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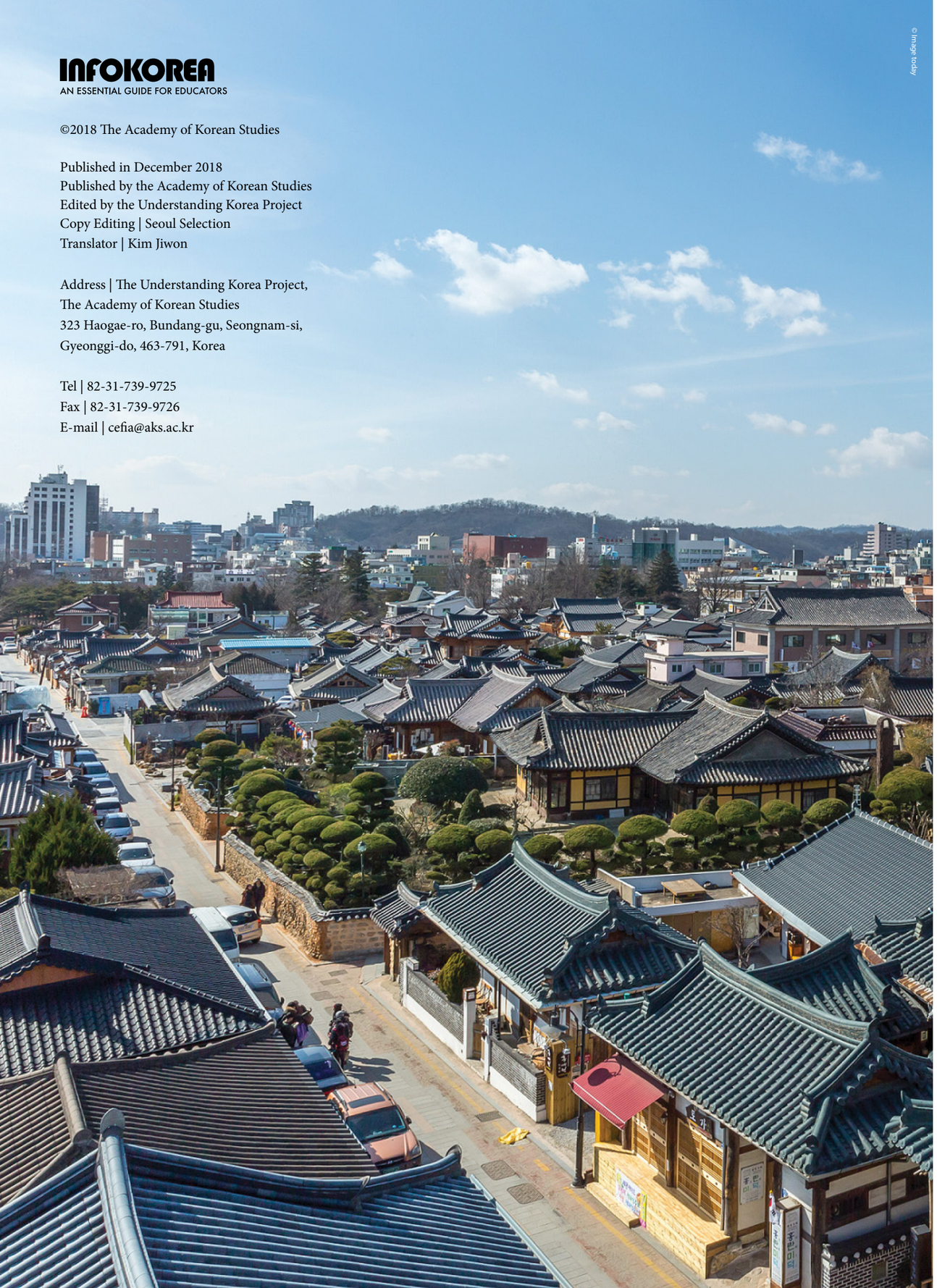
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FEATURE
History of Korean Ceramics

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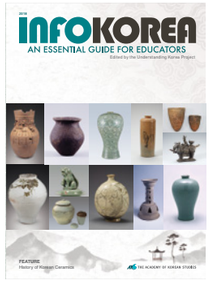
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All statistics and descriptions in the statistics part refer to *Korea Statistical Yearbook 2017* by STATISTICS KOREA (kostat.go.kr).

01 Land, Population, and Households

Utilization of Land

Forests cover 64% of Korea's land mass. A national land utilization plan helps the country allocate the land properly, and the country is constantly pursuing a balanced development of its national territory.

As of the end of 2016, forests made up 63.7% of Korea's land mass; dry paddy fields and paddy fields, 18.9%; road and railroad sites, 3.3%; and building sites, 3.0%.

In examining Korea's land area by 17 cities and provinces as of the end of 2016, Gyeongsangbuk-do had the highest share of land area at 19.0%; Gangwon-do was the second at 16.8%; and then Jeollanam-do at 12.3%.

In terms of population, Gyeonggi-do had the highest share, at 24.6%. Seoul was the second at 19.2%, followed by Busan at 6.7% and Gyeongsangnam-do at 6.5%. The average population density was 511 people per square kilometer and the figure of Seoul was 16,284, 181-fold higher than that of Gangwon-do.

Gyeonggi-do had 23.1% of the country's households, followed by Seoul at 19.6%, Busan at 7.0%, and Gyeongsangnam-do at 6.6%. While the metropolitan area (Seoul, Incheon, and Gyeonggi-do) of Korea occupied only 11.8% of the land of the country, their population accounted for 49.5% of the total.

Size and Structure of Population

Since population drives both production and consumption of a country, demographic changes—both the size of a population and its structure—can have profound and far-reaching effects on a country, including an economic and social impact. A decline in the population because of a low birthrate can undermine growth potential, as it weakens the labor market in the long term. In addition, an aging population can cause a decline in labor productivity as the number of economically active people is reduced. A younger population will therefore sustain a heavier burden of supporting the elderly members of the society.

In *Population Projections* released in December 2016, the future population of Korea is estimated in midrange, high-range, and low-range scenarios based on the results of the *2015 Population and Census*, as well as recent trends of population changes (child births, deaths, international migration, etc.).

If the midrange projections turn out to be accurate, Korea's population will peak at 52,960,000 in 2031 and then fall gradually to 45,250,000 in 2060 (which is a level similar to that in 1995).

Table 1-1 Land Utilization by Land Category

(km², %)

	Total area	Dry paddy fields & paddy fields	Forests	Orchards & pastures	Building sites	Factory sites	Road & railroad sites
1990 (Composition)	98,730 100.0	21,484 21.8	65,571 66.4	817 0.8	1,937 2.0	246 0.2	1,922 1.9
2000 (Composition)	99,461 100.0	20,507 20.6	65,571 66.4	1,088 1.1	2,349 2.4	514 0.5	2,397 2.4
2005 (Composition)	99,646 100.0	20,108 20.2	64,805 65.0	1,108 1.1	2,533 2.5	622 0.6	2,685 2.7
2010 (Composition)	100,033 100.0	19,617 19.6	64,504 64.5	1,128 1.1	2,744 2.7	749 0.7	2,981 3.0
2015 (Composition)	100,295 100.0	19,108 19.1	64,003 63.8	1,166 1.2	2,983 3.0	924 0.9	3,285 3.3
2016 (Composition)	100,339 100.0	18,994 18.9	63,918 63.7	1,163 1.2	3,041 3.0	959 1.0	3,339 3.3

Source: Ministry of Land, Infrastructure and Transport, *Cadastral Statistical Annual Report, Statistical Yearbook of MLTM*

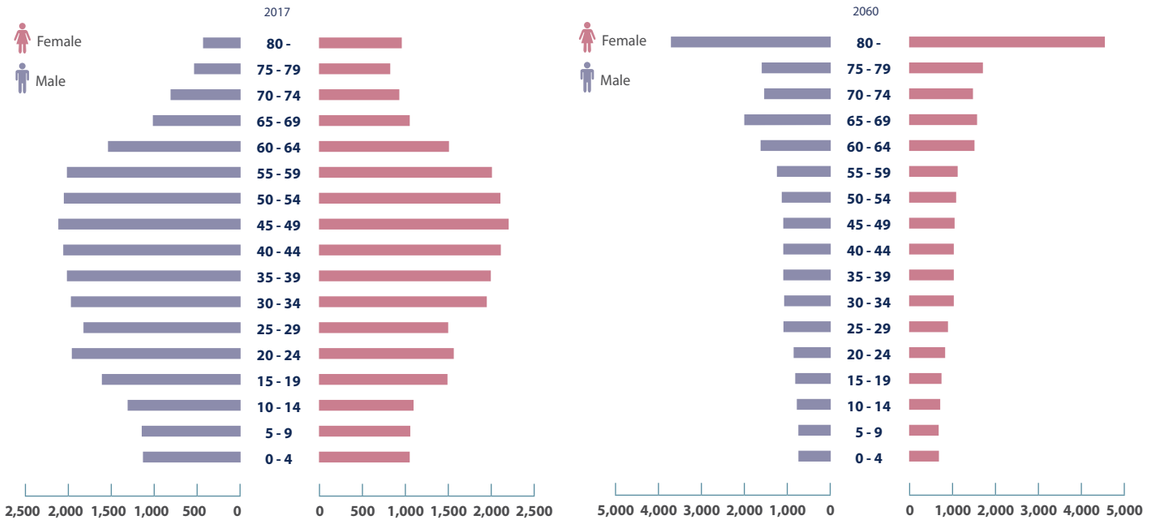
Table 1-2 Statistics by Cities and Provinces (2016)

(km², %)

	Land area (km²)	Composition (%)	Estimated population (1,000)	Composition (%)	Population density (people/km²)	Number of households (1,000)	Composition (%)
2016	100,339	100.0	51,246	100.0	511	19,285	100.0
Seoul	605	0.6	9,852	19.2	16,284	3,785	19.6
Busan	770	0.8	3,447	6.7	4,477	1,341	7.0
Daegu	884	0.9	2,465	4.8	2,789	933	4.8
Incheon	1,063	1.1	2,907	5.7	2,735	1,054	5.5
Gwangju	501	0.5	1,504	2.9	3,001	569	3.0
Daejeon	539	0.5	1,535	3.0	2,848	587	3.0
Ulsan	1,061	1.1	1,169	2.3	1,101	425	2.2
Sejong	465	0.5	233	0.5	500	85	0.4
Gyeonggi-do	10,183	10.1	12,612	24.6	1,239	4,452	23.1
Gangwon-do	16,827	16.8	1,520	3.0	90	614	3.2
Chungcheongbuk-do	7,407	7.4	1,596	3.1	216	612	3.2
Chungcheongnam-do	8,226	8.2	2,123	4.1	258	809	4.2
Jeollabuk-do	8,069	8.0	1,833	3.6	227	723	3.7
Jeollanam-do	12,319	12.3	1,800	3.5	146	726	3.8
Gyeongsangbuk-do	19,031	19.0	2,686	5.2	141	1,074	5.6
Gyeongsangnam-do	10,540	10.5	3,346	6.5	317	1,268	6.6
Jeju-do	1,849	1.8	619	1.2	335	227	1.2

Source: Ministry of Land, Infrastructure and Transport, *Cadastral Statistical Annual Report; Statistics Korea, Future Population Projections by City and Province, Future Household Projections by City and Province*

Figure 1-1 Changes in Korea's Population Structure[1]



Note: The chart is based on a midrange growth scenario
Source: Statistics Korea, *Population Projections*

Table 1-3 Size and Structure of Population[1]

Year	Population size (1,000 people)	Population growth (%)	Population structure by age group (%)			Aging index[2] (per 100 people)	Dependency ratio[3] (per 100 people)
			Age 0-14	Age 15-64	Age over 65		
1980	38,124	1.56	34.0	62.2	3.8	11.2	6.1
1990	42,869	0.99	25.6	69.3	5.1	20.0	7.4
2000	47,008	0.84	21.1	71.7	7.2	34.3	10.1
2005	48,185	0.21	19.1	71.9	9.0	46.8	12.5
2010	49,554	0.50	16.1	73.1	10.8	97.2	14.8
2015	51,015	0.53	13.8	73.4	12.8	93.1	17.5
2016	51,246	0.45	13.4	73.4	13.2	98.6	18.0
2017	51,446	0.39	13.1	73.1	13.8	104.8	18.8
2018	51,635	0.37	12.9	72.8	14.3	110.5	19.6
2019	51,811	0.34	12.8	72.4	14.8	116.4	20.5
2020	51,974	0.31	12.6	71.7	15.6	123.7	21.8
2030	52,941	0.07	11.5	64.0	24.5	212.1	38.2
2040	52,198	-0.32	10.8	56.4	32.8	303.2	58.2
2050	49,433	-0.72	9.5	52.4	38.1	399.0	72.6
2060	45,246	-0.97	9.4	49.6	41.0	434.6	82.6

Notes: 1) The chart is based on a midrange growth scenario.
2) The aging index is the proportion of people 65 and over to those between the ages of 0 and 14. It is calculated by dividing the former figure by the latter and multiplying by 100.
3) The dependency ratio is the proportion of people 65 and over who need to be supported by those aged between 15 and 64 to the people between the ages of 15 and 64. It is calculated by dividing the former figure by the latter and multiplying by 100.
Source: Statistics Korea, *Population Projections*

According to the population projections, Korea's total population was 51,446,000 in 2017, marking a year-on-year increase of 0.39%. In terms of population structure, Koreans under the age of 15 accounted for 13.1% of the country's entire population. Economically active people between the ages of 15 and 64 made up 73.1% of the total, whereas 13.8% were aged over 65.

A society in which citizens over the age of 65 make up more than 7% of the population is considered an aging society. If 14% of the population is over 65, it is an aged society, and at 20% it becomes a super-aged society. Korea became an aging society in 2000 when the figure reached 7.2%.

