount of USD 20.6 million, which is 1.6 times more than companies located in other cities.

Korea Credit Data attracted KRW 100 billion from Morgan Stanley

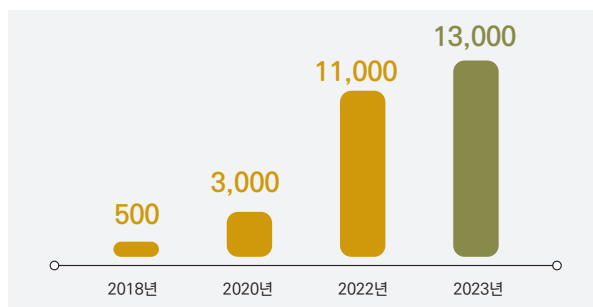
Korea Credit Data, the Cash Note operator of small business management service, received an investment of KRW 100 billion from Morgan Stanley Tactical Value Investing, a global private equity fund, in August 2023.²⁶⁾ Since the establishment of the corporation, their accumulated investment amount has reached KRW 260 billion.

Korea Credit Data is a startup company that provides business management services to local stores with 'Cash Note', a small business super app. They provide data package services in various fields such as local economic analysis, business location information, card purchase/sales, and delivery.

Overview of Korea Credit Data

Establishment	April 2016
Representative	Kim Dong-ho
Sales	KRW 64.6 billion (as of 2022)
Business place	2 million
Cumulative investment amount	KRW 260 billion
Corporate value	KRW 1300 billion (as of 2023)

Korea Credit Data's corporate value (unit: KRW 100 million)



Source: Korea Credit Data

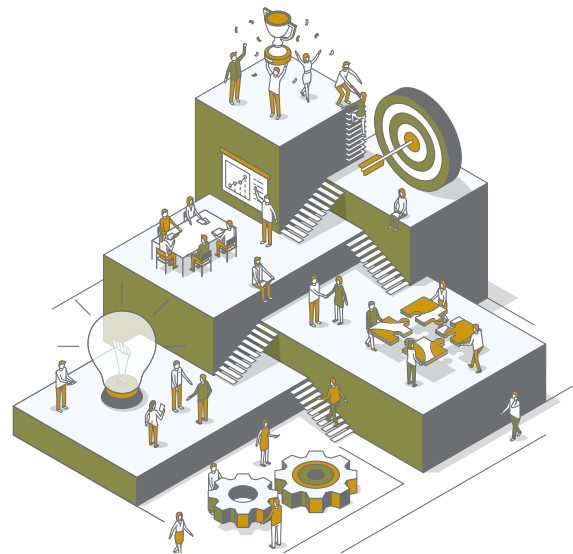
Through this investment, Korea Credit Data was recognized for its corporate value of USD 1 billion (a 25-fold increase compared to KRW 50 billion in 2018) and became the first unicorn company among small business startups. Korea Credit Data is the only

startup that has built a network infrastructure for more than 2 million small business owners, and has a strong influence in the domestic small business market with a managed transaction volume of more than KRW 300 trillion.

This investment can also be seen as a result of Korea Credit Data's strong small business-based business model being recognized, and is highly likely to expand to 7.335 million²⁷⁾ domestic small businesses in the future. Since there are many small business owners who keep their ledgers manually or do not systematically manage their business credit scores, Cash Note service is analyzed as a business model with very high growth potential.

Main features of Cash Note

- Cash Note Ledger: Calculation and management services for complex sales, customer, and tax management.
- Cash Note Finance: Financial benefit services such as loans, cards, refunds, settlements, and free credit score inquiries.
- Cash Note Community: Community service for sharing information and counseling for small business owners
- Cash Note Market: Service to search, order, and purchase items needed for business.



26) Korea Credit Data is the first case where Morgan Stanley Investment Management has invested in a Korean company.

27) Basic statistics on small and medium-sized businesses from the Ministry of SMEs and Startups (as of 2021). <https://www.mss.go.kr/site/smba/foffice/ex/statDB/AreaSubStat.do>

IV

Seoul-based companies aiming to become a rising star

1. MOBILTECH

Replica City: Redefining Your Spatial Experience.



