# Economic Index and Industrial Structure

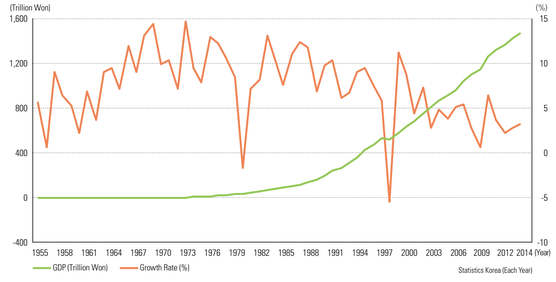
Economic index has been used to understand the economic power or business cycle of a country, or to predict the future of the business cycle, and is often measured by using various statistically valid indicators. Different countries adopted different indices for their national atlas. In the United States, the indices are: per capita income, unemployment rate, per capita number of jobs, median household income, and per capita average wage of employee. In Canada, only income related economic indicators, such as median household income, male median income, and female median income, were selected. In this National Atlas of Korea, total regional gross domestic product (GDP), total number of establishments and employees, value added by industries, international trade and balance of payments, research and development activities, local finance, and other statistical indicators are presented as economic indicators.

Regional gross domestic product means the sum of the newly created final products and services rendered, i.e., total value added during a specific time at a particular place. With other economic indices, the size of the regional economy, the level of production, and industrial structure can be deduced. Furthermore, these can be used as the basis for the establishment of regional economic policies and regional economic research. If this regional GDP is expanded to the national level, it could be the national gross domestic product; however, the data used for the estimation and the methodologies may vary and may not necessarily be the same.

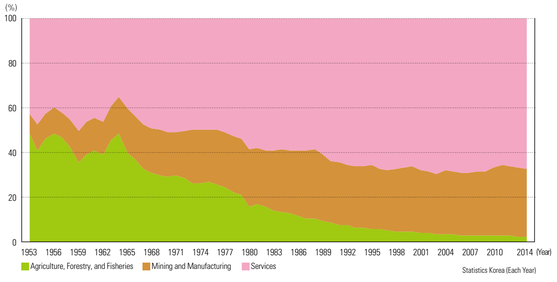
According to the World Bank (2014), Korea's gross domestic product (nominal basis) was ranked 12th in the world in 2014 at 1 trillion won, or 1,410 billion USD, and when adjusted with the Purchasing Power Parity, it occupied 13th place. The growth pattern of the gross domestic product showed that in 1971 it was just over 10 billion USD, and after 15 years in 1985 it increased 10 times, exceeding 100 billion USD. In 2006, 35 years after it first exceeded 100 billion USD, it broke through the 100-fold increase of 1 trillion USD, demonstrating that Korea has achieved accelerated economic growth in a compressed time frame. A review of the economic growth pattern of Korea reveals that pre-1960, GDP growth rate changes remained less than 5%; however, in the 1960s (1961 – 1970) the growth rate was 9.5%; in the 1970s (1971 – 1980), 9.3%; in the 1980s (1981 – 1990), 9.9%, with the highest growth rate of almost 10% for some time during this time. But in the 1990s (1991 – 2000) the growth rate declined to 7.0% and in the 2000s (2001 – 2010), the growth rate dropped to 4.4%, indicating the slowing growth of the Korean economy. Since 2010, growth has further slowed, with a growth rate of less than 4%.

An analysis of the changes in the industrial structure by industrial sector reveals that the proportion of the gross domestic product accounted for by the agriculture, forestry, and fishery industries declined sharply from 48.2% in 1953 to 28.9% in 1970, 8.4% in 1990, and only 2.3% in 2014. Meanwhile, mining and manufacturing had the proportion of 8.9% in 1953, 20.4% in 1970, 28.0% in 1990, and 30.3% in 2014, demonstrating a continuous increase. Services and other tertiary sectors were at 42.8% in 1953, 50.7% in 1970, 63.6% in 1990, and 67.4% in 2014, showing a proportional increase. This shows that the industrial structure of Korea was quickly reorganized after 1970, with industry's proportion of the gross domestic product moving from a primary industry to secondary and tertiary industries.

Trends in the Real Growth Rate of GDP (1955 – 2014)




Changes in GDP by Industry (1953 – 2014)



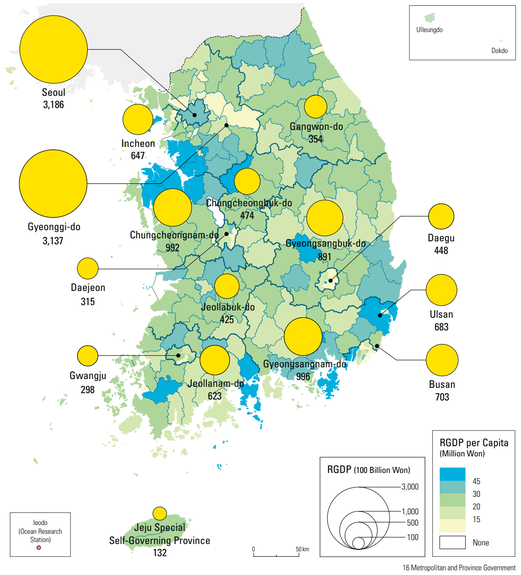




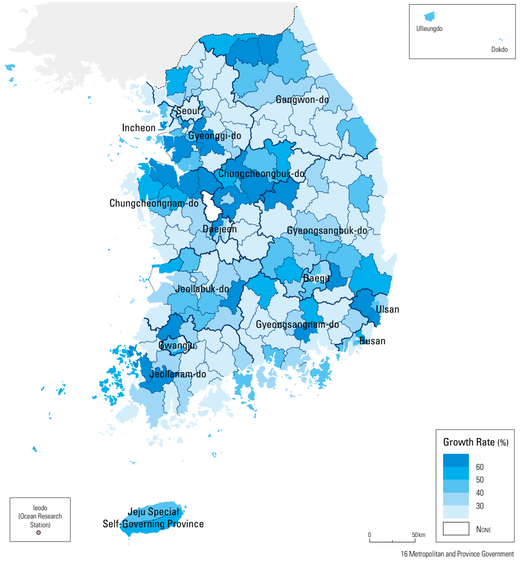



## Economic Growth

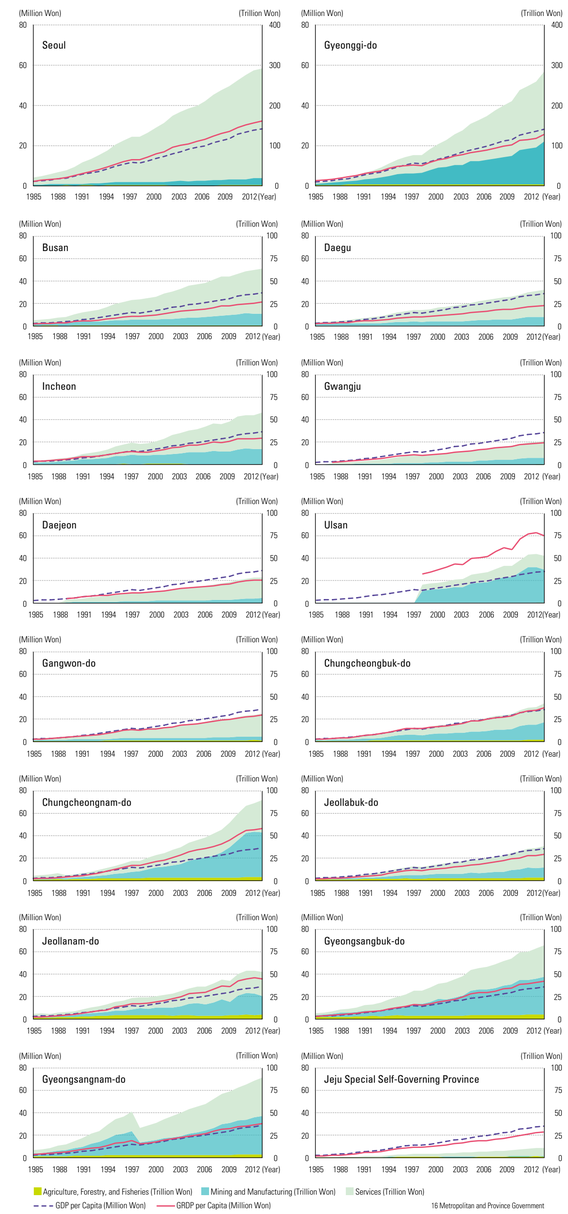
Regional Gross Domestic Product (2012)