The aging index, which refers to the ratio of aged population over 65 to young population under 15, was 104.8 in 2017,

an increase by 6.2 from the previous year. The dependency ratio, an indicator of the number of elderly people over 65 who require support to the number of working-age people between 15 and 64 who are capable of supporting them, rose by 0.8 year on year to reach 18.8.

Population Growth Trends and Fertility

In addition to the problem of an aging population, Korea is facing an issue of declining natural population growth as a result of fewer births.

The total number of births in 2016 was 406,243, a decrease by 32,177 from the 2015 level. Accordingly, the natural population growth rate (crude birth rate-crude death rate) recorded 2.5 per thousand. This was a decrease of 0.7 from the previous year's level.

The total fertility rate, which is the average number of children that a woman is expected to have in her lifetime, decreased by 0.067 to 1.172 in 2016, from 1.239 in 2015.

In 2016, the age group with the highest fertility rate (the highest number of births per thousand women) was women in their early thirties. The fertility rate for women in that age group was 110.1 in 2016, representing a decline of 6.6 year on year. The fertility rate for women between 25 and 29 was 56.4, a decrease of 6.7 from the previous year. The fertility rate for women between 35 and 39 was 48.7, a 0.4 increase from the previous year. The fertility rate of women in that age group has seen a steady increase.



Table 1-4 Population Growth Trends[1)]

(People, per 1,000 people)

	1985	1990	1995	2000	2005	2010	2015	2016
Live births	655,489	649,738	715,020	634,501	435,031	470,171	438,420	406,243
Crude birth rate	16.1	15.2	15.7	13.3	8.9	9.4	8.6	7.9
Natural growth rate	10.2	9.5	10.3	8.2	3.9	4.3	3.2	2.5
Total fertility rate	1.660	1.570	1.634	1.467	1.076	1.226	1.239	1.172

Note: Including infant deaths
Source: Statistics Korea, *Annual Report on Live Births and Deaths Statistics* (Based on the chapter "Vital Registration")

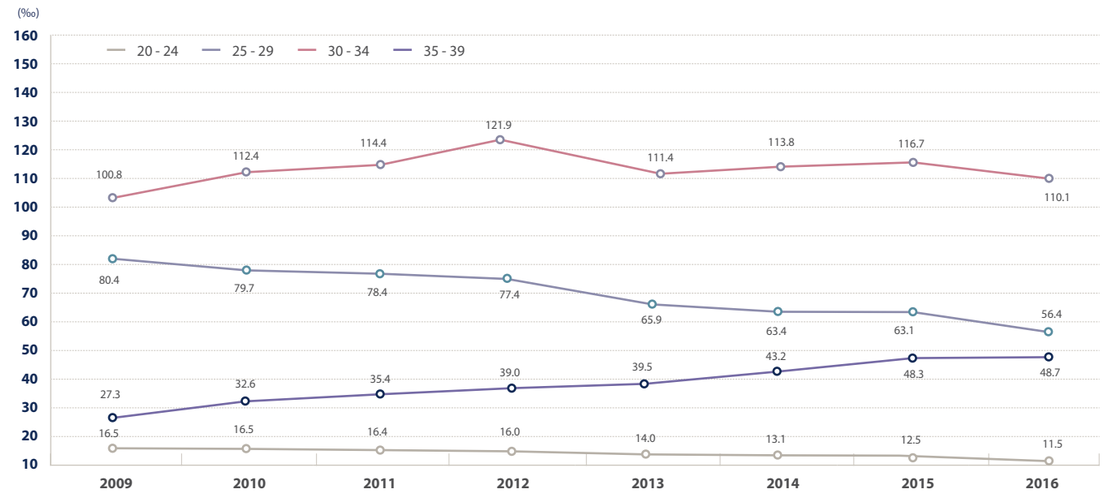
Table 1-5 Status of Fertility

(1,000 people, people, age)

		2009	2010	2011	2012	2013	2014	2015	2016
No. of fertile women (15–49)		13,461	13,347	13,215	13,096	13,002	12,909	12,796	12,678
Women in the most fertile age group (25–39)		6,064	5,928	5,780	5,632	5,492	5,363	5,261	5,197
Mean age at first marriage (female)		28.7	28.9	29.1	29.4	29.6	29.8	30.0	30.1
Fertility rate (‰)	**20-24**	16.5	16.5	16.4	16.0	14.0	13.1	12.5	11.5
	25-29	80.4	79.7	78.4	77.4	65.9	63.4	63.1	56.4
	30-34	100.8	112.4	114.4	121.9	111.4	113.8	116.7	110.1
	35-39	27.3	32.6	35.4	39.0	39.5	43.2	48.3	48.7

Source: Statistics Korea, *Annual Report on Live Births and Deaths Statistics* (Based on the chapter "Vital Registration")

Figure 1-3 Fertility Rates



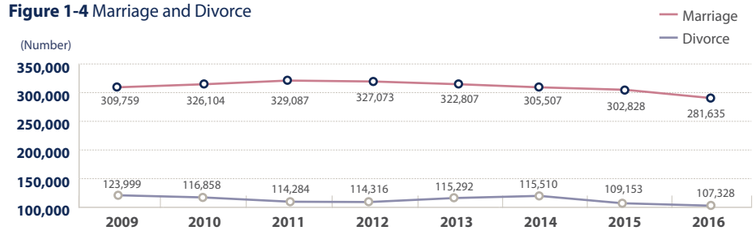
Source: Statistics Korea, *Annual Report on Live Births and Deaths Statistics* (Based on chapter "Vital Registration").



Marriage and Divorce

In 2016, there were 281,635 marriages, 7% down from the 2015 level. The number of divorces in 2016 was 107,328, a 1.7% decrease compared with the 2015 level.

Figure 1-4 Marriage and Divorce



Source: Statistics Korea, *Annual Report on Marriage and Divorce Statistics*

Table 1-6 Marriage and Divorce

(Number, %)

	2009	2010	2011	2012	2013	2014	2015	2016
No. of marriages	309,759	326,104	329,087	327,073	322,807	305,507	302,828	281,635
Year-on-year increase	-5.5	5.3	0.9	-0.6	-1.3	-5.4	-0.9	-7.0
No. of divorces	123,999	116,858	114,284	114,316	115,292	115,510	109,153	107,328
Year-on-year increase	6.4	-5.8	-2.2	0.0	0.9	0.2	-5.5	-1.7

Source: Statistics Korea, *Annual Report on Marriage and Divorce Statistics*

Table 1-7 Acquisition and Loss of Korean Nationality

(Number)

	Nationalization	Acquisition of Korean nationality	Loss of Korean nationality	Recovery of Korean nationality	Others
2007	8,828	312	24,513	1,754	-
2008	11,610	275	23,070	3,531	171
2009	24,475	351	19,938	1,887	1,564
2010	16,979	806	26,121	1,013	2,066
2011	15,980	1,235	21,917	2,330	2,969
2012	10,507	863	16,768	2,037	2,098
2013	11,528	429	20,695	2,683	1,876
2014	11,420	359	18,292	2,940	2,778
2015	10,152	435	16,686	2,383	2,221
2016	10,777	471	35,206	2,482	2,698
Year-on-year increase (%)	6.2	8.3	111.0	4.2	21.5

Source: Supreme Court, *Judicial Yearbook*

Table 1-8 Number of Deaths by Five Major Causes of Death (2016)

Ranking	Cause of death	Number of deaths (people)	Ratio[1)] (%)	Crude death rate[2)] (per 100,000 people)	Average number of deaths a day (people)
	Total	280,827	100.0	549.4	767
	Five major causes of death	160,912	57.3	314.8	440
1	**Malignant neoplasm (cancer)**	78,194	27.8	153.0	214
2	**Heart disease[3)]**	29,735	10.6	58.2	81
3	**Cerebrovascular disease**	23,415	8.3	45.8	64
4	**Pneumonia**	16,476	5.9	32.2	45
5	**Deliberate self-injury[4)] (suicide)**	13,092	4.7	25.6	36

Note: 1) The compositions of deaths whose cause can be categorized to total deaths
2) Number of deaths per 100,000 people
3) Heart diseases include ischemic heart disease and other types of cardiac disorders
4) Deliberate injuries (suicide) per 100,000 people over the age of 5
Source: Statistics Korea, *Annual Report on Cause of Death Statistics*

Acquisition and Loss of Korean Nationality

In 2016, the number of naturalizations to Korea was 10,777, a 6.2% year-on-year increase, and the number of foreigners who acquired Korean nationality recorded 471, an 8.3% increase from the previous year. The number of people who lost or relinquished their Korean nationality was 35,206 in 2016, an increase of 111.0% from the previous year, while the number of people who recovered their Korean nationality recorded 2,482, representing a 4.2% increase year on year.

Major Causes of Death and Average Number of Deaths a Day

The total number of deaths in 2016 was 280,827 and an average of 767 people died each day.

In 2016, the five major causes of death in Korea were cancer, heart disease, cerebrovascular diseases, pneumonia, and deliberate self-injury (suicide). Together, the number of those deaths recorded 160,912, accounting for 57.3%.

The crude death rate (the number of deaths per 100,000 people) in 2016 was 549.4 people, an increase of 7.9 people from 541.5 in 2015.

02 Employment, Labor, and Wages

Economic Activity

Economic activity is important for the maintenance and development of a society. Labor is important not just as a means of living, but also as a means of self-realization. Higher employment rates greatly improve individuals' economic power and render a society more stable.

The number of people over the age of 15 in 2017 was 43,931,000, a 0.7% increase from the previous year. The economically active population amounted to 27,748,000 people, a year-on-year increase of 1.2%. The number of economically inactive population was 16,183,000 people, a similar level as the previous year.

The economic participation rate, which refers to the ratio of the economically active population to the population of people over the age of fifteen, was 63.2%, a 0.3 percentage point increase year on year. The economic participation rate for men increased by 0.1 percentage points from the previous year to 74.1%, while the rate for women increased by 0.5 percentage points to 52.7%.

The number of unemployed people in 2017 recorded 1,023,000, an increase of 1.4% year on year, and the unemployment rate was 3.7%, the same as the previous year's level.

Employment Levels for Different Industries

In 2017, the number of employed people in different industries was 26,725,000, an increase of 1.2% year on year. Broken down in more detail, the number of people employed in social overhead capital and other services industries increased by 1.6%, while the number in agriculture and fisheries increased by 0.5%. Conversely, the number of people employed in mining and manufacturing decreased 0.3%.

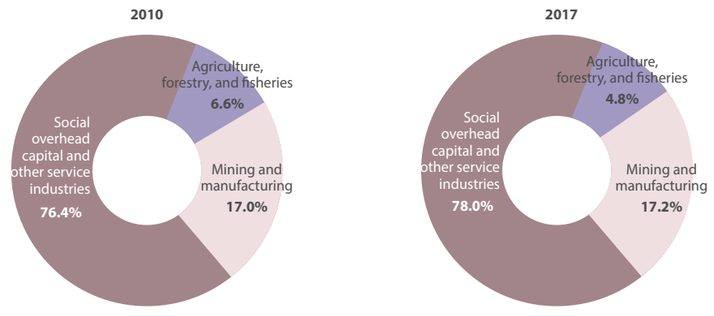
Table 2-1 Economic Activity

(1,000 people, %)

	Population over age 15[2]	Economically active population	Economically inactive population	Economic participation rate	Male	Female	Unemployed people	Unemployment rate
2010	40,825	24,956	15,868	61.1	73.2	49.6	924	3.7
2011	41,387	25,389	15,998	61.3	73.4	49.8	863	3.4
2012	41,857	25,781	16,076	61.6	73.5	50.1	826	3.2
2013	42,304	26,108	16,196	61.7	73.5	50.3	808	3.1
2014	42,795	26,836	15,959	61.7	74.4	51.5	939	3.5
2015	43,239	27,153	16,086	62.7	74.1	51.9	976	3.6
2016	43,606	27,418	16,187	62.9	74.0	52.2	1,009	3.7
2017	43,931	27,748	16,183	63.2	74.1	52.7	1,023	3.7
Year-on-year increase(%)	0.7	1.2	-0.0	0.3%p	0.1%p	0.5%p	1.4	0.0%p

Note: 1) The data was revised, reflecting changes in the population projections that were written retroactively based on the result of the 2015 Population Census (Registration Census).
2) Excluding soldiers, riot police, public service workers, and prisoners whose jail terms are confirmed
Source: Statistics Korea, *Annual Report on Economically Active Population Survey*

Figure 2-1 Employed People by Industry



Source: Statistics Korea, *Annual Report on Economically Active Population Survey*



Table 2-2 Employed People by Industry[1]

(1,000 people)

	2010	2011	2012	2013[1]	2014[1]	2015[1]	2016[1]	2017[1]	Year-on-year increase (%)
Total	23,829	24,244	24,681	25,299	25,897	26,178	26,409	26,725	1.2
Agriculture, forestry, and fisheries	1,566	1,542	1,528	1,513	1,446	1,337	1,273	1,279	0.5
Mining and manufacturing	4,049	4,108	4,120	4,322	4,471	4,618	4,603	4,589	-0.3
Manufacturing	4,028	4,091	4,105	4,307	4,459	4,604	4,584	4,566	-0.4
Social overhead capital and other services	18,214	18,595	19,033	19,464	19,980	20,222	20,534	20,857	1.6
Construction	1,753	1,751	1,773	1,780	1,829	1,854	1,869	1,988	6.4
Wholesale and retail trade, hotels, and restaurants	5,469	5,492	5,595	5,678	5,952	6,011	6,045	6,083	0.6
Electricity, transport, telecom, and finance	2,834	2,956	2,997	3,077	3,068	3,079	3,088	3,053	-1.1
Business, personal, public, service, and others	8,158	8,396	8,668	8,929	9,131	9,278	9,532	9,734	2.1

Note: The data from the Tenth Revision of Standard Industrial Classification
Source: Statistics Korea, *Annual Report on Economically Active Population Survey*

Employment Levels for Different Classes of Workers

In 2017, the number of regular (or permanent) employees increased 2.8% compared with 2016 figures, and daily workers increased 2.1%. The number of self-employed small business owners increased 1.2%. Conversely, the number of temporary (or non-regular) workers decreased 2.6% and the number of unpaid family workers decreased 1.4%.