We provide a service to create 3D maps using 'Replica City', a 3D high-precision map.

A company that provides updated 3D city data with the goal of providing precise urban spatial information for smart city.

Investment Stage	Series B
Number of employees	103 people
Investment Attraction Amount (Accumulated)	KRW 20 billion

Q Introduction to Mobiltech

MOBILTECH creates 3D maps of real spaces and provides 3D spatial data to customers according to their use and purpose. For example, when installing landmarks such as the Seoul Ring (Han River Ferris Wheel) being promoted in Seoul or simulating autonomous driving, we produce and provide 3D spatial data.

Main products and services

Replica City is a 3D map that replicates urban space and implements it as a digital twin, providing precise maps for autonomous driving and digital twins for urban planning. It uses a high-precise 3D scanner

and a self-developed AI algorithm to provide high-precision maps, while replicating urban space to provide up-to-date urban data. 3D spatial information can be used in a wide variety of fields, including autonomous driving, smart cities, UAM, metaverse, real estate, and even the defense industry.

Features and benefits of Mobiltech

In the case of the metaverse, it is not the same as the real world and can only be used in a single environment. However, Mobiltech's products generate 3D spatial information through AI and enable visualization identical to actual coordinates through a 3D space scanner, providing an immersive service. In addition, it provides an immersive digital twin service on the web through multi-platforms such as low-end PCs, smartphones, and tablets, and is more feasible than other companies, so once created, it can be reused.

Q Mobiltech's business and overseas expansion plans

MOBILTECH is focusing on its international expansion into two Middle Eastern countries (UAE and Saudi Arabia). In the UAE, we are collaborating with construction companies by applying digital twin technology to the real estate sector with more three-dimensional technology by reconstructing information in 3D rather than the existing 2D. In Saudi Arabia, cities other than the capital are often underdeveloped. We plan to use our products to detect problems such as road damage and waste in these cities and represent them as digital twins.

Q Expected effects from attracting investment

Currently, we are proving the effectiveness of commercialized products and services by supplying them to actual sites. In the future, Mobiltech's goal is to provide our products and services not only in Seoul but also around the world. In particular, given the nature of spatial data, complete spatial information across administrative districts rather than just a few regions are needed. By securing a bridgehead for overseas, it would be great helpful in expanding spatial information.

2. ActionPower

Discovering invisible data value through Daglo



We provide unstructured data solutions utilizing AI technologies in the areas of Speech, Language, and Vision.

A company that provides 'Daglo' service to discover insights from unstructured data ranging from voice, video, image, and natural language processing.

Investment Stage	Series A
Number of employees	51 people
Investment Attraction Amount (Accumulated)	KRW 15 billion

Q Introduction to ActionPower

ActionPower uses a deep learning-based AI engine based on the three central axes of Speech, Language, and Vision to convert unstructured data such as voice, video, and image that cannot be processed with existing Relational DB into analyzable data to discover insights from data. We have been selected as one of Korea's top 100 AI startups for three consecutive years, and are moving toward a 'future where people and computers talk and work together.'

Main products and services

Daglo extracts insights from text-based data and improves a recognition accuracy in interactive

speech through a speech recognition engine with an end-to-end algorithm. Based on a deep learning model, it analyzes not only voice, but also images and video, and combines voice and natural language processing technology. Additionally, it can extract video content into text or create shorts. Daglo has created a total of more than 5 billion words with voice recognition based on its self-developed AI technology, and also provides multi-modal services incorporating AI technologies such as NLP and OCR.

Features and benefits of ActionPower

ActionPower's strengths are "usability" and "technology". In terms of usability, we have been providing services directly using voice data since 2016, so we understand exactly what users want and provide services such as AICC and education to various corporate customers in the media field. In terms of technology, the proportion of researchers within the company is 70%, and more than half of them have master's/doctoral degrees in computer engineering from prestigious universities and are directly developing core technologies through excellent human resources. We process hundreds of thousands of voice data generated from Daglo every month, and we have excellent strengths, especially in data processing and preprocessing.