Growth Rate in RGDP (2007 – 2012)



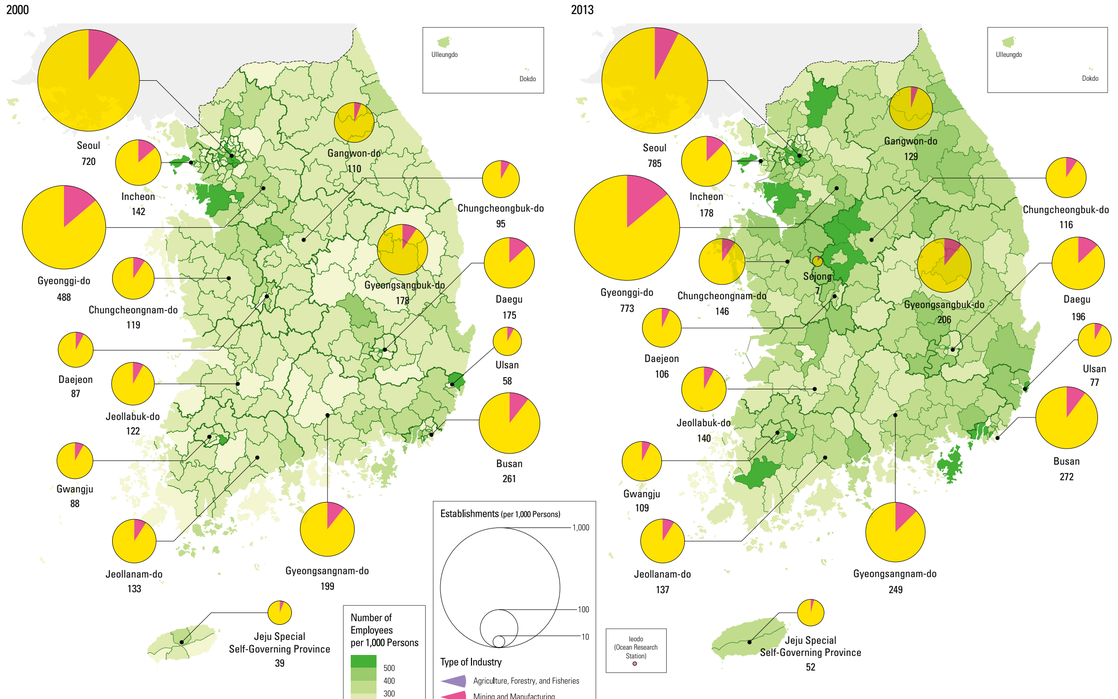

RGDP and RGDP per Capita




An analysis of the industrial structure of cities and provinces through the changes in regional GDP between 1985 and 2013 shows that all areas experienced growth in regional GDP. In particular, the rapid growth of Gyeonggi-do is noticeable; in 1985, Seoul had 22.9 trillion won, while Gyeonggi-do had 12.5 trillion won, not even 55% of Seoul. However, in 2013, Gyeonggi-do improved its regional GDP to 313.6 trillion won, almost the same level as Seoul with 318.6 trillion won. The agriculture, forestry, and fishery industries showed proportionate losses in all areas, while service sectors gained proportionately in all regions. In particular, Seoul gained the mostly in service and related sectors, increasing sharply from 87.9% in 1985 to 93.2% in 2013, which reflects the service-oriented industrial restructuring process. The manufacturing sector showed proportionate losses in the greater metropolitan areas, while other areas gained proportionately in the manufacturing sector. Gyeonggi-do, Chungcheongbuk-do, and Chungcheongnam-do showed pronounced increases in manufacturing growth, indicating a new growth trend in the region south of the Greater Seoul Metropolitan area, Chungcheongnam-do, and Chungcheongbuk-do.

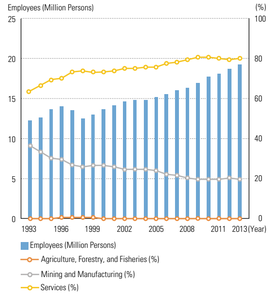
The regional per capita GDP by city (-si) and county (-gun) in 2012 was as follows: Asan-si (89.69 million won), Yeongam-gun (80.59 million won), Dangjin-si (72.97 million won), Yeosu-si (71.68 million won), Gwangyang-si (69.68 million won), Gumi-si (63.45 million won), Ulsan (63.42 million won), and Seosan-si (60.77 million won).

Establishments and Employees



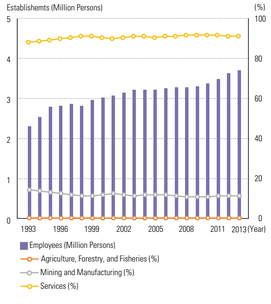

Ministry of the Interior (2000), Ministry of Security and Public Administration (2013), Statistics Korea (2000, 2013)

Number of Employees by Industry (1993 – 2013)



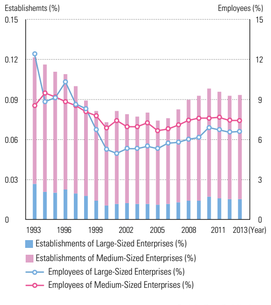

Statistics Korea(Each Year)

Number of Establishments by Industry (1993 – 2013)



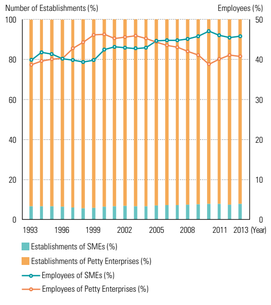

Statistics Korea (Each Year)

Employees and Establishments of Large- and Medium-Sized Enterprises (1993 – 2013)




Statistics Korea (Each Year)

Employees and Establishments of SMEs and Petty Enterprises (1993 – 2013)




Statistics Korea (Each Year)

An analysis of the changes in the proportion of employees and establishments by industries reveals that the economic sectors of agriculture, forestry, fishery, mining, and manufacturing have declined continuously since 1993, while service sectors have increased. For example, the proportion of mining and manufacturing employees and their establishments declined from 32.1% and 12.3% in 1993 to 19.9% and 10.1% in 2013, respectively. On the other hand, the proportion of service industrial sector employees and their establishments grew from 67.6% and 87.6% in 1993 to 79.9% and 89.8%, respectively, in 2013. In particular, for the number of service workers (unit is in thousands of persons) between 2000 and 2013, the greatest increases were shown in Gangseo-gu in Busan (449 → 1,391); Geumcheon-gu in Seoul (388 → 844); Jung-gu in Seoul (2,44 → 2,836); Jung-gu in Busan (1,122 → 1,458); Jongno-gu in Seoul (1,182 → 1,472); Yeongam-gun (288 → 575); and Dong-gu in Busan (499 → 769). This indicates that the greatest rate of increase in service employees since 2000 was mostly in the large metropolitan areas where the service sector grew the fastest.

It is notable that there has been a decline in the proportion of large-sized establishments and an increase in the number of small and medium-sized establishments (SMEs) since 1993 in terms of the number of businesses and employees.