Table 2-3 Employed People by Working Status[1]

(1,000 people)

	Total	Regular workers	Temporary workers	Daily workers	Self-employed small business owners	Unpaid family workers
2009	23,688	9,479	5,134	1,973	5,749	1,352
2010	24,033	10,178	5,107	1,826	5,643	1,279
2011	24,527	10,786	5,045	1,765	5,657	1,273
2012	24,955	11 ,250	5,032	1,639	5,768	1,266
2013	25 ,299	11 ,847	4,919	1,600	5,703	1,232
2014	25 ,897	12,319	5,069	1,570	5,720	1,219
2015	26,178	12,716	5,114	1,572	5,622	1,153
2016	26,409	13,062	5,124	1,483	5,614	1,126
2017	26,725	13,428	4,992	1,514	5,682	1,110
Year-on-year increase (%)	1.2	2.8	-2.6	2.1	1.2	-1.4

Note: The data was revised, reflecting changes in the population projections that were written retroactively based on the result of the 2015 Population Census (Registration Census).
Source: Statistics Korea, *Annual Report on Economically Active Population Survey*

Wages and Hours Worked

The average number of days an employee worked in a month at businesses with five or more employees was 20.9 days in 2016. This was a decrease of 0.9% from the 2015 level. The total average monthly wage per regular worker increased by 3.8% from 2015 to KRW 3,623,000 (except for those who worked in the agriculture, forestry, and fisheries industries).

Employment Insurance and Unemployment Allowances

As of the end of December 2016, the number of business establishments covered by employment insurance was 2,174,508, an increase of 3.2% from 2015. The number of insured employees saw a 2.4% increase from 2015, to reach a total of 12,655,202. The number of unemployment allowance beneficiaries in 2016 was 1,303,691, which was a 0.3% decrease from 2015.

Industrial Accidents

In 2016, 18,432,000 workers (2.6% year-on-year increase) worked at 2,457,225 businesses that were covered by industrial accident compensation insurance (3.8% year-on-year increase). There were a total of 90,009 accidents that required four or more days of recuperation, an increase of 0.7% from the previous year. The number of injured people increased 0.6%, compared with 2015, to 90,656.

Table 2-4 Wages & Hours Worked[1)2)]

(Days, KRW 1,000)

	2009	2010	2011	2012	2013	2014	2015	2016	Year-on-year increase (%)
Average monthly days worked	21.5	21.5	21.5	21.3	21.1	20.9	21.1	20.9	-0.9
Total amount of average monthly wages	2,863	3,047	3,019	3,178	3,299	3,378	3,490	3,623	3.8

Note: 1) Regular employees of businesses with five or more employees in all industries except for agriculture, forestry, and fisheries
2) 9th Revision of Standard Industrial Classification
Source: Ministry of Employment and Labor

Table 2-5 Coverage by Employment Insurance

(Number of business establishments, people)

	Number of business establishments covered by employment insurance	Year-on-year increase (%)	Number of workers covered by insurance[1)]	Year-on-year increase (%)	Number of unemployment allowances beneficiaries	Year-on-year increase (%)
2008	1,424,330	10.6	9,271,701	3.7	1,162,534	15.2
2009	1,385,298	-2.7	9,653,678	4.1	1,528,407	31.5
2010	1,408,061	1.6	10,131,058	4.9	1,336,439	-12.6
2011	1,508,669	7.1	10,675,437	5.4	1,278,106	-4.4
2012	1,610,713	6.8	11,152,354	4.5	1,267,427	-0.8
2013	1,747,928	8.5	11,571,213	3.8	1,290,686	1.8
2014	1,935,302	10.7	11,930,602	3.1	1,296,505	0.5
2015	2,107,071	8.9	12,363,063	3.6	1,307,963	0.9
2016	2,174,508	3.2	12,655,202	2.4	1,303,691	-0.3

Note: The statistics on insured workers are on regular workers, excluding daily workers
Source: Korea Employment Information Service, *Yearly Statistics of Employment Insurance*

Table 2-6 Industrial Accidents[1)]

	Number of workplaces	Worker (1,000 people)	Number of accidents (case)	Number of injured people	Number of deaths[2)]	Physical disability, injury, and disease (people)
2006	1,292,696	11,689	88,821	89,910	2,453	87,457
2007	1,429,885	12,529	89,106	90,147	2,406	87,741
2008	1,594,793	13,490	94,745	95,806	2,422	93,384
2009	1,560,949	13,885	96,984	97,821	2,181	95,640
2010	1,608,361	14,199	97,923	98,645	2,200	96,445
2011	1,738,196	14,362	92,657	93,292	2,114	91,178
2012	1,825,296	15,548	91,417	92,256	1,864	90,091
2013	1,977,057	15,449	91,097	91,824	1,929	89,591
2014	2,187,391	17,062	90,158	90,909	1,850	88,775
2015	2,367,186	17,969	89,354	90,129	1,810	88,063
2016	2,457,225	18,432	90,009	90,656	1,777	88,616
Year-on-year increase (%)	3.8	2.6	0.7	0.6	-1.8	0.6

Note: 1) Death or accident that required four or more days of recuperation, which is recognized to have resulted from a work-related accident or disease under the Industrial Accident Compensation Insurance Act
2) The number of deaths after 2012 excludes deaths from a traffic accident outside the business establishment, sports events, acts of physical violence, and deaths from an accident that took place more than one year prior. (However, it does include those who died from traffic accidents that occurred in the transportation business and outside restaurant and hotel business establishments.)
Source: Ministry of Employment and Labor, *Yearbook of Employment & Labor Statistics*

03 Prices and Household Economy

Prices

Prices are a comprehensive concept that refers to a rough average of diverse products and services required for people's daily lives. Prices can be expressed by the price index. The price index shows comprehensive price trends. The index is a number calculated on the basis of the average prices for different products. To measure changes in the prices, economists set a certain price as the baseline level, 100, and consider changes in other prices relative to that baseline.

The price index is calculated objectively and systematically, but figures shown here may differ somewhat from actual prices in daily life.

Producer Price Index

The producer price index is a statistic for measuring changes in the prices of products and services supplied by domestic producers in the domestic market, which is used as an indicator for assessing economic trends and as a GDP deflator. As of 2017, a total of 870 items (766 products and 104 services) were surveyed for calculating the index.

The producer price index in 2017 was 102.5 (2010=100), recording a 3.4% year-on-year increase. The index for products rose by 4.5%, while the index for agricultures, forestry, and fisheries product; mining product; manufacturing product; and electric power, gas, and water supply, which are sub-items of products, all increased as well.

Table 3-1 Producer Price Index

(2010=100)

	Weight	2011	2012	2013	2014	2015	2016	2017	Year-on-year increase (%)
All items	1,000.0	106.7	107.5	105.7	105.2	101.0	99.1	102.5	3.4
Products	650.4	108.7	108.9	106.2	104.8	98.0	94.7	99.0	4.5
Agricultural, forestry, and fisheries products	36.5	107.4	108.3	101.9	102.5	104.9	111.0	118.2	6.5
Mining products	2.6	102.1	105.7	108.2	110.5	110.9	115.3	121.0	4.9
Manufacturing products	560.4	109.0	108.6	105.3	103.1	96.2	92.8	97.2	4.7
Electric power, water supply, and gas	50.9	105.8	113.7	120.2	126.6	116.6	106.9	108.0	1.0
Services	349.6	102.5	104.2	104.5	106.1	107.5	108.8	110.5	1.6

Source: Bank of Korea



Shoppers at a grocery store in Seoul

Consumer Price Index

The consumer price index (CPI) is a number that is calculated to measure price changes for 460 goods and services purchased by households for their daily lives.

The 2017 consumer price index recorded 102.93 (2015=100), having increased 1.9% year on year. When broken down by sector, the indices for transportation (3.6%), foods and non-alcoholic beverages (3.4%), other goods and services (2.8%), restaurants and hotels (2.4%), housing/water/power/fuel (1.7%), alcoholic beverages and cigarettes (1.5%), education (1.1%), household equipment and routine household maintenance service (1.1%), clothing and footwear (1.1%), healthcare (0.9%), communications (0.3%), and recreation and culture (0.1%) all increased.

Consumer Price Index for Living Necessities

Prices that consumers experience daily are subjective, depending on an individual's lifestyle. Consumers tend to think that price changes for the goods that they buy frequently reflect larger price trends. To measure consumers' subjective perception of prices, Statistics Korea compiled a list of 141 items including those purchased by consumers frequently and basic necessities, for which price changes would have a significant impact on consumers. This list forms the basis for the consumer price index for necessities. The consumer price index for necessities in 2017 was 103.14 (2015=100), a 2.5% increase year on year.

Table 3-2 Consumer Price Index[1)]

(2015=100)

	Weight	2012	2013	2014	2015	2016	2017	Year-on-year increase (%)
All items	1,000.0	96.789	98.048	99.298	100.00	100.97	102.93	1.9
Foods and nonalcoholic beverages	137.7	97.256	98.090	98.377	100.00	102.31	105.78	3.4
Alcoholic beverages and cigarettes	15.5	65.584	66.678	66.630	100.00	100.69	102.20	1.5
Clothing and footwear	61.4	92.179	94.873	98.680	100.00	101.80	102.90	1.1
Housing, water, electricity, and fuel	170.2	94.498	97.841	100.645	100.00	99.19	100.87	1.7
Household equipment and routine household maintenance service	41.7	95.192	95.446	97.476	100.00	101.55	102.67	1.1
Health	68.7	97.725	98.074	98.765	100.00	100.99	101.88	0.9
Transportation	111.0	110.864	110.279	108.508	100.00	97.79	101.29	3.6
Communications	54.8	100.384	100.254	100.192	100.00	100.09	100.38	0.3
Recreation and culture	57.2	99.048	100.063	100.492	100.00	101.84	101.90	0.1
Education	97.0	95.762	96.888	98.312	100.00	101.64	102.80	1.1
Restaurants and hotels	129.4	94.855	96.326	97.722	100.00	102.51	104.97	2.4
Other goods and services	55.4	94.059	94.495	97.409	100.00	103.44	106.31	2.8

Note: The indexes before 2014 were in three decimal places. After 2015, they were changed to two.
Source: Statistics Korea, *Monthly Consumer Price Index Report*

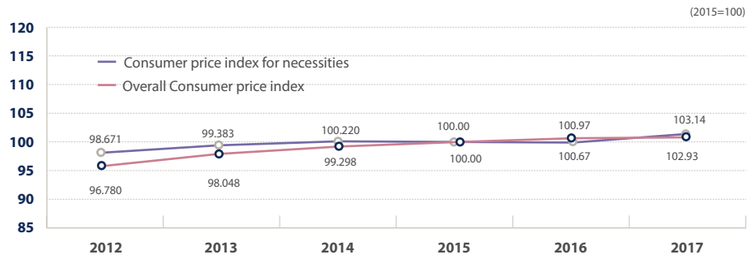
Table 3-3 Consumer Price Index for Necessities and Overall Consumer Price Index[1)]

(2015=100)

	2012	2013	2014	2015	2016	2017
Consumer Price Index for Necessities	98.671	99.383	100.220	100.00	100.67	103.14
Year-on-year increase (%)	1.7	0.7	0.8	-0.2	0.7	2.5
Consumer price index	96.789	98.048	99.298	100.00	100.97	102.93
Year-on-year increase (%)	2.2	1.3	1.3	0.7	1.0	1.9

Note: The indexes before 2014 were three digits but changed to two digits after 2015.
Source: Statistics Korea, *Monthly Consumer Price Index Report*

Figure 3-1 Consumer Price Index for Necessities and Overall Consumer Price Index



Source: Statistics Korea, *Consumer Price Index Yearbook*

Monthly Average Household Economic Index of Households across the Country

The average monthly income of households across the country in 2016 was KRW 4,399,000, an increase of 0.6% from the previous year, and their disposable income was KRW 3,588,000, a 0.7% increase year on year.

In 2016, the surplus value (KRW 1,038,000) increased by 3.8% and the surplus rate (28.9%) increased by 0.8 percentage points year on year. The average propensity to consumption was 71.1%, a decrease of 0.8 percentage points from the previous year.

Average Monthly Consumption Expenditures per Household across the Country

In terms of the monthly average consumption expenditures per household in 2016, the expenditures for food and non-alcoholic drinks accounted for the largest proportion at 13.7%, followed by restaurants and hotels (13.5%), transportation (12.1%), and education (11.1%).

The total value of consumption expenditures in 2016 was KRW 2,550,000, a decrease by 0.5% from the previous year's level. Expenditures increased year on year in the category of alcoholic beverages and cigarettes, household equipment and housekeeping services, healthcare, restaurants and hotels, and other goods and services.