Q ActionPower's business and overseas expansion plans

ActionPower plans to launch the Daglo service targeting English-speaking countries, Japan, and Southeast Asia in January next year and diversify its business portfolio such as AICC, media, and education.

Q Expected effects from attracting investment

By recognizing the importance of original technology, we have developed our own voice recognition engine technology and are using it in various industries. This is expected to be of great help in future technological advancement and marketing expansion.

3. SNPLAB

Creating a world where personal information becomes business



We provide an on-Device MyData platform service that allows users to receive compensation by selling de-identified data to companies, and allows companies to create customized advertisements using user data.

A company specializing in personal information distribution that provides 'my:D', a personal information platform for win-win cooperation between individuals and companies.

Investment Stage	Series A
Number of employees	45 people
Investment Attraction Amount (Accumulated)	KRW 3 billion

Q Introduction to SNPLAB

SNPLAB provides a service that allows individuals, who are information subjects, to directly manage their own data, store various data, and provide it where necessary with the philosophy that "Only individual can determine the value and price of personal information".

Main products and services

My:D allows users to manage data such as their bank information, card details, medical records, shopping habits, and YouTube records, and receive compensation by selling de-identified data to companies. It is the first data transaction service through smartphone-based on-device

pds, allowing anonymized personal data to be sold to companies in exchange for points. As it is a personal information service, a high level of security is required, which can be met by storing personal records on the user's device rather than on a corporate server.

Features and benefits of SNPLAB

Because individuals process their own data, we are free from compliance issues related to personal information. Additionally, we have the know-how to analyze data in a non-server state. The biggest advantage is that there is no risk of data leakage through companies as data is stored only on personal smartphones, and users can access service without complicated membership registration since it does not identify the users. In particular, we are paying particular attention to data security through the label differential privacy method.

Q SNPLAB's business and overseas expansion plans

SNPLAB is planning to enter the European market, focusing on Finland, where the MyData headquarter is located, and is also considering entering Canada market. In Korea, the proportion of individuals is currently higher than that of companies, but we plan to expand the My:D service through marketing targeting companies.

Q Expected effects from attracting investment

When people change their perception of data, our service needs to be scaled up. By attracting investment, we will be able to secure a bridgehead overseas and prepare accordingly.



4. t' Order

Completing all orders with data



We are building a data-based ecosystem in F&B offline through 'Table Order', a tablet ordering platform.

Korea's No. 1 company that digitizes offline stores through a data-based tablet ordering solution platform.

Investment Stage	Series B
Number of employees	250 people
Investment Attraction Amount (Accumulated)	KRW 14 billion

Q Introduction to t' order

t'order has started by building an unmanned ordering platform for F&B offline and now provides various services such as data platform service that converts advertising and offline indicators into data, with the vision of "completing all orders with data".

Main products and services

t'order provides the software and hardware of Table Order tablet in a monthly subscription format. In addition, it functions as an advertising platform by broadcasting advertisements and running promotional events through tables in the store. The cumulative number of orders placed through table orders is more than 220 million, with an average of 13 million per month. It is building a big data solution ecosystem that can manage branches and analyze customers in offline F&B stores by receiving store evaluations (staff friendliness, taste) from on-site customers.

Features and benefits of t'order

t'order is building a tablet infrastructure by identifying store orders and sales, collecting data in real time, and reflecting the feedback to the tablet. Although the POS integration conditions and preferences vary from store to store, t'order has considerable development know-how for this. In addition, even if the number of table orders increases, it can create proper store environment by simplifying the cost structure. Data insight (establishing sales strategies for each store by analyzing meaningful data such as menus with high sales, peak hours, customer age, and gender) based on this infrastructure is currently being tested, but is expected to be commercialized soon.