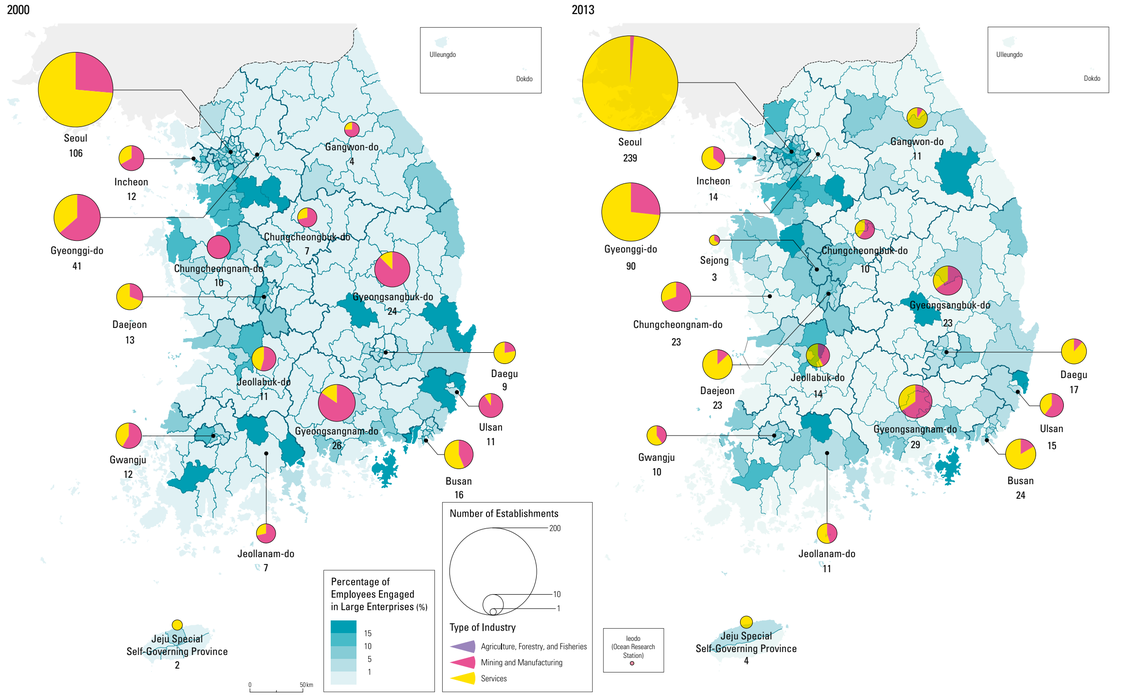
For example, the proportions of large establishments and of their employees decreased significantly, from 0.02% and 12.4%, respectively, in 1993, to 0.01% and 6.6%, respectively, in 2013, while the proportions of the number of establishments and number of employees with mid-sized companies also decreased from 0.09% and 8.6%, respectively, in 1993, to 0.07% and 7.4%, respectively, in 2013. Meanwhile, the proportions of the number of establishments and number of employees with SMEs increased from 6.6% and 40.0%, respectively, in 1993, to 7.7% and 45.2%, respectively, in 2013, and the proportions of the number of establishments and number of employees with petty enterprises remained relatively stable at 93.2% and 40.8%, respectively, in 1993, compared to 92.2% and 39.0%, respectively, in 2013.





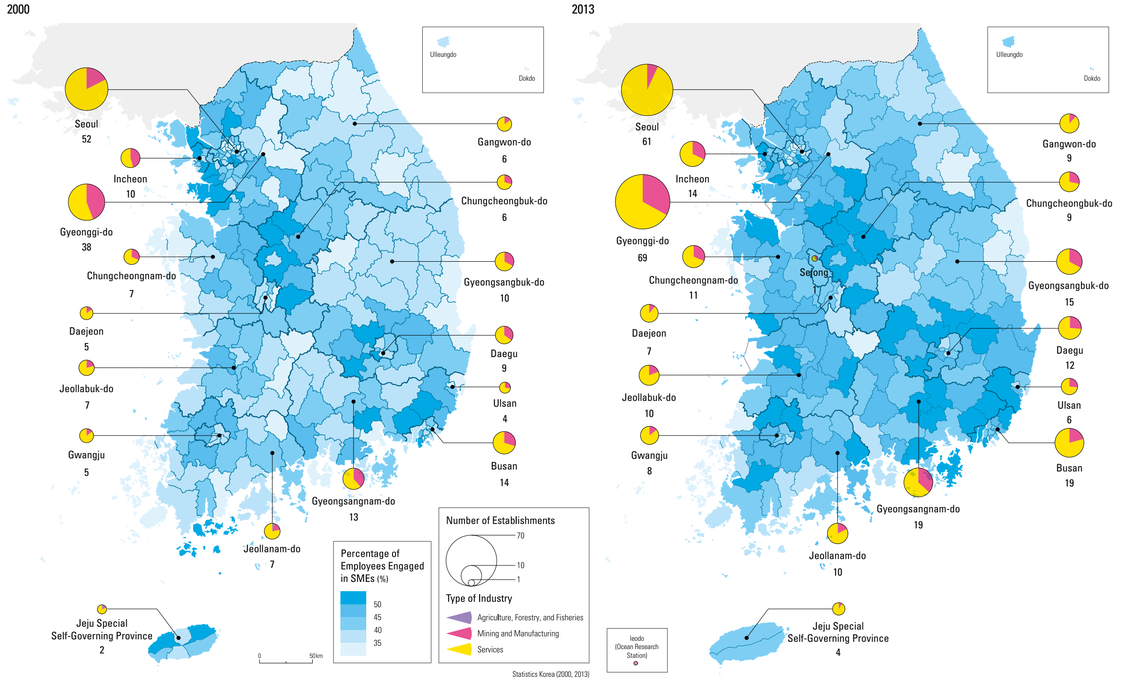


Number of Establishments and Percentage of Employees Engaged in Large Enterprises




Statistics Korea (2000, 2013)

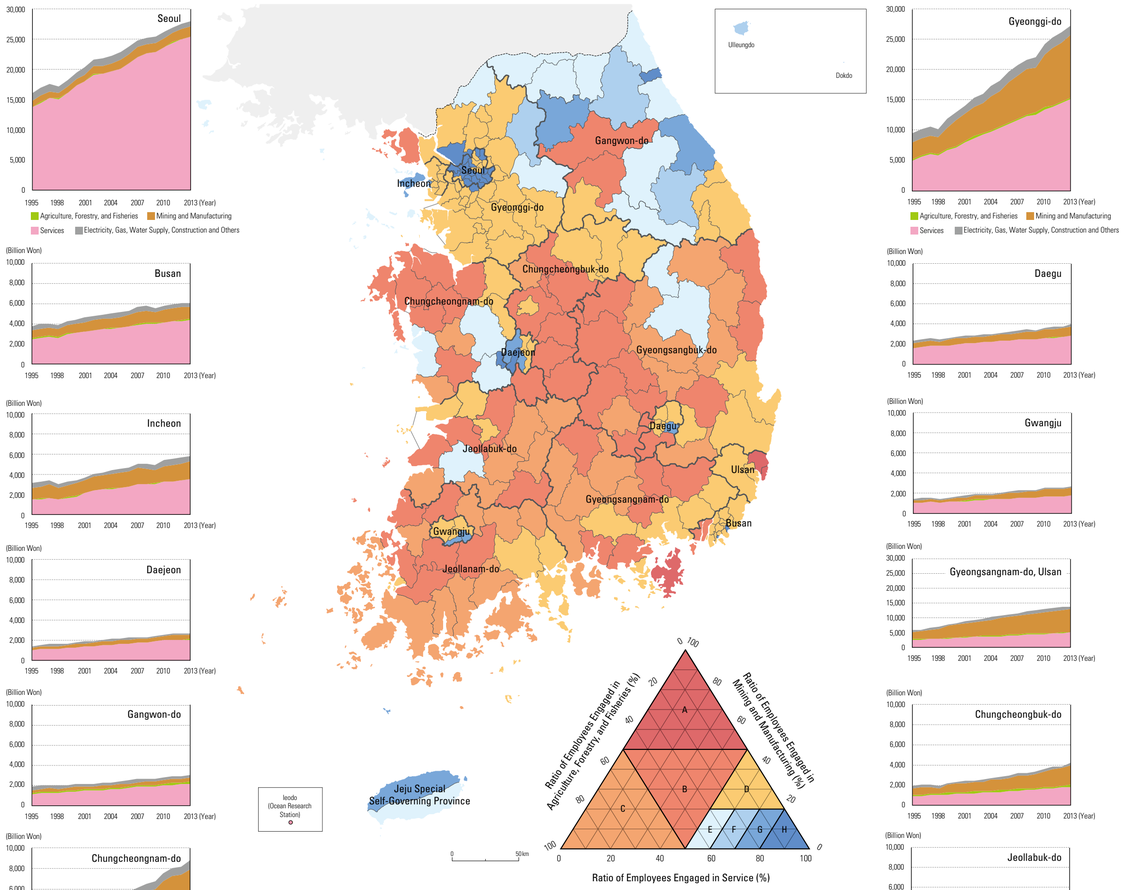
Number of Establishments and Percentage of Employees Engaged in SMEs




Statistics Korea (2000, 2013)