Table 3-4 Trend of Monthly Average Household Economic Index of Households (of Two or More People) across the Country

(KRW 1,000, %)

	2009	2010	2011	2012	2013	2014	2015	2016
Income	3,432.0	3,631.7	3,841.6	4,076.9	4,161.8	4,302.4	4,373.1	4,399.2
Consumption expenditure	2,149.2	2,286.9	2,392.7	2,457.4	2,480.7	2,551.1	2,563.1	2,549.7
Disposable income[1)]	2,805.6	2,957.7	3,119.3	3,317.4	3,381.0	3,497.9	3,562.9	3,587.5
Surplus value[2)]	656.5	670.8	726.6	860.0	900.2	946.8	999.8	1,037.8
Surplus rate[3)]	23.4	22.7	23.3	25.9	26.6	27.1	28.1	28.9
Average propensity to consumption[4)]	76.6	77.3	76.7	74.1	73.4	72.9	71.9	71.1

Note: 1) Disposable income: income - nonconsumption expenditures
2) Surplus value: disposable income - consumption expenditures
3) Surplus rate: (value of surplus / disposable income) * 100
4) Average propensity to consumption: (consumption expenditures / disposable income) * 100
Source: Statistics Korea, *Household Economy Survey*

Table 3-5 Average Monthly Consumption Expenditures of per Households (of Two or More People) across the Country

(KRW 1,000, %)

	2014	Composition	2015	Composition	2016	Composition	Year-on-year increase (%)
Consumption expenditures	2,551.1	100.0	2,563.1	100.0	2,549.7	100.0	-0.5
Foods and non-alcoholic drinks	351 .2	13.8	354.0	13.8	349.4	13.7	-1.3
Alcoholic beverages and cigarettes	27.8	1.1	33.1	1.3	34.8	1.4	5.1
Clothing and footwear	169.4	6.6	161.9	6.3	158.0	6.2	-2.4
Housing, water, heating	264.7	10.4	277.5	10.8	273.1	10.7	-1.6
Household equipment and routine household maintenance service	104.7	4.1	105.2	4.1	109.2	4.3	3.8
Health	168.3	6.6	174.4	6.8	177.2	6.9	1.6
Transportation	334.0	13.1	321.6	12.5	307.7	12.1	-4.3
Communications	150.4	5.9	147.7	5.8	144.0	5.6	-2.5
Recreation and culture	146.8	5.8	149.9	5.8	149.7	5.9	-0.1
Education	284.6	11.2	283.3	11.1	282.1	11.1	-0.4
Restaurants and hotels	334.9	13.1	339.5	13.2	344.4	13.5	1.4
Other miscellaneous goods and services	214.3	8.4	215.1	8.4	220.2	8.6	2.4

Source: Statistics Korea, *Household Economy Survey*

04 Health and Welfare

Number of Licensed Health-Care Providers and Pharmacists

In 2016, the number of licensed medical doctors increased by 1.8% from 2015, to reach 118,093.

The number of licensed medical doctors was 118,093; dentists, 29,503; Korean traditional medicine doctors, 23,460; licensed nurses, 355,772; and licensed pharmacists, 66,992.

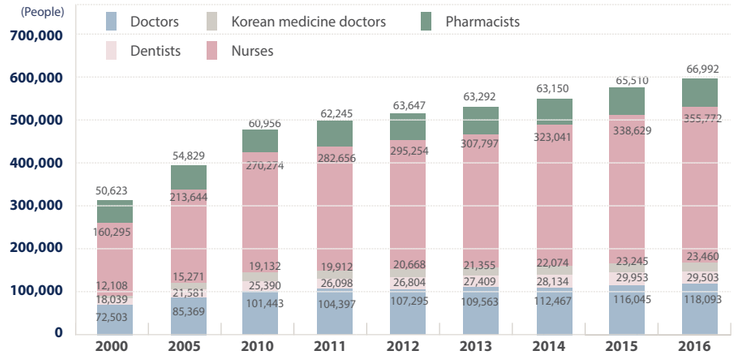
Recipients of National Basic Livelihood Security Benefits and Total Expenditures

The number of recipients of national basic livelihood security benefits in 2016 was 1,631,000. The number of general recipients was 1,540,000, while the number of institutionalized recipients was 91,000. The ratio of the recipients of national basic livelihood security benefits to the entire registered population in Korea was 3.2% in 2016.

The total value of national basic livelihood security paid to recipients in 2016 was KRW 4,157 billion, a 21.9% increase over the previous year. Of all benefits paid, 94.2% went to general recipients and the remaining 5.8% went to institutionalized recipients.

- In 2015, the system of basic livelihood security benefits was revised, and residential benefits (Land Ministry) and education benefits (Education Ministry) were transferred to relevant government agencies. Accordingly, the basic livelihood security benefit was changed into living expenses benefit and childbirth/funeral benefit.

Figure 4-1 Number of Licensed Health-Care Providers



Source: Ministry of Health and Welfare, *Ministry of Health and Welfare Yearbook*

Table 4-1 Number of Licensed Health Care Providers[1)]

(People)

	Doctors	Dentists	Korean medicine doctors	Nurses	Pharmacists
2000	72,503	18,039	12,108	160,295	50,623
2005	85,369	21,581	15,271	213,644	54,829
2010	101,443	25,390	19,132	270,274	60,956
2011	104,397	26,098	19,912	282,656	62,245
2012	107,295	26,804	20,668	295,254	63,647
2013	109,563	27,409	21,355	307,797	63,292
2014	112,476	28,134	22,074	323,041	63,150
2015	116,045	28,953	23,245	338,629	65,510
2016	118,093	29,503	23,460	355,772	66,992
Year-on-year increase (%)	1.8	1.9	0.9	5.1	2.3

Note: Including Koreans living overseas, excluding those who have passed away
Source: Ministry of Health and Welfare, *Ministry of Health and Welfare Yearbook*

Table 4-2 Total Recipients of National Basic Livelihood Security Benefit and Total Expenditure[1)]

(1,000 people, KRW billion, %)

	2009	2010	2011	2012	2013	2014	2015	2016
Number of total recipients	1,569	1,550	1,469	1,394	1,351	1,329	1,646	1,631
(Change rate)	(2.5)	(-1.2)	(-5.2)	(-5.1)	(-3.1)	(-1.6)	(23.9)	(-0.9)
Rate of recipients	3.2	3.1	2.9	2.7	2.6	2.6	3.2	3.2
General recipients	1,483	1,458	1,380	1,300	1,259	1,237	1,554	1,540
Institutionalized recipients	86	92	89	94	92	91	92	91
Total benefits	3,923	3,998	4,017	3,930	4,088	4,072	3,410	4,157
(Change rate)	(6.7)	(1.9)	(0.5)	(-2.2)	(4.0)	(-0.4)	(-16.3)	(21.9)
General benefits	3,791	3,854	3,856	3,761	3,899	3,853	3,180	3.914
Benefits to institutions	132	144	161	170	189	218	230	243
Minimum cost of living (1,000 won)	1,327	1,363	1,439	1,496	1,546	1,631	1,668	-
(Change rate)	4.8	2.7	5.6	4.0	3.3	5.5	2.3	-

Note: 1) Total number of recipients means the total number of recipients including those who received residential and education benefits that have been transferred to other government agencies, along with the recipients of living expenses and childbirth/funeral benefits.
Recipient rate = Number of national basic livelihood security benefit recipients/number of registered residents * 100
Total benefits are from government expenses and local expenses, and they include only living expenses and childbirth/funeral benefits, as the residential benefit (Land Ministry) and education benefit (Education Ministry) were transferred to relevant government agencies in the customized benefit revision implemented in 2015.
Source: Ministry of Health and Welfare, *Ministry of Health and Welfare Yearbook.*

Number of Welfare Institutions for the Elderly and Their Residents

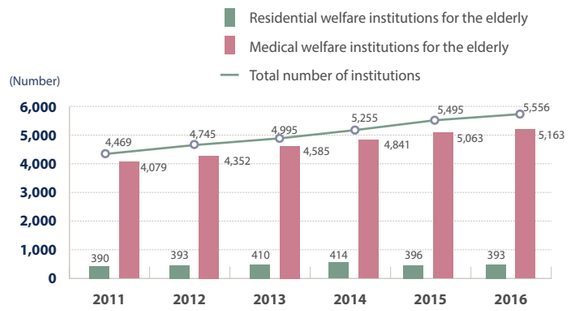
As medical technology develops and people become more conscious of their health, the average lifespan of the Korean people has increased, resulting in a consistent increase in the population over the age of 65.

The number of welfare facilities for the elderly at the end of 2016 was 5,556, increasing by 1.8% year on year. The number of residential welfare institutions for the elderly was 393, decreasing by 0.8% from the previous year. The number of medical welfare institutions for the elderly was 5,163, a 2.0% increase year on year.

Child Welfare Institutions and Children Protected by Those Institutions

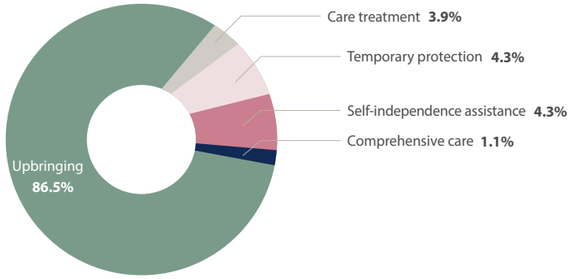
Child welfare institutions include those that specialize in bringing children up, providing care and treatment, assisting residents in living independently, providing temporary protection, and providing comprehensive care. As of the end of 2016, 13,689 children were under protection at 281 such institutions.

Figure 4-2 Number of Residential Welfare Institutions for the Elderly



Source: Ministry of Health and Welfare, *Ministry of Health and Welfare Yearbook*

Figure 4-3 Number of Children Welfare Institutions (2016)



Source: Ministry of Health and Welfare, *Ministry of Health and Welfare Yearbook*

Table 4-3 Welfare Institutions for the Elderly and Their Residents

(People, facilities)

	Population over 65[1)]	Total number of establishments	Facilities of residential welfare institutions for the elderly		Medical welfare facilities for the elderly	
			Number of facilities	Number of residents	Number of facilities	Number of residents
2011	5,515,179	4,469	390	9,478	4,079	103,973
2012	5,766,729	4,745	393	9,943	4,352	112,650
2013	6,022,659	4,995	410	9,428	4,585	118,713
2014	6,277,126	5,255	414	9,968	4,841	127,356
2015	6,541,168	5,459	396	9,709	5,063	135,154
2016	6,762,842	5,556	393	9,590	5,163	142,079
Year-on-year increase (%)	3.4	1.8	-0.8	-1.2	2.0	5.1

Note: Based on population projections (medium-level scenario) written in December 2016
Source: Statistics Korea, Population Projections; Ministry of Health and Welfare, *Ministry of Health and Welfare Yearbook*

Table 4-4 Children Welfare Institutions

(Number of facilities, people)

		Total[1)]	Upbringing	Protection and treatment	Self-independence assistance	Temporary protection	Comprehensive care
2012	Number of facilities	281	243	11	12	12	3
	People	15,916	14,700	497	256	335	128
2013	Number of facilities	281	243	11	13	11	3
	People	15,239	14,038	486	250	359	106
2014	Number of facilities	278	242	10	12	11	3
	People	14,630	13,437	481	252	336	124
2015	Number of facilities	281	243	11	12	12	3
	People	14,001	12,821	447	243	350	140
2016	Number of facilities	281	243	11	12	12	3
	People	13,689	12,448	485	230	356	170

Note: Children welfare institutions include those for rearing children, vocational training, protection and treatment, assistance for independent living, temporary protection, and comprehensive care.
Source: Ministry of Health and Welfare, *Ministry of Health and Welfare Yearbook*

05 Environment

Overall Weather

The annual mean temperature in 2016 was 13.6 degrees Celsius (°C). The mean maximum temperature for the year was 18.9°C and the mean minimum temperature was 9.0°C. The annual mean temperature, mean maximum temperature, and mean minimum temperature in 2016 were higher by 1.1°C, 0.8°C, and 1.3°C, respectively, than average levels.

Nationwide, annual average precipitation in 2016 was 1,272.5 millimeters (mm), 35.2 mm less than the average level. The number of days with 30 mm or more of hourly precipitation was 1.8 in 2016, greater than average by 0.1 days. The number of days with 80 mm or more daily precipitation was 1.9, which was 0.4 days less than average.

The global average temperature in 2016 (from January to November) recorded the all-time high level. The annual average temperature in Korea was the highest in 2016 as well, since 1973.

Water Quality of Major Water Supply Sources

Water quality standards are measured according to the biological oxygen demand (BOD) of rivers and lakes: water with a BOD of 1 milligram (mg) or lower per liter is classified as a first-grade water supply source, and 3 mg or lower is considered second grade. Second-grade water is not potable without treatment, although it is clear and odorless.

When examining the contamination level for major water supply sources as of 2016, Paldang Dam recorded 1.3 mg per liter, Mulgeum 2.0 mg, Daecheong Dam 0.9 mg, and Damyang 1.5 mg of BOD.

Table 5-1 Weather Factors by Decade[1)]

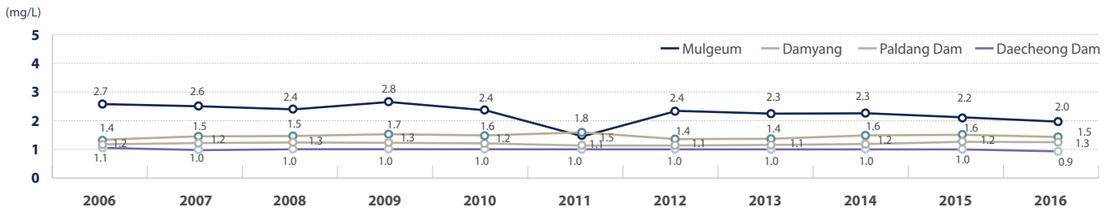
(°C, mm, days)

	Average temperature	Mean maximum temperature	Mean minimum temperature	Precipitation	Number of days of precipitation	Number of days with 30 mm or more hourly precipitation	Number of days with 80 mm or more daily precipitation
1973–1980	12.1	17.6	7.3	1,209.6	104.6	1.2	1.7
1981–1990	12.2	17.8	7.4	1,284.1	104.2	1.6	2.1
1991–2000	12.5	18.2	7.6	1,280.5	99.3	1.6	2.4
2001–2010	12.8	18.3	8.1	1,358.5	106.9	2.0	2.5
Level of avg. years (a) (1981–2010)	12.5	18.1	7.7	1,307.7	103.5	1.7	2.3
2016 (b)	13.6	18.9	9.0	1,272.5	109.4	1.8	1.9
2016 values-level of avg. years (b-a)	1.1	0.8	1.3	-35.2	5.9	0.1	-0.4

Note: Average of values measured at 45 largest weather observatories on land, excluding island areas
Source: Korea Meteorological Administration


© Getty Images Bank
Canola field at Sengsan Ilchulbong, Jeju Island

Figure 5-1 Water Quality of Major Water Supply Sources (BOD)



Source: Ministry of Environment

Table 5-2 Water Quality of Major Water Supply Sources (BOD)

(mg/L)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Paldang Dam	1.2	1.2	1.3	1.3	1.2	1.1	1.1	1.1	1.2	1.3	1.3
Mulgeum	2.7	2.6	2.4	2.8	2.4	1.5	2.4	2.3	2.3	2.2	2.0
Daecheong Dam	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
Damyang	1.4	1.5	1.5	1.7	1.6	1.8	1.4	1.5	1.6	1.6	1.5

Source: Ministry of Environment

Waste

The total amount of waste (excluding specified wastes) generated in 2016 was 415,345 tons (t) per day, a 2.6% increase from the previous year's level (404,812t/day). Household waste generated in 2016 recorded 53,772 tons (13.0%) per day, a 4.9% increase from the previous year. The amount of waste from industrial facilities recorded 162,129 tons (39.0%) per day, a 4.4% year-on-year increase. Construction waste generated in 2016 amounted to 199,444 tons per day (48.0%), increasing by 0.6% from the previous year. The amount of household waste had recorded a decrease, but began to increase again from 2014.