Q t'order's business and overseas expansion plans

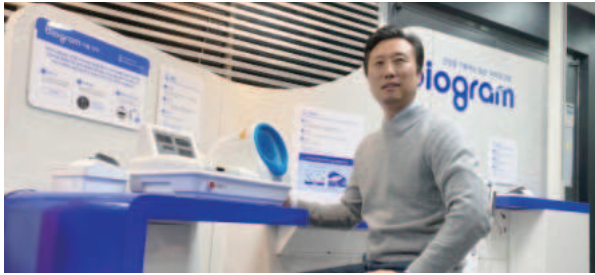
As of 2023, t'order's cumulative number of orders reaches 220 million, but we believe we can go beyond this and continuously increase its share of the restaurant industry market. In the case of overseas, we established subsidiaries and corporations in Canada and the United States, respectively. Last October, we signed an MOU with a leading POS solution partner in the eastern United States to accelerate our entry into the North American market. In addition to overseas subsidiaries, we are introducing tablets by signing individual contracts with store owners in Hong Kong and Japan.

Q Expected effects from attracting investment

The investment environment is not good due to the economic downturn, but in times like these, we must focus on discovering companies that have been verified with intuitive numbers. Even in difficult economic situations such as COVID-19, t'order has achieved a market share of 60% and a corporate value of KRW 150 billion in three years, responding well to digital transformation and workforce shortages. Through this investment as a bridgehead, we hope to build a tablet infrastructure around the world that provides data analysis suitable for the offline digital era with simple tablet installation.

5. HealthMax

Biogram to record health



We provide customized healthcare services (e.g. exercise, diet) by analyzing health data measured directly by users.

A digital healthcare company that analyzes user health data collected through kiosks and mobile devices to provide customized healthcare services and operates a health data distribution platform.

Investment Stage	Series A
Number of employees	40 people
Investment Attraction Amount (Accumulated)	KRW 10.5 billion

Q Introduction to HealthMax

HealthMax analyzes user health data collected through Biogram Zone and mobile devices (wearable devices, apps) using AI to provide customized healthcare services and provides data to companies that need health data.

Main products and services

Biogram is a digital healthcare service that provides information such as customized exercise, nutrition, diet, medication instructions, and points (motivation) to help users form a healthy lifestyle by analyzing health data (37 types, including body composition, blood pressure, blood sugar, stress, etc.) collected in real time through Biogram Zones installed in over 330 locations across the country, wearable devices, and mobile apps. In addition, we also offer a distribution platform service that provides health data to companies that require

health data (e.g. insurance, health & beauty, health functional foods, pharmacies, and large supermarkets) with the user's consent.

Features and benefits of HealthMax

Biogram can record and analyze users' health data in real time through kiosks and wearable devices rather than hospital or medical examination information. To date, it holds 22 million Patient Generated Health Data (PGHD). Existing hospital and health insurance data are based on past data (1-2 years ago), but HealthMax's Biogram collects and analyzes health data in real time to provide convergence services such as customized healthcare services and health data in a timely manner. Insurance and health functional food manufacturing and distribution companies use HealthMax health data to develop insurance products and manufacture or recommend customized health functional foods.

Q HealthMax's business and overseas expansion plans

We aim to expand the number of biogram zones currently installed in 330 locations across the country to 700 and 1,000 by 2024 and 2025, respectively. For this, we are pursuing the expansion of Biogram to H&B chains, large supermarkets (e.g. Olive Young, E-Mart), and construction companies. In addition, we are developing a miniaturized 'Biogram Mini' that measures key values such as body composition, blood pressure, and blood sugar to release it in the first half of 2024. Meanwhile, we are pursuing entry into Southeast Asian markets such as Indonesia. Recently, as income levels in Southeast Asia have increased, the number of people with chronic diseases has also increased, attracting attention as a region with high potential for Biogram.

Q Expected effects from attracting investment

If the investment attraction is successful, it will be possible to secure the funds needed to expand Biogram services (infrastructure), improve convenience (Biogram Mini), and enter the Southeast Asian market. We are planning to attract investment worth KRW 5 billion before proceeding with Series B in earnest.