## Industrial Structure

### Ratio of Employees by Industry (2010)



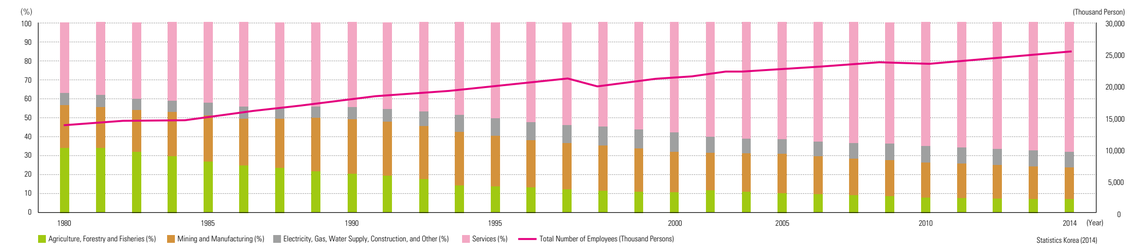

### Ratio of Employees by Industry

| Type | Agriculture, Forestry, and Fisheries | Mining and Manufacturing | Service |
|---|---|---|---|
| A | Less than 50% | Above 50% | Less than 50% |
| B | Less than 50% | Less than 50% | Less than 50% |
| C | Above 50% | Less than 50% | Less than 50% |
| D | Less than 30% | 20 – 50% | 50 – 80% |
| E | 20 – 50% | Less than 20% | 50 – 60% |
| F | 10 – 40% | Less than 20% | 60 – 70% |
| G | Less than 20% | Less than 20% | 70 – 80% |
| H | Less than 20% | Less than 20% | Above 80% |

Statistics Korea (2010)

Statistics Korea (Each Year)

### Percentage of Employees by Industry (1980 – 2014)



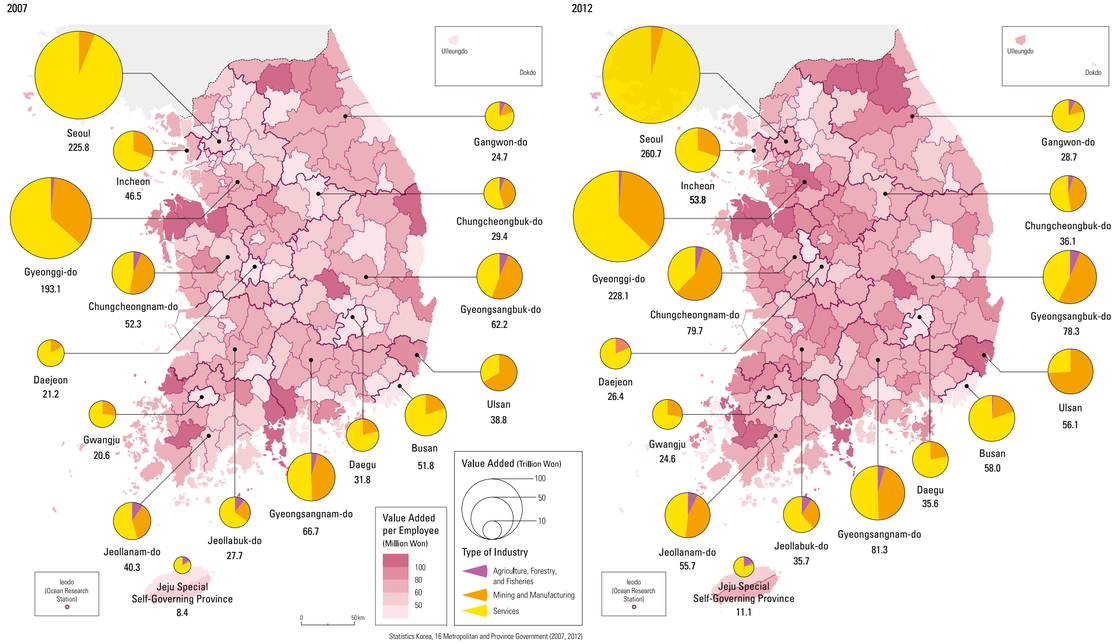

Statistics Korea (2014)





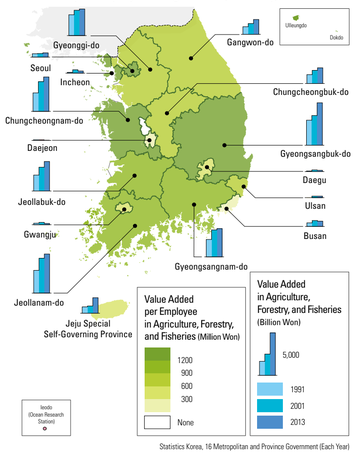


### Value Added

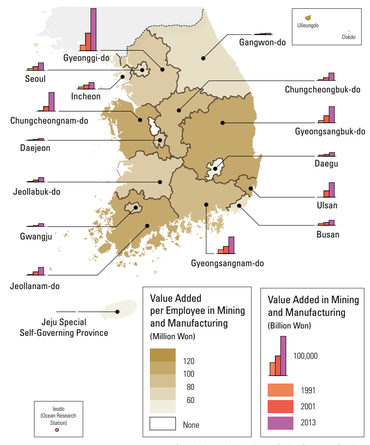



Statistics Korea, 16 Metropolitan and Province Government (2007, 2012)

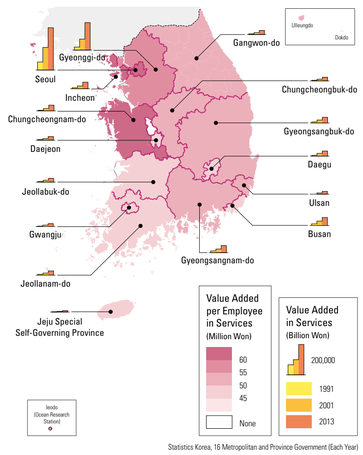
### Value Added per Employee in Agriculture, Forestry, and Fisheries




### Value Added per Employee in Mining and Manufacturing

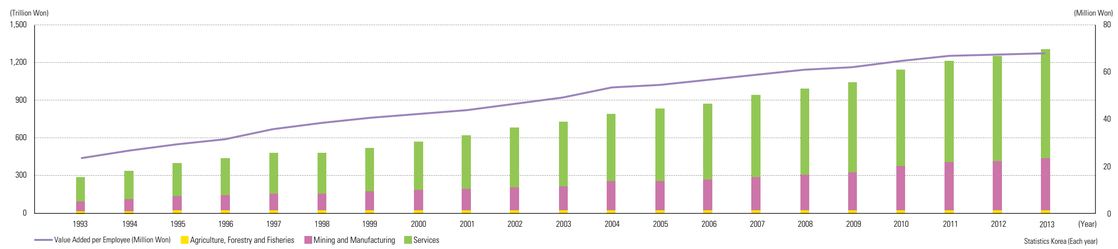



### Value Added per Employee in Services




Statistics Korea, 16 Metropolitan and Province Government (Each Year)