As of 2016, a total of 13,794 tons of specified wastes were generated per day, increasing by 2.9% from the previous year's volume.

Disposal of General Waste

The rate of household waste recycling in 2016 was 60.0%, a 0.8 percentage point increase from the previous year's level. The incineration rate for that year was 25.3%, decreasing by 0.4 percentage points from the previous year. The landfill rate decreased by 0.4 percentage points to 14.7%.

For industrial facilities' waste, the recycling rate in 2016 recorded 79.1%, increasing by 0.9 percentage points from the previous year. The incineration rate in 2016 was 6.0%, a 0.2 percentage point decrease from the previous year. The landfill rate recorded 14.8%, decreasing by 0.4 percentage points from the previous year's level.

The recycling rate for construction waste was 98.1%, a 0.5 percentage point increase year on year. The incineration rate was 0.4%, a 0.1 percentage point decrease from the previous year's level. The landfill rate decreased by 0.4 percentage points, to 1.5%.

Table 5-3 Amount of Waste Generation

(tons/day)

	Total	Household waste[1]	Wastes from industrial facilities[2]	Construction waste	Specified waste
2007	337,158	50,346	114,807	172,005	9,511
2008	359,296	52,072	130,777	176,447	9,594
2009	357,861	50,906	123,604	183,351	9,060
2010	365,154	49,159	137,875	178,120	9,488
2011	373,312	48,934	137,961	186,417	10,021
2012	382,009	48,990	146,390	186,629	12,501
2013	380,709	48,728	148,443	183,538	12,417
2014	388,486	49,915	153,189	185,382	13,177
2015	404,812	51,247	155,305	198,260	13,410
2016	415,345	53,772	162,129	199,444	13,794
Year-on-year increase (%)	2.6	4.9	4.4	0.6	2.9

Note: 1) Household waste includes waste from homes, daily life-related waste from industries, and daily life-related waste from construction sites
2) Industrial facilities' wastes exclude specified wastes
Source: Ministry of Environment, National Institute of Environmental Research, Generation & Treatment of Wastes, *Generation & Treatment of Specified Wastes*

Table 5-4 Disposal of General Waste

(%)

	Household waste			Waste from industrial facilities				Construction waste			
	Landfill	Incineration	Recycling	Landfill	Incineration	Recycling	Discharge of waste at sea	Landfill	Incineration	Recycling	Discharge of waste at sea[1]
2007	23.6	18.6	57.8	19.6	6.5	66.8	7.0	1.8	0.7	97.5	-
2008	20.3	19.9	59.8	18.6	5.3	70.8	5.3	1.7	0.8	97.5	-
2009	18.6	20.3	61.1	22.3	5.6	66.5	5.7	1.5	0.7	97.8	-
2010	17.9	21.6	60.5	16.9	5.8	72.3	5.0	1.2	0.5	98.2	-
2011	17.2	23.7	59.1	16.7	6.0	73.0	4.3	1.4	0.5	98.1	-
2012	15.9	25.0	59.1	14.9	6.5	76.5	2.1	2.2	0.5	97.3	-
2013	15.6	25.3	59.1	16.6	6.3	75.4	1.7	1.8	0.7	97.5	-
2014	15.7	25.3	59.0	16.1	5.7	77.3	0.9	1.6	0.5	97.9	-
2015	15.1	25.7	59.2	15.2	6.2	78.2	0.4	1.9	0.5	97.6	-
2016	14.7	25.3	60.0	14.8	6.0	79.1	0.1	1.5	0.4	98.1	-

Note: The rate of discharge of construction wastes at sea (%) is low, so it is excluded from the table.
Source: Ministry of Environment, National Institute of Environmental Research, *Generation & Disposal of Wastes Nationwide*

06 Agriculture, Forestry, and Fisheries

Farming Population and Cultivated Land Area

In 2016, the number of farming households and the farm population decreased 1.9% and 2.8% year on year, respectively. The number has shown a trend of decrease every year. Cultivated land area per farming household decreased, to reach 153.9 a (a = 100m^2) in 2016, which is a 0.2% year-on-year decrease.

Structure of Farming Household Income

In 2016, dependence on agriculture—the proportion of the agricultural income in a farming household's total income—was 27.1%, 3.1 percentage points down from the previous year's level. Agricultural income decreased by 10.6% and irregular income by 0.6%.

Cultivation Area by Crop

In 2016, the cultivation area for food crops was 962,000 hectares (ha), down by 2.1% from the previous year; the area has been on a constant decline. Within the cultivation area for food crops, the area for rice recorded 779,000 ha, down by 2.5% year on year.

The cultivation area for vegetables decreased by 3.8% year on year, while the area for fruits and special-purpose/medicinal crops increased by 1.8% and 8.3%, respectively.

Table 6-1 Farming households

(Households, people, a)

	Number of farming households	Farming population	Farming household size	Farming area per household
2007	1,231,009	3,274,091	2.66	144.7
2008	1,212,050	3,186,753	2.63	145.1
2009	1,194,715	3,117,322	2.61	145.4
2010	1,177,318	3,062,956	2.60	145.7
2011	1,163,209	2,962,113	2.55	146.0
2012	1,151,116	2,911,540	2.53	150.3
2013	1,142,029	2,847,435	2.49	149.9
2014	1,120,776	2,751,792	2.46	150.9
2015	1,088,518	2,569,387	2.36	154.2
2016	1,068,274	2,496,406	2.34	153.9
Year-on-year increase (%)	-1.9	-2.8	-0.8	-0.2

Source: Statistics Korea, *Agriculture, Forestry, and Fisheries Census*, *Agricultural Area Statistics*

Table 6-2 Structure of Farming Household Income

(KRW 1,000, %)

	1990	2000	2005	2010	2013	2014	2015	2016	Year-on-year increase
Farming household Income	11,026	23,072	30,503	32,121	34,524	34,950	37,215	37,197	-0.0
Farming income	6,264	10,897	11,815	10,098	10,035	10,303	11,257	10,068	-10.6
Non-farming income	2,841	7,432	9,884	12,946	15,705	14,799	14,939	15,252	2.1
Transfer income	1,921	4,743	4,078	5,610	5,844	6,819	7,906	8,783	11.1
Irregular income	-	-	4,725	3,467	2,940	3,029	3,114	3,095	-0.6
Dependence on agriculture	56.8	47.2	38.7	31.4	29.1	29.5	30.2	27.1	-3.1%p

Source: Statistics Korea, *Farm Household Economy Survey Report*

Table 6-3 Cultivation Area by Crop

(1,000 ha, %)

	Food crops		Vegetables[2]	Fruit	Special-purpose and/or medicinal crops[3]
		Rice[1]			
2010	1,095	892	229	162	66
2011	1,056	854	242	161	62
2012	1,052	849	225	160	59
2013	1,040	833	228	161	58
2014	1,013	816	231	162	70
2015	983	799	211	163	72
2016	962	779	203	166	78
Year-on-year increase	-2.1	-2.5	-3.8	1.8	8.3

Note: 1) Polished rice
2) Green vegetables, fruits and vegetables, root vegetables, condiment vegetables
3) Sesame, perilla, peanuts
Source: Statistics Korea, *Agricultural Area Statistics*

Trends of Agricultural Production

In 2016, 4,707,000 tons of food crops were produced, a 2.9% decrease from the previous year's 4,846,000 tons. By the type of crop, the production volume of rice decreased by 3.0%, vegetables by 6.8%, and fruits by 1.7%. The production volume of special-purpose crops increased by 9.5%.

Forest Land Area and Growing Stock

In 2016, Korea's forest land area was 6,330,000 ha. Growing stock recorded 950,490,000 cubic meters. While the forest land area has been on a constant decline, growing stock has been increasing. Growing stock per hectare was 150.24 cubic meters in 2016, which was a 2.9% year-on-year increase.

Number of Fishing Households and Fishing Household Income

The number of fishing households in 2016 was 53,000, a year-on-year decrease of 3.6%, and the fishing population decreased by 1.6% from the previous year to 126,000. In 2016, the income of fishing households increased by 7.2% from the previous year to reach KRW 47,077,000.



Table 6-4 Trends of Agricultural Production

(1,000 tons)

	Food crops		Vegetables[2]	Fruit	Special-purpose crops[3]
		Rice[1]			
2009	5,553	4,916	9,353	2,881	51
2010	4,836	4,295	7,894	2,489	61
2011	4,775	4,224	9,120	2,458	51
2012	4,565	4,006	7,518	2,374	49
2013	4,825	4,230	8,186	2,523	57
2014	4,828	4,241	9,381	2,697	68
2015	4,846	4,327	8,167	2,697	74
2016	4,707	4,197	7,615	2,652	81
Year-on-year increase (%)	-2.9	-3.0	-6.8	-1.7	9.5

Note: 1) Polished rice
2) Green vegetables, fruit vegetables, root vegetables, condiment vegetables
3) Sesame, perilla seeds, peanuts
Source: Statistics Korea, *Crop Production Statistics*

Table 6-5 Forest Land Area and Growing Stock

	Forest land area (1,000 ha)	Growing stock (1,000 m^3)	Proportion of forest (%)	Growing stock per ha (m^3)
2009	6,370	696,828	63.77	109.39
2010	6,369	800,025	63.67	125.62
2011	6,348	827,982	63.38	130.44
2012	6,340	848,763	63.28	133.88
2013	6,339	872,613	63.23	137.65
2014	6,342	901 ,816	63.24	142.19
2015	6,335	924,810	63.16	145.99
2016	6,326	950,486	63.05	150.24

Source: Korea Forest Service, *Statistical Yearbook of Forestry*

Table 6-6 Major Indicators of Fishing Households

	Fishing households (1,000)	Fishing population (1,000 people)	Fishery workers (1,000 people)	Fishery workers per household (people)	Fishing household income (KRW 1,000)	Fishery income (KRW 1,000)	Composition of fishery income (%)
2008	71	192	119	1.7	31,176	13,801	44.3
2009	69	184	116	1.7	33,945	16,220	47.8
2010	66	171	107	1.6	35,696	16,607	46.5
2011	63	159	104	1.6	38,623	20,432	52.9
2012	61	153	100	1.6	37,381	19,539	52.3
2013	60	147	98	1.6	38,586	18,538	48.0
2014	59	141	96	1.6	41,015	20,987	51.2
2015	55	128	90	1.6	43,895	23,086	52.6
2016	53	126	88	1.7	47,077	26,598	56.5
Year-on-year increase (%)	-3.6	-1.6	-2.2	6.3	7.2	15.2	3.9%p

Source: Statistics Korea, *Census of Agriculture, Forestry and Fisheries; Agriculture, Forestry and Fisheries Research Report; Statistics of Fishing Household Economy*

07 Mining and Manufacturing and Energy

Mining and Manufacturing

In 2016, the number of mining and manufacturing business establishments with 10 or more employees was 69,404, a 0.2% increase from 2015. The number of employees at those establishments, as of the end of December 2016, was 2,974,484, an increase of 0.6% from the 2015 level.

Annual wages and salaries paid to those employees recorded KRW 124,216 billion, having increased by 3.5% from 2015. The value of shipments in the mining and manufacturing industry decreased by 1.1% from 2015 to KRW 1,417,431 billion.