6. Big data companies attracting attention from investors

Company name (in Korean alphabetical order)	Representative name	Representative product/service	Investment stage	Webpage
Nuvilab	Kim Dae-Hoon (Logan kim)	AI Food Tray Scanner/AI Food Bin Scanner Food data solution (nutrition management/ carbon reduction/operation optimization)	Series A	https://www.nuvilab.com/
NEARHLAB	Choi Jay-Hyuk	Autonomous flight drone, autonomous flight mobile app Zoomable(Cloud Data Analysis)	Series C	https://www.nearthlab.com/
Dabeeo	Park Ju-Hum	Digital spatial information (Building Polygon DATA) Road network information (RoadNetworkDATA)	Series B	https://www.dabeeo.com/
ROWAN	Kang Sung-Min/ Han Seung-Hyun	Dementia prevention digital treatment device (SuperBrain/SuperBrainG)	Series A	https://www.rowan.kr/
Macrogen	Kim Chang-Hoon	Disease prediction genetic test, DTC genetic test, Animal genetic test	Series D	https://www.macrogen.com
MACHBASE	Kim Sung-Jin	Time Series Database Engine (Time Series Database)	Series C	https://machbase.com
mAy-I	Park Jun-Hyuk	Visitor video analysis solution (mAsh)	Pre-A	https://may-i.io/
IMBdx	Kim Tae-You/ Moon Sung-Tae (Peter Moon)	Cancer diagnosis solution based on genome analysis (Alphaquid® Profiling)	Series B	https://www.imbdx.com/
Acryl	Park Jin	Integrated Artificial Intelligence Platform (Jonathan®)	Series B	https://www.acryl.ai
evidnet	Brian Jo	Medical big data solution (50 million people) Medical MyData Platform (Medipangpang)	Series B	https://evidnet.com/en/
Aiden lab	Kang Cheol-Yong (Charlie Kang)	Market data platform (Encode8)	Seed	https://www.aidenlab.io/
AITRICS	Kim Kwang-Joon	Patient condition worsening prediction solution (AITRICS VC)	Series A	https://www.aitrics.com/
AIZEN	Kang Jung-Seok	Finance-specific AutoML solution (ABACUS) BankingasaService(e-Mobility)	Series B	http://www.aizenglobal.com/
Waycen	Kim Kyung-Nam (James Kim)	Lifelog data collection/analysis platform (H-AID)	Series A	https://waycen.com/
UTINFRA	Park Dong-Kook	Data-based cancer patient nutrition management platform (Kini Care)	Pre-A	https://utinfrac22.quv.kr/
Com2Verse	LEE Kyung-Il (Richard Lee)	Metaverse Office / Com2verse Convention	Series A	https://www.com2verse.com/
Kweather	Kim Dong-Sik	Air quality integrated management software (Air Big Data Platform)	Series B	https://www.kweather.co.kr/
Constant	Jeong Keun-Sik	Big data-based hair loss care (Refilled)	Seed	https://refilled.co.kr/main
Promedius	Bae Hyun-Jin	Chest X-ray based osteoporosis screening solution (PROS CXR)	Series A	https://promedius.ai/
HurayPositive	Choi Doo-Ah	Customized health care service (e.g. Obesity, chronic diseases)	Series C	https://www.huray.net/

V. Invest Seoul with you



Invest Seoul is a foreign investment promotion agency established by the Seoul Metropolitan Government to create an investment environment that is friendly to foreign investors, with the aim to transform Seoul into an attractive destination for global investments.

We create quality jobs by attracting leading global companies to Seoul and provide promising companies in Seoul with robust growth opportunities by establishing connections with global investors.

We are committed to providing more detailed and diverse customized services in conjunction with specialized industrial organizations, field-specific private experts, and the central government.

Invest Seoul's support service by phase



Investment incentive

Cash Grants	Cost support for building or refurbishing cutting-edge technology & business factories and offices. Cost support for land or real estate purchase, rents or construction, capital goods and R&D goods purchase, infrastructure, employment, education and training.
Tax Exemption and Reduction	When foreign investors are newly building factories/offices or investing 2 million USD or more, they can enjoy a reduction on acquisition and property tax. Also, they will be exempt from tariffs, individual consumption tax and value-added tax.
Subsidies for Employment and Education/ Training	Global foreign investors investing in Seoul's 8 new growth powerhouse industries (IT/convergence, green industries, digital contents, business services, fashion/design, finance, tourism/convention, and biotechnology) can receive subsidies for employment and education & training via signing MOU on foreign investment attraction business.



Seoul leads Digital
Innovation Economy
with **Big Data**

invest
Seoul