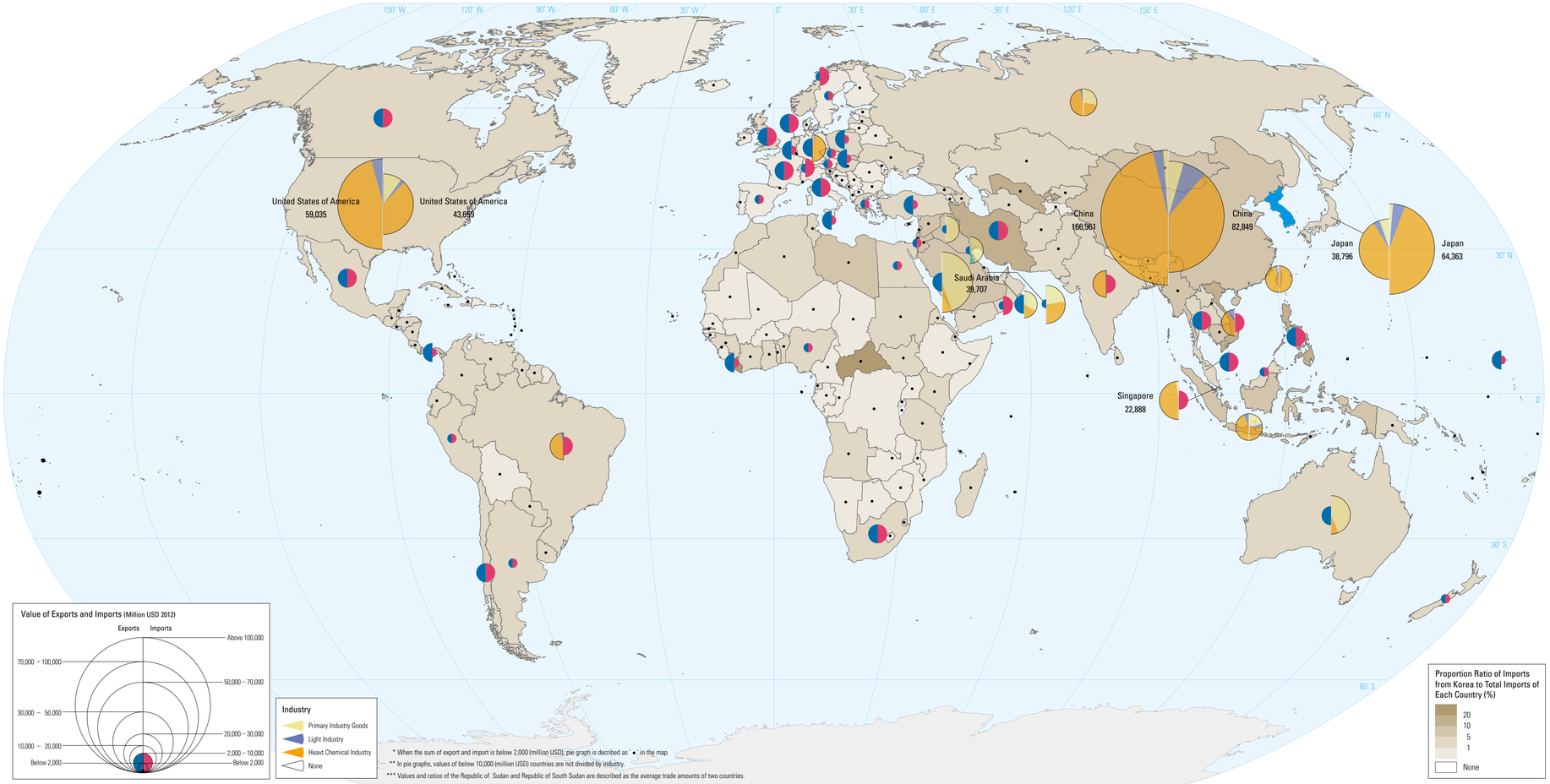
### Total Value Added by Industry



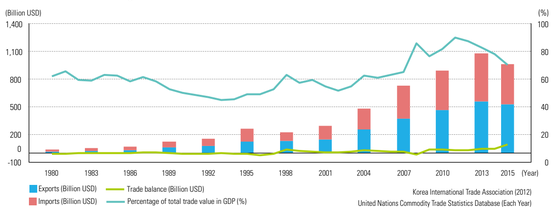

Statistics Korea (Each year)

## Trade and International Balance

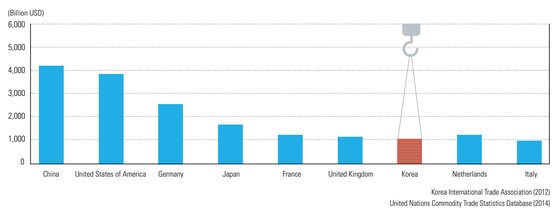
### Exports and Imports of Korea



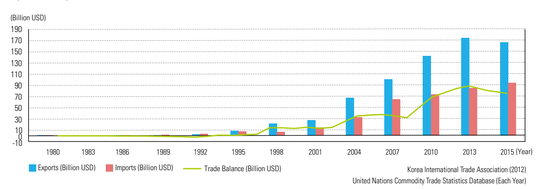

### Exports-Imports and Trade Balance and Degree of Dependence on Foreign Trade for Korea (1980 – 2015)



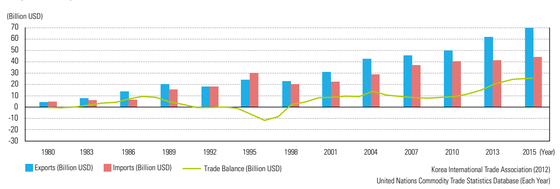

### Leading Countries in World Trade




### Exports-Imports and Trade Balance of China (1980 – 2015)



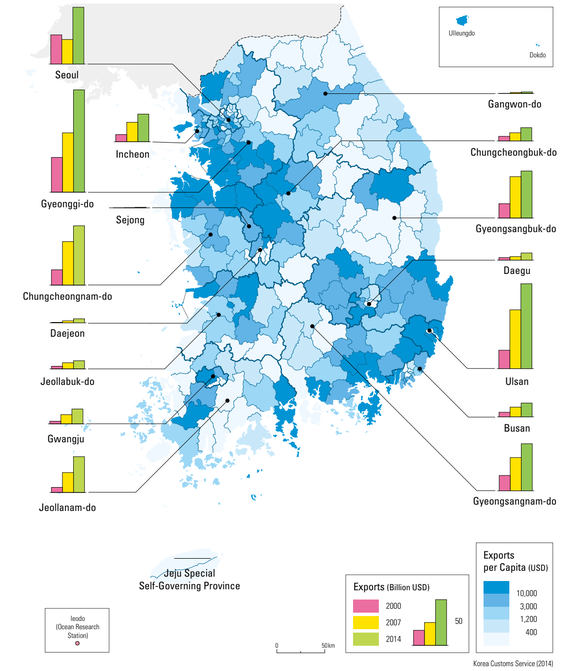

### Exports-Imports and Trade Balance of the United States of America (1980 – 2015)



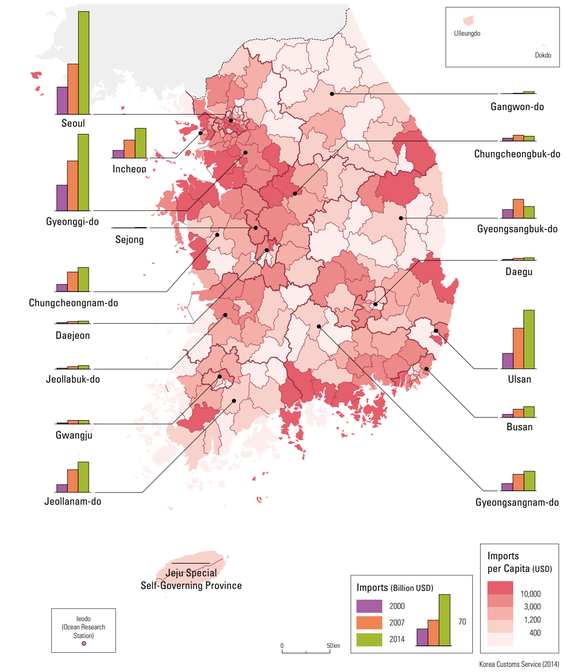

Since the 1960s, the rapid growth of international trade has played a crucial role in the economic growth of Korea. By 2012, the country's international trade volume had exceeded 1 trillion USD, and in 2013, it reached US$ 1.0752 trillion (export: $559,6 billion, import: $551.5 billion). In particular, the foreign trade dependency initiated by the export-led growth strategy of the 1960s maintained a steady increase (to 40%) through the mid- to late-1990s, and continued to increase to the present level of 82.4% by 2013. In terms of international trading, the highest volume of exports was to China, followed by the United States, Japan, Singapore, and Vietnam. Meanwhile, China was also the country from which Korea received the most imports, followed by Japan, the United States, and Saudi Arabia. In particular, China has been Korea's most important trading partner since 2007.

The analyses of international trading activities by region reveal that Gyeonggi-do (19.5%) had the most export volume in 2014, followed by Ulsan (16.1%), Chungcheongnam-do (11.4%), Seoul (10.9%), and Gyeongsangbuk-do (9.0%). On the other hand, Seoul (26.7%) had the most import volume in 2014, followed by Gyeonggi-do (19.9%), Ulsan (15.2%), Jeollanam-do (8.0%), and Incheon (7.7%). In particular, the highest per capita export volume in US dollars was from Asan (US$ 141,216), followed by Buk-gu in Ulsan (US$111,162), Ulju-gun in Ulsan (US$ 107,019), Yeosu-si (US$104,627), and Dong-gu in Ulsan (US$100,163). The highest per capital import in US dollars was to Ulju-gun in Ulsan at US$165,866, followed by Jung-gu in Seoul (US$162,855), Seosan-si (US$127,772), Yeosu-si (US$113,388), and Nam-gu in Ulsan (US$104,069).