Manufacturing by Industry Structure

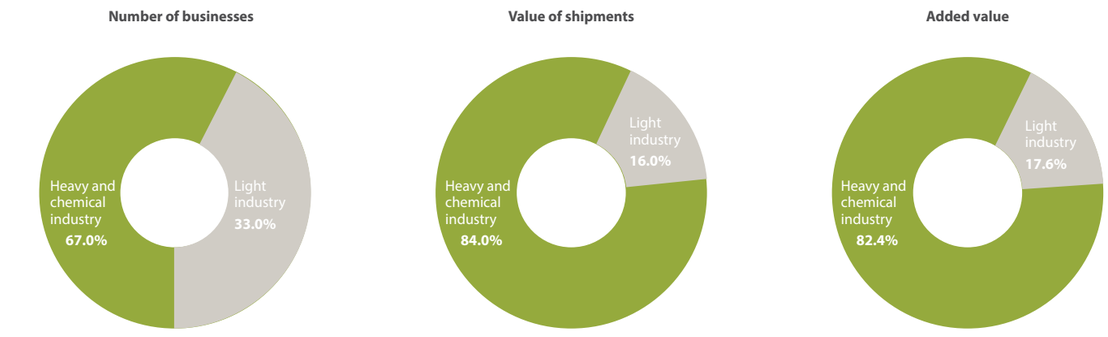
When looking at the structure of the manufacturing industry in 2016, the number of heavy and chemical industry business establishments was 46,306, a decrease of 1.3% from the 2015 level, and the proportion of heavy and chemical industry business establish-

Table 7-1 Mining and Manufacturing[1]

Sector	Year	Number of establishments	Number of workers (people)	Wages and salaries (KRW 1 billion)	Value of shipments (KRW 1 billion)
Mining & manufacturing	2013	65,742	2,824,352	104,440	1,494,751
	2014	68,989	2,915,775	111,329	1,489,572
	2015	69,269	2,958,171	120,026	1,432,727
	20161)	69,404	2,974,484	124,216	1,417,431
	Year-on-year increase (%)	0.2	0.6	3.5	-1.1
Manufacturing	2013	65,389	2,813,575	104,023	1,491,736
	2014	68,640	2,904,914	110,895	1,486,574
	2015	68,913	2,946,796	119,575	1,429,715
	20161)	69,068	2,963,237	123,746	1,414,212
	Year-on-year increase (%)	0.2	0.6	3.5	-1.1

Note: Tenth Revision of Korea Standard Industrial Classification
Source: Statistics Korea, *Report on Mining and Manufacturing Survey*

Figure 7-1 Manufacturing by Structure of Industry (2016)



Source: Statistics Korea, *Report on Mining and Manufacturing Survey*

ments was 67.0%, a 1.1% decrease from the previous year.

Meanwhile, the number of light industry business establishments in 2016 was 22,762, a 3.4% increase from 2015, and the proportion of light industry establishments was 33.0%, increasing by 1.1 percentage points year on year.

Shipbuilding Performance

The volume of ship orders in 2016 was 4,285,000 gross tonnage (G/T), a 80.6% decrease from 22,102,000 G/T in 2015. The year 2016 recorded 21,935,000 G/T of ship completions, an increase of 9.7% from 19,998,000 G/T in 2015.

As of the end of 2016, the number of ship orders that had not been delivered yet recorded 39,351,000 G/T, a 32.7% decrease from 58,484,000 G/T in 2015.

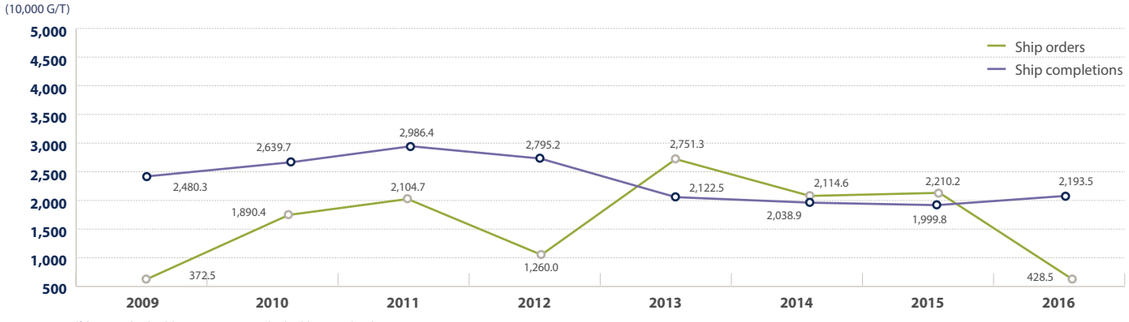
Table 7-2 Manufacturing by Industry Structure (Business establishments with 10 or more employees)[1)]

(EA, KRW 1 billion, %)

	Sector	Number of establishments	Composition (%)	Value of shipments	Composition (%)	Added value	Composition (%)
2014	Manufacturing	68,640	100.0	1,486,574	100.0	484.485	100.0
	Light industry	22,076	32.2	218,161	14.7	80,038	16.5
	Heavy and chemical industry	46,564	67.8	1,268,413	85.3	404,447	83.5
2015	Manufacturing	68,913	100.0	1,429,715	100.0	495,774	100.0
	Light industry	22,011	31.9	219,078	15.3	83,964	16.9
	Heavy and chemical industry	46,902	68.1	1,210,637	84.7	411,810	83.1
2016	Manufacturing	69,068	100.0	1,414,212	100.0	504,810	100.0
	Light industry	22,762	33.0	226,614	16.0	88,661	17.6
	Heavy and chemical industry	46,306	67.0	1,187,598	84.0	416,149	82.4

Note: 2014 (Ninth Revision of Korea Standard Industrial Classification), 2015–2016 (Tenth Revision of Korea Standard Industrial Classification)
Source: Statistics Korea, *Report on Mining and Manufacturing Survey*

Figure 7-2 Shipbuilding Performance



Source: Korea Offshore & Shipbuilding Association, *Shipbuilding Yearbook*

Table 7-3 Shipbuilding Performance

(10,000 G/T)

	2009	2010	2011	2012	2013	2014	2015	2016	Year-on-year increase (%)
Ship orders	372.5	1,890.4	2,104.7	1,260.0	2,751.3	2,114.6	2,210.2	428.5	-80.6
Ship completions	2,480.3	2,639.7	2,986.4	2,795.2	2,122.5	2,038.9	1,999.8	2,193,5	9.7
Remaining orders	9,626.7	8,067.5	7,176.0	5,560.2	6,343.2	6,332.2	5,848.4	3,935.1	-32.7

Source: Korea Offshore & Shipbuilding Association, *Shipbuilding Yearbook*

Energy Supply and Dependence on Imported Energy

In 2016, the volume of primary energy supply was 295 million tonnage of oil equivalent (toe), increasing by 7 million toe year-on-year. The volume of final energy consumption in 2016 was 226 million toe, increasing by 8 million toe from the previous year.

Per capita energy consumption was 5.75 toe, a 0.11 toe increase year-on-year. The ratio of dependence on imported energy in 2016 was 94.7%, a 0.1 percentage point decline from 2015.

Oil Imports and Unit Cost

In 2016, Korea imported 1,078.12 million barrels of oil, which was a 5.1% increase from the previous year. The value of oil imports in 2016 was US$42,662 million, which was a 19.3% year-on-year decrease. The annual average unit cost of oil imports decreased by 23.2% year on year, from US$51.54 per barrel in 2015 to US$39.57 in 2016.

Supply Structure by Primary Energy Source

When looking at energy supply structure in 2016, petroleum accounted for the greatest percentage of the total at 40.1%. Coal accounted for 27.8%, liquefied natural gas (LNG) 15.4%, and nuclear energy 11.6%. Compared with 2015, the proportion of coal decreased by 2.0 percentage points and nuclear energy by 0.5 percentage points, while the proportion of petroleum increased by 2.0 percentage points, natural gas by 0.2 percentage points, hydro energy by 0.1 percentage points, and new and renewable energy by 0.1 percentage points.

Table 7-4 Energy Consumption and Dependence on Imported Energy[1)]

	Energy consumption (1 million toe)		Per-capita energy consumption (toe)	Dependence on imported energy (%)
	Primary energy	Final energy		
2000	193	150	4.10	97.2
2005	229	171	4.74	96.6
2010	264	196	5.33	96.5
2011	277	206	5.54	96.5
2012	279	208	5.55	96.0
2013	280	210	5.56	95.7
2014	283	214	5.58	95.2
2015	288	218	5.64	94.8
2016	295	226	5.75	94.7
Year-on-year increase	7	8	0.11	-0.1%p

Note: Since 2007, based on revised Calorific Value, which is revised every five years
Source: Korea Energy Institute, *Energy Statistics Yearbook*

Table 7-5 Oil Imports and Unit Price of Import

	1990	2000	2010	2011	2012	2013	2014	2015	2016
Oil import (million barrels)	308.4	893.9	872.4	927.0	947.3	915.1	927.5	1,026.1	1,078.1
Year-on-year increase (%)	4.0	2.3	4.5	6.3	2.2	-3.4	1.4	10.6	5.1
Value of oil import (FOB, US$ million)	6,164	24,174	67,283	98,572	105,212	97,610	92,374	52,889	42,662
Year-on-year increase (%)	31.5	71.5	35.9	46.5	6.7	-7.2	-5.4	-42.7	-19.3
Unit price of imported oil (FOB, US$/barrel)	19.99	27.04	77.12	106.33	111.07	106.67	99.59	51.54	39.57
Year-on-year increase (%)	26.4	67.6	30.1	37.9	4.5	-4.0	-6.6	-48.2	-23.2

Source: Korea Energy Institute, *Energy Statistics Yearbook*

Table 7-6 Supply Structure by Primary Energy Source[1)]

(%)

	Coal	Petroleum	Natural gas	Hydro energy	Nuclear energy	New and renewable energy
1995	18.7	62.5	6.1	0.9	11.1	0.7
2000	22.2	52.0	9.8	0.7	14.1	1.1
2005	24.0	44.4	13.3	0.6	16.1	1.7
2009	28.2	42.1	13.9	0.5	13.1	2.3
2010	29.2	39.5	16.3	0.5	12.1	2.3
2011	30.2	38.0	16.7	0.6	12.0	2.4
2012	29.1	38.1	18.0	0.6	11.4	2.9
2013	29.2	37.8	18.7	0.6	10.4	3.2
2014	29.9	37.1	16.9	0.6	11.7	3.9
2015	29.8	38.1	15.2	0.4	12.1	4.5
2016	27.8	40.1	15.4	0.5	11.6	4.6
Year-on-year increase (%p)	-2.0	2.0	0.2	0.1	-0.5	0.1

Note: Since 2012, based on revised Calorific Value
Source: Korea Energy Institute, *Energy Statistics Yearbook*

08 Construction, Housing, and Land

Construction Permits Issued

The total land area for which construction permits are issued is a leading indicator of the construction business. In 2016, this figure amounted to 178,960,000 m^2, a decrease of 5.7% year on year. Land for residential use amounted to 78,420,000 m^2, a decrease of 8.3% year on year. The area for commercial use was 48,140,000 m^2, a decrease of 8.2% from the previous year, and the area for industrial use was 17,440,000 m^2, a 4.4% increase from the previous year.

Housing Construction and Investment

In 2016, total 726,048 units of housing were constructed, which was a 5.1% decrease from 2015. By the type of housing, the number of detached house construction increased by 9.6%, while the number of apartment, row house, and multi-household housing construction declined by 5.3%, 6.9%, and 14.9%, respectively. Housing investment rate—the ratio of the amount invested in housing to real GDP—increased by 0.8 percentage points from 2015, to record 5.4% in 2016.

Table 8-1 Land Area of Construction Permits

(1,000 m^2)

	Total area	Residential	Commercial	Industrial	Cultural, educational, and social	Others
1985	38,215	20,606	9,497	4,140	-	3,972
1990	116,419	70,927	26,408	10,569	-	8,514
1995	117,327	62,614	28,549	13,727	-	12,438
2000	81,055	41,283	18,882	11,645	-	9,245
2005	111,506	50,281	23,368	13,576	-	24,280
2010	125,447	51,464	26,617	15,484	12,062	19,820
2011	137,868	56,557	34,002	16,499	10,452	20,358
2012	137,142	59,256	32,334	15,940	10,459	19,152
2013	127,066	50,238	33,719	16,092	10,319	16,697
2014	141,347	60,935	37,420	15,655	9,350	17,987
2015	189,840	85,520	52,449	16,709	10,333	24,828
2016	178,955	78,420	48,144	17,443	10,612	24,335
Year-on-year increase (%)	-5.7	-8.3	-8.2	4.4	2.7	-2.0

Source: Ministry of Land, Infrastructure, and Transport

Table 8-2 Housing Construction and Investment

(unit, %)

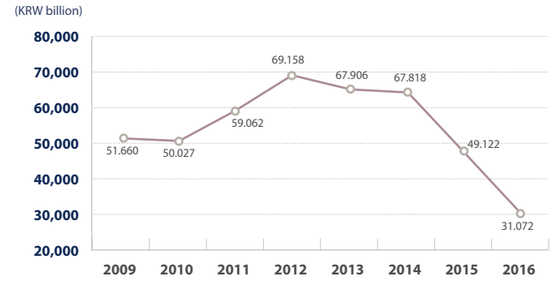
	Number of housing construction[1]	Detached house (including multiple dwellings)	Apartment	Row house	Multi-household housing	Housing investment rate
1995	619,057	55,710	497,273	17,212	48,862	8.9
2000	433,488	34,777	331 ,579	10,242	56,890	5
2005	463,641	27,799	415,511	4,613	15,718	6.1
2010	386,542	62,173	276,989	5,956	41,424	3.6
2012	586,884	71,255	376,086	19,591	119,952	3.1
2013	440,116	69,759	278,739	10,730	80,888	3.7
2014	515,251	74,979	347,687	10,898	81 ,687	3.9
2015	765,328	88,293	534,931	19,308	122,796	4.6
2016	726,048	96,768	506,816	17,983	104,481	5.4
Year-on-year increase (%)	-5.1	9.6	-5.3	-6.9	-14.9	0.8%p

Note: Based on construction permits and approval of construction plans
Source: Ministry of Land, Infrastructure, and Transport, Bank of Korea

Value of Overseas Construction Orders Received

The value of overseas construction contracts as of 2016 was KRW 31,072 billion, a 36.7% year-on-year decrease. When comparing the value of overseas construction orders by region, Asia accounted for 55.2% and the Middle East, 35.3%, respectively, accounting for 90.5% of the total. The Americas followed at 4.2% and then Africa at 4.0%.

Figure 8-1 Value of Overseas Construction Orders Received



Source: Statistics Korea, *Report on Construction Survey*

City Planning

A city is an area where systematic development, maintenance, management, and preservation are needed, as population and industries are concentrated or expected to be concentrated in it.