### Exports (2014)

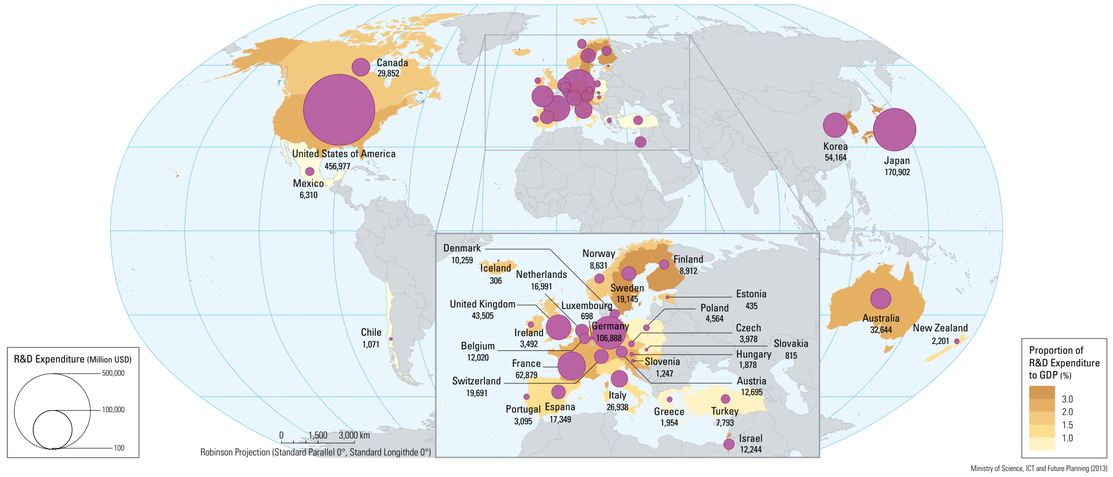



### Imports (2014)



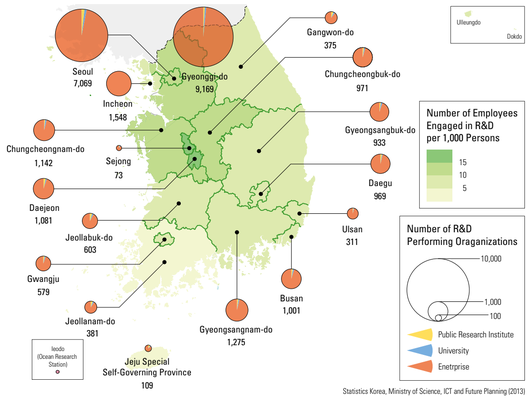
## Research and Development

### R&D by Country in OECD



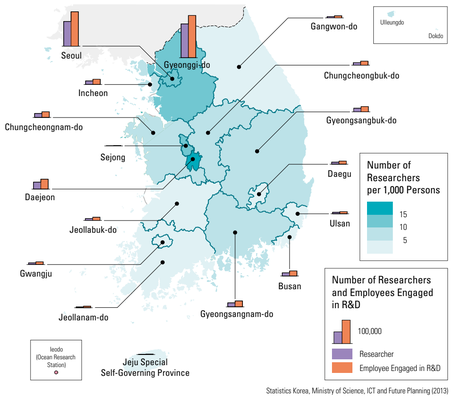

Ministry of Science, ICT and Future Planning (2013)

### Employees and Organizations of R&D (2013)



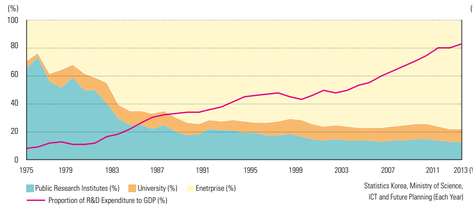

Statistics Korea, Ministry of Science, ICT and Future Planning (2013)

### Number of Researchers (2013)



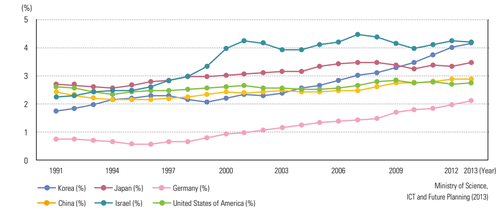

Statistics Korea, Ministry of Science, ICT and Future Planning (2013)

### Proportion of R&D Performing Organizations(1975 – 2013)




Statistics Korea, Ministry of Science, ICT and Future Planning (Each Year)

### Proportion of R&D Expenditure to GDP by Leading Countires (1991 – 2013)




Ministry of Science, ICT and Future Planning (2013)

Since the 1980s, Korea's industry has been transformed into an innovation-led industrial structure through technology investments and advanced technology, as well as human resource development. The R&D ratios to GDP among OECD countries reveal that Israel is currently in first place at 4.2%, with South Korea in second place at 4.1%, followed by Japan (3.5%), Finland (3.4%), Sweden (3.3%), and Denmark (3.1%).

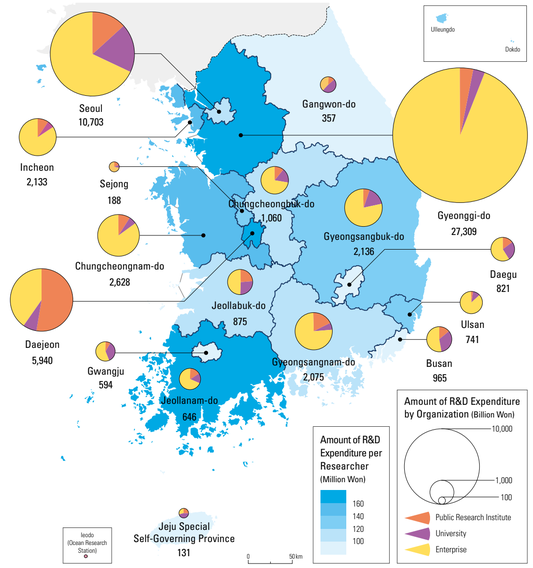
A review of the R&D performing organizations shows that in the 1970s, over half of them were public research institutions, but starting in 1980, the proportion of private enterprises increased rapidly, and after 1989, they accounted for more than 70%. In 2013 the proportion of public research organizations accounted for 12.4%, private enterprises accounted for 78.5%, and universities accounted for 9.2%. An examination of R&D performing organizations by region shows that most R&D organizations are located in the Greater Seoul Metropolitan area of Gyeonggi-do (33.2%) and Seoul (25.6%), followed by Incheon (5.6%), Gyeongsangnam-do (4.6%), Chungcheongnam-do (4.1%), and Daejeon (3.9%). The locations with the greatest number of researchers per thousand Persons are Daejeon (19.5 persons), Sejong-si (12.7 persons), Gyeonggi-do (12.8 persons), Seoul (10.4 persons), and Chungcheongnam-do (8.4 persons). The numbers for local research and development personnel also appear similar to the numbers for researchers by region. Daejeon had the most R&D personnel per thousand Persons at 27.5 persons, followed by Sejong-si (16.7 persons), Gyeonggi-do (14.7 persons), Seoul (14.5 persons), and Chungcheongnam-do (11.9 persons).





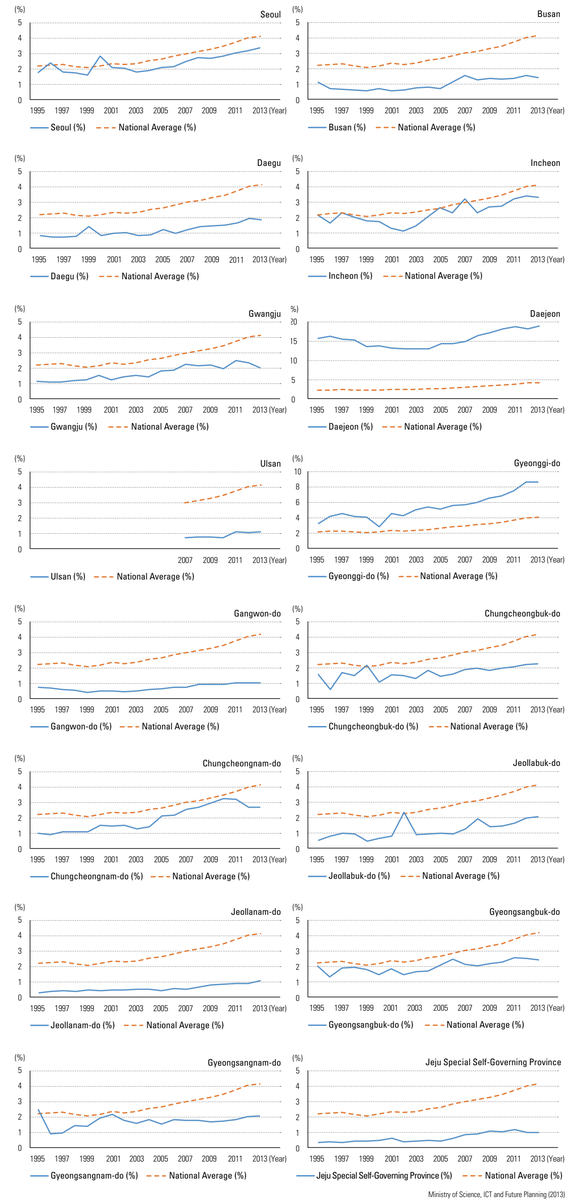


### R&D Expenditure by Metropolitan Area and Province (2013)



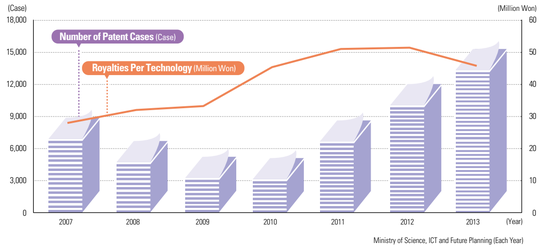

Ministry of Science, ICT and Future Planning (2013)

### Proportion of R&D Expenditure to RGDP



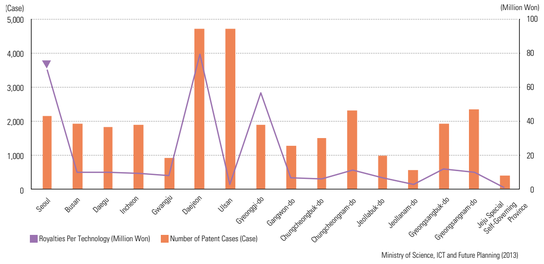

Ministry of Science, ICT and Future Planning (2013)

### Number of Patent Cases and the Amount of Royalties per Technology Agreement (2007 – 2013)




Ministry of Science, ICT and Future Planning (Each Year)

### Number of Patent Cases and the Amount of Royalties per Technology Agreement by Region (2013)

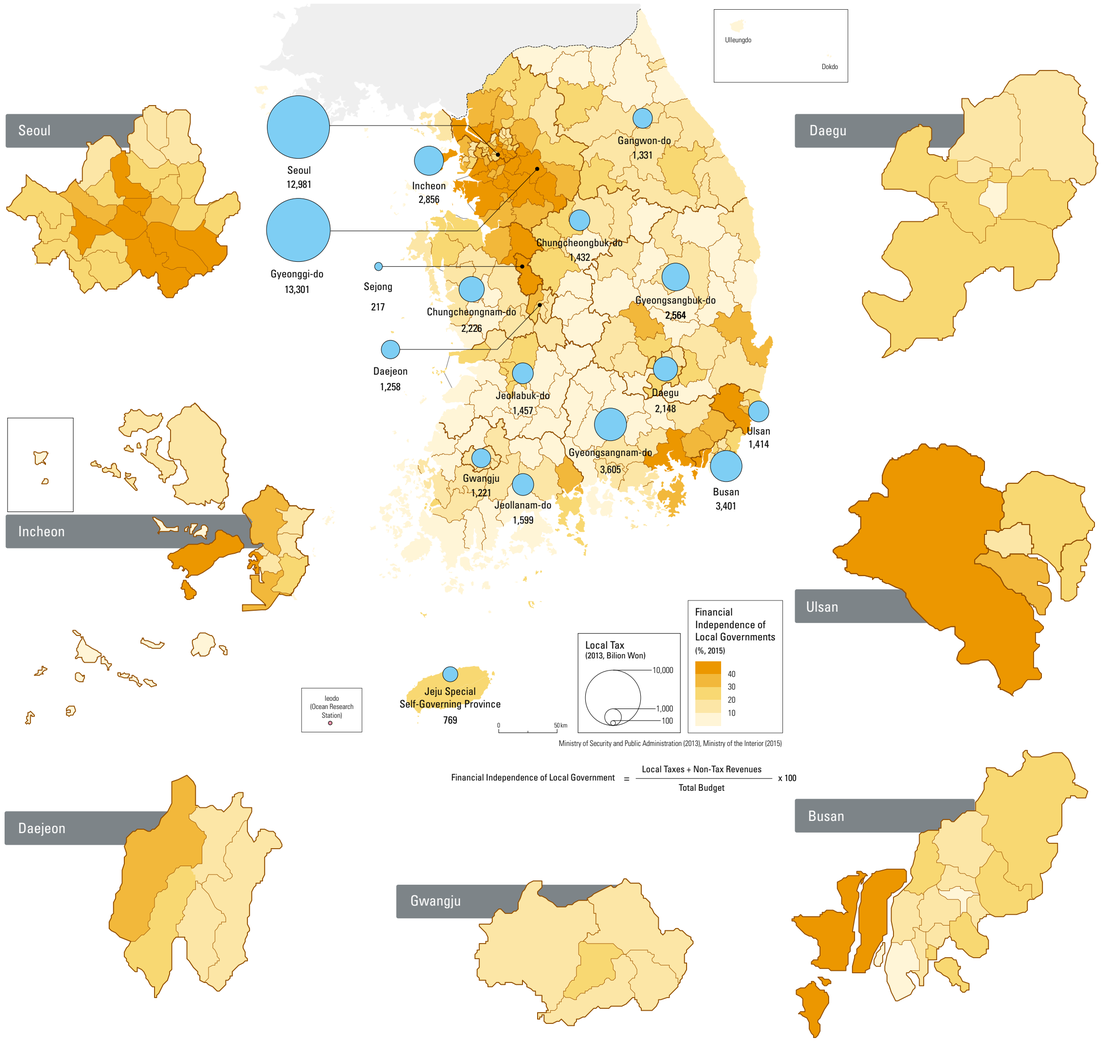



Ministry of Science, ICT and Future Planning (2013)

In the R&D investment trends, the share of R&D to GDP went from less than 1% in the early 1980s to 2% in the 1990s and continued to rise, accounting for 4.2% in 2013. According to the proportion of R&D to regional GDP, with the exception of Daejeon and Gyeonggi-do, all other metropolitan areas and provinces did not reach the national average. Since 1973 the Ministry of Science and Technology has invested 30 trillion won in Yuseong-gu in Daejeon and established Korea's first intensive scientific technology and research park in the Daedeok Research Complex. As a result, R&D expenses in the Daejeon area accounted for 15.5% of the regional GDP in 1995, and continued to increase to 18.9% in 2013. Meanwhile, Gyeonggi-do, through vigilant attention to technology-intensive enterprises after the 1997 financial crisis, significantly increased R&D investment throughout the 2000s. Statistically, the R&D ratio to GDP was 3.2% in 1995, but by 2013 it had increased significantly to 8.7%. In particular, according to the number of patents by cities and provinces, Daejeon had the highest in the nation with 3,995 cases (26.5%) in 2013, followed by Seoul (23.4%) and Gyeonggi-do (18.8%). All other regions had less than 4 percent, showing a big gap compared to Daejeon, Seoul, and Gyeonggi-do. The average royalty received from technology agreements in Daejeon and Ulsan for 2013 is the highest in the country at 94.85 million won, while the average royalty received by cities and provinces in 2013 for the rest of the country is less than 50 million won.