As of 2016, the total area of cities in Korea was 17,610 square kilometers, which was a level similar to the previous year, taking up 16.6% of the total land in Korea. With regard to land classification, 71.7% of the land consisted of green areas, 15.0% residential, 6.6% industrial, and 1.9% commercial. The remaining 4.8% was undesignated.



Night scenery of Songdo

Table 8-3 Value of Overseas Construction Orders Received by Site of Construction[1]

(KRW billion, %)

	2009	2010[2]	2011	2012	2013	2014	2015	2016	Composition
Total	51,660	50,027	59,062	69,158	67,906	67,818	49,122	31,072	100.0
Middle East	37,650	32,492	32,680	35,047	28,813	25,856	17,653	10,977	35.3
Asia	7,933	13,323	17,772	24,779	27,700	18,868	20,546	17,145	55.2
Europe	361	138	184	414	1,516	7,099	462	330	1.1
Africa	1,747	976	1,077	2,841	2,122	7,309	908	1,229	4.0
Oceania	2,968	58	38	52	5,284	204	1,804	91	0.3
America	968	3,016	7,304	5,987	2,453	8,471	7,736	1,299	4.2
Others	33	25	8	38	17	12	12	0	0.0

Note: Contract value (general contract, subcontract), the tenth revision of Korea Standard Industrial Classification was applied.
Source: Statistics Korea, *Report on Construction Survey*

Table 8-4 Urban Planning

(km^2, %)

	Urban planning area	Proportion to urban land area	Residential area	Commercial area	Industrial area	Green area	Undesignated area
2000	15,806.43	15.8	1,897.74	244.80	715.28	11,751.24	1,197.37
2005	17,039.77	16.1	2,121.85	264.04	793.11	12,607.49	1,253.29
2010	17,492.20	16.6	2,494.27	310.55	1,048.62	12,666.46	972.3
2011	17,558.81	16.5	2,536.30	316.99	1,074.44	12,704.23	926.87
2012	17,587.13	16.6	2,563.03	322.86	1,108.96	12,682.08	910.2
2013	17,593.38	16.5	2,579.65	324.71	1,122.31	12.682.83	883.87
2014	17,596.85	16.6	2,594.69	328.11	1,141.83	12,662.06	870.17
2015	17,613.68	16.6	2,620.23	328.95	1,157.76	12,647.11	859.63
2016	17,609.52	16.6	2,646.90	330.90	1,166.79	12,625.69	839.24
Composition	100.0	-	15.0	1.9	6.6	71.7	4.8

Source: Ministry of Land, Infrastructure, and Transport, *Status of Urban Planning.*

09 Transportation and Information and Communications

Number of Registered Cars

As of the end of 2017, the number of cars registered in Korea was 22,529,000, an increase of 3.3% from the end of the previous year. The number of passenger cars was 18,035,000, which accounted for 80.1% of all cars in Korea. Of those, the number of private cars was 17,122,000, for a ratio of 8.8 cars to every 10 households.

Civil Aviation Traffic

The number of passengers carried by civil international flights in 2016 was 71,280,000, a 19.9% year-on-year increase. The volume of air freight transport was 3,630,000 tons, up by 8.3% from the previous year.

For civil aviation traffic in 2016, the number of passengers carried by domestic lines was 30,450,000, a year-on-year increase of 10.9%. The volume of freight carried by domestic lines increased 2.1% year on year, to 290,000 tons.

Table 9-1 Number of Registered Cars

(1000 cars, cars)

	2000	2005	2010	2012	2013	2014	2015	2016	2017
Total	12,059	15,397	17,942	18,871	19,401	20,118	20,990	21,803	22,529
Passenger cars	8,084	11,122	13,632	14,577	15,078	15,747	16,562	17,338	18,035
Private passenger cars	7,798	10,759	13,125	14,011	14,460	15,060	15,808	16,505	17,122
Vans	1,427	1,125	1,050	987	971	947	920	893	868
Freight vehicles	2,511	3,102	3204	3,244	3,286	3,354	3,433	3,492	3,540
Special-purpose vehicles	37	48	56	63	66	70	75	80	86
No. of private passenger cars per 10 households[1)]	5.4	6.7	7.5	7.7	7.9	8.1	8.3	8.6	8.8

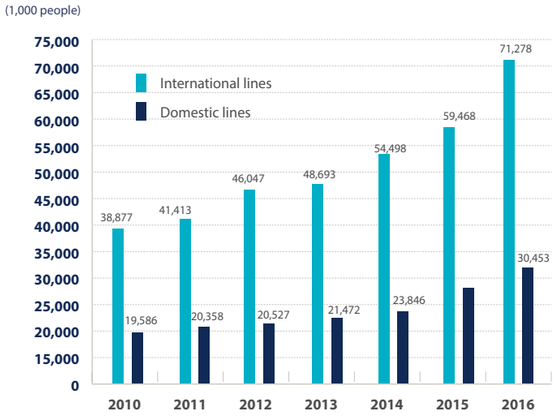
Note: Calculated based on the number of households stated in the "Future Household Projections"
Source: Statistics Korea, Ministry of Land, Infrastructure, and Transport, *Statistical Yearbook of MLTM*

Table 9-2 Civil Aviation Traffic

	International lines		Domestic lines	
	Passengers (1,000 people)	Freight[1)] (1,000 t)	Passengers (1,000 people)	Freight[1)] (1,000 t)
1990	9,383	761	10,833	180
1995	13,948	1,198	20,413	319
2000	18,905	1,886	22,289	431
2005	27,505	2,412	16,691	367
2007	35,450	3,001	16,202	310
2008	34,311	2,845	16,134	248
2009	32,891	2,729	17,584	264
2010	38,877	3,138	19,586	257
2011	41,413	2,913	20,358	275
2012	46,047	2,984	20,527	257
2013	48,693	3,083	21,472	246
2014	54,498	3,269	23,846	276
2015	59,468	3,355	27,454	284
2016	71,278	3,633	30,453	290
Year-on-year increase (%)	19.9	8.3	10.9	2.1

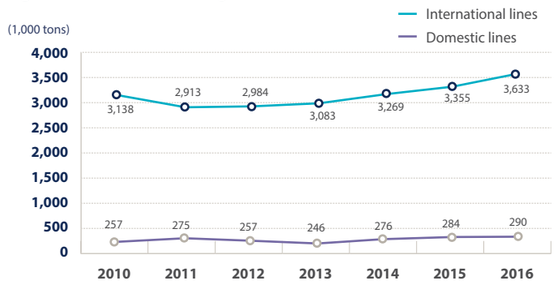
Note: Includes the postal service
Source: Ministry of Land, Infrastructure, and Transport, *Statistical Yearbook of MLTM*

Figure 9-1 Civil Aviation Passenger Traffic



Source: Ministry of Land, Transport and Maritime Affairs, *Statistical Yearbook of MLTM*

Figure 9-2 Civil Aviation Freight Traffic[1)]



Note: Including postal service
Source: Ministry of Land, Infrastructure, and Transport, *Statistical Yearbook of MLTM*

International Shipping Traffic

Regarding international shipping traffic in 2017, the number of passengers transported internationally was 2,728,147, a 1.6% year-on-year decrease, while the volume of internationally-shipped freight increased by 5.6% to 1,312,250,000R/T.

Production of Information and Communications Technology Industry

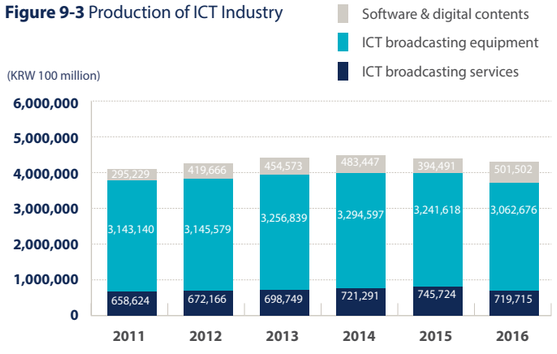
In 2016, the entire production of the information and communications technology (ICT) industry recorded KRW 428,389.3 billion, a decrease of 2.2% from 2015. By subsector, the production of ICT broadcasting services and ICT broadcasting equipment posted 3.5% and 5.5% year-on-year decrease, respectively. Meanwhile, the production of software and digital content increased by 27.1%.

Table 9-3 International Shipping Traffic

	Passengers (people)	International freight (1,000 R/T)		
		Total	Entry	Departure
2005	2,112,939	754,936	512,445	242,491
2007	2,549,874	862,523	576,501	286,022
2008	2,536,333	894,694	601,617	293,077
2009	2,088,967	848,299	566,082	282,217
2010	2,769,808	966,193	647,040	319,153
2011	2,702,432	1,069,565	703,753	365,812
2012	2,880,672	1,108,539	724,397	384,142
2013	2,737,201	1,123,205	735,854	387,351
2014	2,646,020	1,184,641	776,623	408,018
2015	2,617,018	1,216,782	799,470	417,312
2016	2,772,555	1,242,597	820,335	422,262
2017	2,728,147	1,312,252	860,358	451,894
Year-on-year increase (%)	-1.6	5.6	4.9	7.0

Source: Ministry of Oceans and Fisheries

Figure 9-3 Production of ICT Industry



Source: Korea Association for ICT Promotion, Korea Electronics Association, *ICT Survey, Report on Major ICT Items*

Table 9-4 ICT Production

(KRW 100 million)

	2011	2012	2013	2014	2015[p)]	2016[p)]	Year-on-year increase (%)
Total	4,096,993	4,237,411	4,410,161	4,499,335	4,381,833	4,283,893	-2.2
ICT broadcasting service	658,624	672,166	698,749	721,291	745,724	719,715	-3.5
Communications service	438,797	431,039	443,564	451,228	439,841	373,117	-15.2
Broadcasting service	119,833	132,381	138,166	141,848	162,922	173,587	6.5
Broadcasting and communications convergence service	99,994	108,746	117,019	128,215	142,961	-	-
ICT broadcasting equipment[1)]	3,143,140	3,145,579	3,256,839	3,294,597	3,241,618	3,062,676	-5.5
Software and IT service	295,229	419,666	454,573	483,447	394,491	501,502	27.1

Note: Statistics on companies with 10 or more employees
Source: Korea Association for ICT Promotion, Korea Electronics Association, *ICT Survey, Report on Major ICT Items*

10 Wholesale and Retail and Service Sector

Wholesale and Retail Trade, Hotels and Restaurants

The number of wholesale and retail businesses in 2016 was 1,019,000, a 2.2% increase from 2014. The number of employees in those industries was 3,148,000, a 5.0% increase from 2014. The annual sales were KRW 1,150,785 billion, an increase of 25.1% from 2014.

The number of hotels and restaurants in 2016 was 729,000, an increase of 3.7% from 2014. The number of employees was 2,166,000, a 4.5% increase from 2014, and annual sales were KRW 131,979 billion, a 38.2% increase from 2014.

Table 10-1 Wholesale and Retail Trade, Hotels and Restaurants[1)2)]

	Wholesale and Retail			Hotels and Restaurants		
	Number of establishments (1,000)	Number of workers (1,000)	Sales (KRW 1 billion)	Number of establishments (1,000)	Number of workers (1,000)	Sales (KRW 1 billion)
2008	860	2,545	653,349	624	1,728	73,371
2009	862	2,626	666,412	628	1,758	79,308
2011	904	2,680	906,210	655	1,840	84,069
2012	942	2,774	918,585	674	1,915	88,180
2013	960	2,880	913,882	686	1,991	90,630
2014	997	2,999	920,173	703	2,072	95,529
2016	1,019	3,148	1,150,785	729	2,166	131,979
Increase from 2014 (%)	2.2	5.0	25.1	3.7	4.5	38.2

Note: 1) Survey was not carried out in 2010 and 2015, because the economic census was conducted in those years.
2) The Ninth Revision of Korea Standard Industrial Classification (Dec. 28, 2007) was applied.
Source: Statistics Korea, *Report on the Wholesale and Retail Trade Survey*

Volume of Trade through Cyber Shopping Malls

The total value of trade through cyber shopping malls in 2017 was KRW 78,227 billion, a 19.2% increase from the previous year. By product line, travel and reservation services recorded KRW 12,961 billion; clothes/fashion and related goods, KRW 12,039 billion; and household goods/motor vehicle parts and accessories, KRW 9,760 billion. The volume of cyber trade for food and beverages showed year-on-year growth of 38.0%, while the volume of home electric appliances/electronics/telecommunication equipment and cosmetics increased by 24.3% and 21.2%, respectively. Those three groups have been maintaining a consistent trend of increase.

Table 10-2 Volume of Trade through Cyber Shopping Malls by Product Line[1)]

(KRW billion)

	2012	2013	2014	2015	2016	2017[p)]	Composition (%)	Year-on-year increase (%)
Total	34,068	38,498	45,302	54,056	65,617	78,227	100.0	19.2
Travel arrangements and reservation services	5,577	6,419	8,383	9,788	11,288	12,961	16.6	14.8
Clothes/fashion and related goods	5,610	6,281	7,346	8,452	10,232	12,039	15.4	17.7
Household goods/motor vehicle parts and accessories	3,655	4,279	5,175	6,671	8,328	9,760	12.5	17.2
Food and beverages	2,892	3,289	3,611	5,243	7,068	9,753	12.5	38.0
Home electric appliances/electronics/telecommunication equipment	3,751	4,105	4,962	5,880	7,170	8,912	11.4	24.3
Cosmetics	1,946	2,100	2,669	3,519	5,171	6,269	8.0	21.2
Computer and computer-related appliances	3,079	3,084	3,414	3,543	3,986	4,474	5.7	12.2
Goods/toys for infants and children	1,658	1,947	2,227	2,711	2,941	3,005	3.8	2.2
Sports/leisure items	1,275	1,639	1,899	2,094	2,521	2,800	3.6	11.1
Agricultural, livestock, and fisheries products	956	1,132	1,171	1,434	1,731	2,036	2.6	17.6
Various services	523	640	960	1,157	1,349	1,551	2.0	15.0
Books	1,273	1,196	1,280	1,151	1,341	1,451	1.9	8.2
Other	1,874	2,387	2,205	2,412	2,492	3,214	4.1	29.0

Note: Products lines with a small share in trade are included in the category of "other."
Source: Statistics Korea

11 Economy and Business Management (Companies)

Business Management Analysis

During 2016, the growth index, profitability, and stability of financial structure of domestic corporations generally improved. As for the growth index, sales growth increased to 2.6% in 2016, from 0.3% in 2015. The ratio of operating profit to the net sales, which is the profitability index, increased by 0.8 percentage points to 5.5% in 2016, from 4.7% in 2015. Following such robust growth of operating profit, the ratio of net income before tax to sales increased to 5.0% in 2016, from 4.4% in 2015.