## Self-Reliance of the Local Economy

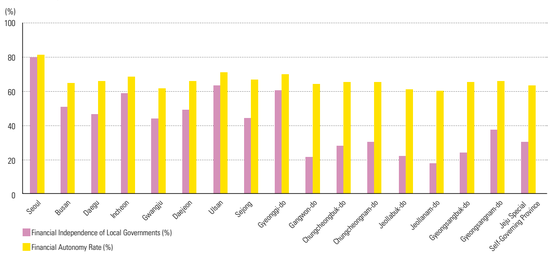
### Financial Independence of Local Governments




Ministry of Security and Public Administration (2013), Ministry of the Interior (2015)

$$\text{Financial Independence of Local Government} = \frac{\text{Local Taxes + Non-Tax Revenues}}{\text{Total Budget}} \times 100$$

### Financial Independence of Local Governments and Financial Autonomy Rates by Metropolitan Area and Province (2015)




Ministry of the Interior (2015)

Financial independence for the local government represents the self-reliance capability of fiscal revenue, measured according to the ratio of local taxes and non-tax revenues to the total budget (general account budget). The fiscal autonomy rate is the ratio of the total revenue from local taxes, non-tax revenues, local allocation tax, and adjustment grants from the central government to the total budget of the local government. Financial independence for the local government focuses on revenues, while the fiscal autonomy rate focuses on the overall financial structure. A higher financial independence indicates a revenue collection base, and a higher fiscal autonomy rate means more revenue is available at the local government's discretion. In other words, financial independence is an indicator of independence in revenue supply while the financial autonomy rate is an index of independence or autonomy in the expenditure of revenue.

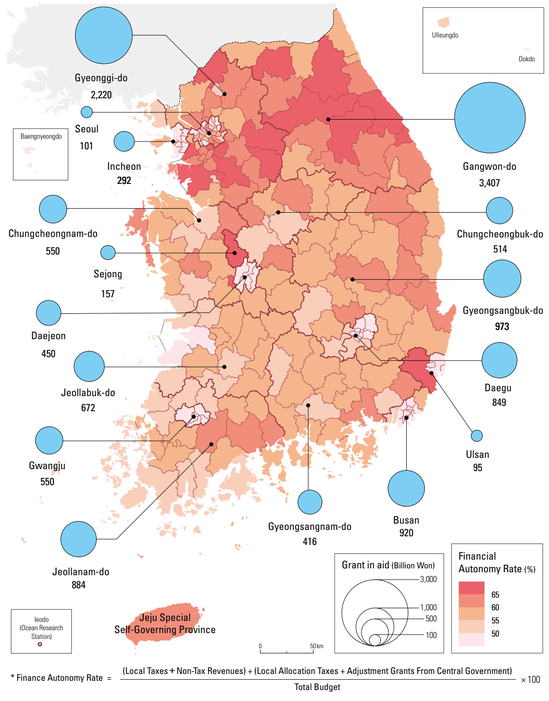
The financial independence of local governments in Korea was on average 57.4% in 2004 and decreased to 45.1% in 2015, indicating a gradually deepening dependence on the central government. The financial independence by region indicated overall higher financial independence around the metropolitan regions, but the rest of the country (provinces and special self-governing province), at 30.3%, was lower than the national average.







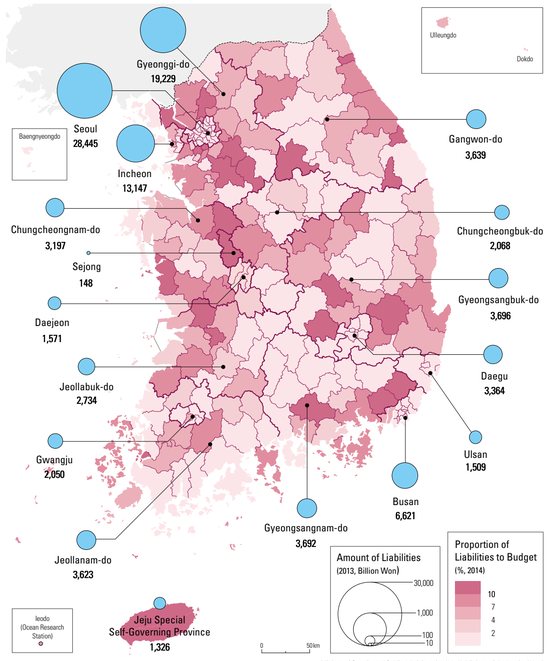
### Financial Autonomy Rate




$$\text{* Finance Autonomy Rate} = \frac{\text{(Local Taxes + Non-Tax Revenues) + (Local Allocation Taxes + Adjustment Grants From Central Government)}}{\text{Total Budget}} \times 100$$

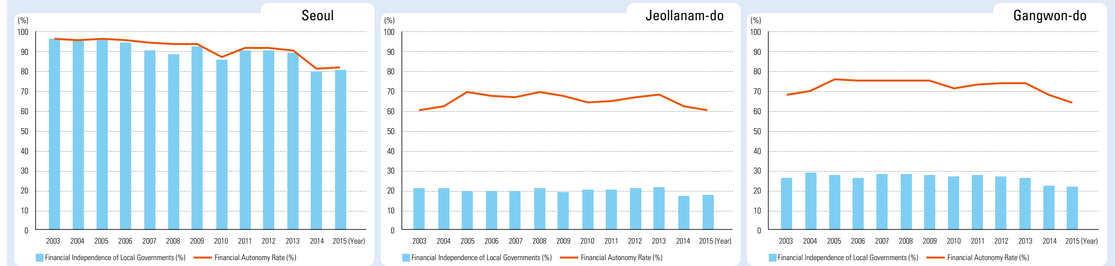
Ministry of the Interior, 17 Metropolitan and Province Government (2015)

### Liabilities of Local Governments




Ministry of Security and Public Administration (2013), Ministry of the Interior (2014)

### Changes in the Financial Independence of Local Governments and the Financial Autonomy Rate (2003 – 2015)




Ministry of the Interior, Ministry of Security and Public Administration, Ministry of Public Administration and Security (Each Year)

The highest financial independence in the country is observed in Seoul (80.4%), followed by Incheon (57.5%), Ulsan (56.1%), Gyeonggi-do (49.9%), and Busan (46.8%). The lower financial independence regions are Jeollanam-do (17.8%), Gangwon-do (21.5%), and Jeollabuk-do (22.1%). Although the greater metropolitan areas of Seoul, Incheon, and Ulsan showed higher independence, at the local level within the city proper, the average municipally distinguished financial independence percentages were very low at 31.5%, 23.8%, and 26.4%, respectively. In particular, the area of the Seoul municipality distinguishes between higher financial independence areas such as Gangnam-gu (60.0%), Jung-gu (58.6%), and Seocho-gu (57.4%), and the lower areas of Nowon-gu (15.9%), Dobong-gu (19.5%), Eunpyeong-gu (19.8%), and the like.

The average financial autonomy rate of Korea was in a recovery trend after plummeting in the wake of the global financial crisis in 2010. However, in 2015, it was in decline, with an increase in government subsidies due to the expansion of the welfare state. As an example, in 2009, the average financial autonomy rate was 78.9%, but declined to 68.0% in 2015. The persistent decline in financial autonomy rate in the cities in particular was due to increased government subsidies and other government policies for the expanded social welfare programs. The average financial autonomy rates for the cities, counties, and boroughs (-si, -gun, and -gu) declined as follows: cities 71.5% in 2009 to 60.1% in 2015, counties 64.6% in 2009 to 57.5% in 2015, and boroughs 61.8% in 2009 to 42.5% in 2015. The highest financial autonomy rate was found in Seoul (80.4%), followed by Incheon (57,5%), Ulsan (56.1%), Gyeonggi-do (49.9%), and Busan (46.8%), and the lowest rates were found in Jeollanam-do (17.8%), Gangwon-do (21.5%), and Jeollabuk-do (22.1%).

Recently, the financial independence of local governments has been gradually reduced, while dependence on the central government (financial autonomy minus financial independence) has been constantly expanding. In particular, in 2015, the highest regional dependences on the central government were in Gangwon-do (43.1%) and Jeollanam-do (42.7%). In 2015, the financial independence percentages of Jeollanam-do and Gangwon-do were 17.8% and 21.5%, respectively, and the financial autonomy rates were 60.5% and 64.6%, respectively.