In the meantime, the debt ratio of domestic corporations, which is an index of financial structure stability, decreased to 121.3% at the end of 2016 from 128.5% at the end of 2015, while the ratio of total borrowing and bonds payable to total assets decreased from 31.5% at the end of 2015 to 29.9% at the end of 2016.

Table 11-1 Business Management Analysis[1)]

(%)

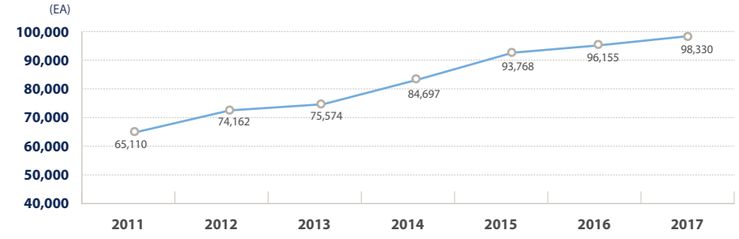
	Debt ratio	Stockholders' equity to total assets	Total borrowings and bonds payable to total assets	Operating income to sales	Net income before taxes to sales	Rate of sales growth
2009	158.7	38.7	32.8	4.6	3.9	-
2010	150.1	40.0	32.2	5.3	4.9	15.3
2011	152.7	39.6	32.2	4.5	3.7	12.2
2012	147.6	40.4	31.9	4.1	3.4	5.1
2013	141.0	41.5	31.5	4.1	2.9	2.1
2014	134.5	42.6	32.2	4.0	3.3	1.3
2015	128.5	43.8	31.5	4.7	4.4	0.3
2016	121.3	45.2	29.9	5.5	5.0	2.6
Year-on-year increase(%p)	-7.2	1.4	-1.6	0.8	0.6	2.3

Note: Statistics have been written according to the *Framework Act on Small and Medium Enterprises*. Data from all-number survey.
Source: Bank of Korea, *Financial Statement Analysis*

Newly Established Corporations

The number of newly established corporations in 2017 was 98,330, a 2.3% increase from the previous year. By industry, year-on-year, the number of newly established corporations in the electricity, gas, steam, and water supply industry and the manufacturing industry recorded a 215.8% and 8.4% increase, respectively. The number of newly established corporations in the services industry decreased by 4.6% from the previous year.

Figure 11-1 Number of Newly Established Corporations



Source: Small and Medium Business Administration

Table 11-2 Number of Newly Established Corporations by Industry[1)]

(EA, %)

	Total	Agriculture, forestry, fishing, and mining	Manufacturing	Electricity, gas, steam, and water supply	Construction	Services
2009	56,830	1,087	14,047	373	6,978	34,345
2010	60,312	1,077	14,818	234	6,790	37,393
2011	65,110	1,768	15,557	299	6,593	40,893
2012	74,162	2,067	17,733	391	6,996	46,975
2013	75,574	1,637	18,721	711	7,069	47,436
2014	84,697	2,593	19,509	1,363	8,145	53,087
2015	93,768	3,161	20,155	967	9,742	59,743
2016	96,155	2,391	19,037	1,488	9,825	63,414
2017	98,330	2,559	20,629	4,699	9,963	60,480
Year-on-year increase(%p)	2.3	7.0	8.4	215.8	1.4	-4.6

Note: 1) The category was changed into "electricity, gas, steam, and air conditioning supply" in the revised "10th Korea Standard Industrial Classification" (July 1, 2017), but the past category name is maintained for the purpose of keeping the time series.
Source: Small and Medium Business Administration.

12 National Accounts, Regional Accounts, and State Assets

(National Wealth)

GDP & GNI

GDP (gross domestic production) is one of the indicators used to understand a country's economic scale, and GNI (gross national income) is used to measure the country's living standards. Per-capita GNI is calculated by dividing the gross national income by population.

In 2016, (nominal) GDP recorded KRW 1,637 trillion, an increase of 4.7% from the previous year, and based on the US dollar, the figure was US$1,411 billion, a 2.1% year-on-year increase.

GNI increased by 4.5% year on year, to KRW 1,639 trillion, and per capita GNI increased by 4.0%, to KRW 31,980,000.

Table 12-1 GDP and GNI[1)]

	GDP		GNI		Per-capital GNI	
	KRW 1 billion	US$1 billion	KRW 1 billion	US$1 billion	KRW 10,000	US$
1970	2,795	8.2	2,843	8.3	9	257
1980	39,471	65	39,083	64	103	1,686
1990	197,712	279	197,415	279	461	6,505
2000	635,185	562	630,614	558	1,342	11,865
2005	919,797	898	912,609	891	1,894	18,508
2006	966,055	1,011	962,447	1,007	1,987	20,823
2007	1,043,258	1,123	1,040,092	1,119	2.136	23,033
2008	1,104,492	1,002	1,104,414	1,002	2,251	20,463
2009	1,151,708	902	1,148,982	900	2,330	18,303
2010	1,265,308	1,094	1,266,580	1,095	2,556	23,105
2011	1,322,681	1,203	1,340,530	1,210	2,685	24,226
2012	1,377,457	1,222	1,391,596	1,235	2,772	24,600
2013	1,429,445	1,305	1,439,644	1,315	2,855	26,070
2014	1,486,079	1,411	1,490,764	1,415	2,938	27,892
2015	1,564,124	1,382	1,568,383	1,386	3,074	27,171
2016[p)]	1,637,421	1,411	1,639,067	1,412	3,198	27,561

Note: Based on the current price of the year
Source: Bank of Korea

Economic Growth Rate and GDP Deflator

The economic growth in 2017 recorded 3.1% increase, a 0.3 percentage point increase from 2.8% in the previous year. By sector, the growth rate of the construction industry, mining and manufacturing industry, and services industry recorded 7.2%, 4.2%, and 2.1%, respectively.

In 2016, the GDP deflator recorded 1.8% growth, which was 0.6 percentage points lower than 2.4% in the previous year.

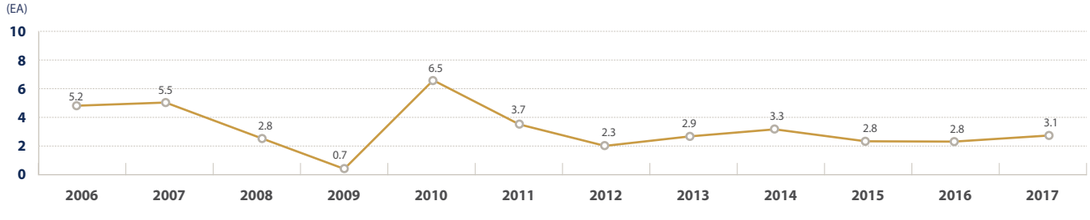
Table 12-2 Growth by Economic Sector[1)] and GDP Deflator[2)]

(2010=100) (%)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016[p)]	2017[p)]
Economic growth rate	5.2	5.5	2.8	0.7	6.5	3.7	2.3	2.9	3.3	2.8	2.8	3.1
Agriculture, forestry, and fishery	1.6	4.1	5.6	3.2	-4.3	-2.0	-0.9	3.1	3.6	-0.4	-2.9	0.4
Mining and manufacturing	7.7	8.3	3.7	-0.5	13.5	6.5	2.4	3.6	3.5	1.7	2.3	4.2
Electricity, gas, and water	2.0	4.2	3.4	5.0	5.9	0.2	4.0	-0.3	2.6	5.1	3.6	1.9
Construction	1.7	2.5	-2.6	2.3	-3.7	-5.5	-1.8	3.0	0.8	5.7	10.5	7.2
Services	4.6	5.2	3.2	1.5	4.4	3.1	2.8	2.9	3.3	2.8	2.3	2.1
GDP Deflator[2)]	88.8	90.9	93.6	96.9	100.0	101.6	102.6	103.5	104.1	106.6	108.6	-
Increase rate	-0.1	2.4	3.0	3.5	3.2	1.6	1.0	0.9	0.6	2.4	1.8	-

Note: 1) Based on prices in 2010
2) GDP Deflator = (Nominal GDP / Real GDP) * 100
Source: Bank of Korea

Figure 12-1 Economic Growth Rate



Source: Bank of Korea



President of the World Bank Group Jim Yong Kim delivered a speech during the plenary session at the International Monetary Fund (IMF) and World Bank annual meeting in Indonesia, 12 October 2018.

National Balance Sheet

The national balance sheet is stock statistics that record real assets, both tangible and intangible, as well as the size and changes in the financial asset/debut of each economic entity and a nation as of the end of every year. The national balance sheet can be seen as the financial statements of a national economy, which allows us to clearly and comprehensively understand the changes in the national wealth or national net assets including tangible and financial assets or in net assets of the country.

In 2016, the total value of nonfinancial assets (nominal) was KRW 12,741 trillion, which represents a year-on-year increase of KRW 618 trillion. Compared with a decade earlier, the figure has increased by 1.8 times (from KRW 7,139 trillion in 2006).

Broken down by the type of asset, land and construction assets accounted for the majority of 88.7% out of the total. Land represented the majority of this subcategory at KRW 6,981 trillion (54.8%), followed by construction at KRW 4,324 trillion (33.9%); plants at KRW 728 trillion (5.7%); inventories at KRW 334 trillion (2.6%); intellectual property products at KRW 327 trillion (2.6%); standing timbers at KRW 24 trillion (0.2%); and underground natural resources at KRW 24 trillion (0.2%).

Table 12-3 National Balance Sheet (Net Asset Stock by Asset Type)[1)]

(KRW trillion)

		2006(A)	Composition (%)	2012	2013	2014	2015	2016[p)] (B)	Composition	Ratio (B/A)
Total value of non-financial assets		7,138.8	100.0	10,768.8	11,097.4	11,582.2	12,123.4	12,741.4	100.0	1.8
Produced assets	**Tangible fixed assets**	2,893.5	40.5	4,668.5	4,826.0	5,002.8	5,177.8	5,378.8	42.2	1.9
	Construction assets	2,322.1	32.5	3,776.4	3,911.1	4,045.7	4,176.4	4,323.8	33.9	1.9
	Plant assets	425.6	6.0	640.6	642.5	664.1	689.8	727.8	5.7	1.7
	Intellectual property products	145.8	2.0	251.4	272.4	293.1	311.5	327.2	2.6	2.2
	Inventories	181.9	2.5	325.4	324.6	327.8	331.1	333.9	2.6	1.8
Non-produced assets	**Land**	4,034.5	56.5	5,727.6	5,900.9	6,209.8	6,571.4	6,981.2	54.8	1.7
	Subsoil assets	20.1	0.3	26.0	23.7	19.1	19.9	23.5	0.2	1.2
	Standing timber	8.8	0.1	21.3	22.2	22.7	23.2	24.0	0.2	2.7

Note: Prices as of the end of the year
Source: Statistics Korea, Bank of Korea

Gross Savings Rate and Investment Rate

The gross savings rate in 2016 recorded 35.8%, an increase of 0.2 percentage points from the previous year (35.6%). The gross savings rate in the private sector decreased by 0.6 percentage points from the previous year (28.6%) to 28.0%, while the rate in the public sector increased by 0.8 percentage points from the previous year (7.0%) to 7.8%.

The gross domestic investment rate recorded 29.3%, a 0.4 percentage point increase from the 2015 figure (28.9%).

In 2016, the gross national disposable income (nominal) recorded KRW 1,633 trillion, an increase of 4.5% year on year, and final consumption expenditures increased 4.1% from the previous year.

Gross Regional Domestic Production

The gross regional domestic production (nominal) in Korea in 2016 was KRW 1,636 trillion, an increase by KRW 70 trillion (4.5%) from the previous year. By city and province, Gyeonggi-do accounted for the largest proportion with KRW 372 trillion (22.8%), followed by Seoul with KRW 357 trillion (21.8%) and Chungcheongnam-do with KRW 117 trillion (7.2%). The proportion of the gross regional domestic production in the capital area (Seoul, Gyeonggi-do, and Incheon) was 49.5%, increasing by 0.1 percentage point from 49.4% in the previous year.

Examining growth by city and province, several regions recorded high growth rates over the national average (4.5%): Jejudo (10.1%), Incheon (6.9%), and Chungcheongbuk-do (6.6%). Others, however, recorded lower growth rates compared with the average. Those include Daegu (1.6%), Ulsan (2.2%), and Jeollabuk-do (2.7%).

Table 12-4 Gross Savings and Investment Rates[1)]

(%)

	2009	2010	2011	2012	2013	2014	2015	2016[P)]	Year-on-year increase(%p)
Gross savings rate[2)]	32.9	35.0	34.6	34.2	34.3	34.5	35.6	35.8	0.2
Private	25.2	27.1	26.6	26.6	27.0	27.6	28.6	28.0	-0.6
Government	7.6	7.8	8.0	7.6	7.3	6.9	7.0	7.8	0.8
Total domestic investment rate	28.6	32.1	32.9	30.8	29.0	29.3	28.9	29.3	0.4
Independence of investment resources	115.0	108.7	105.1	110.9	118.5	117.8	123.1	122.3	-0.8

Note: 1) Based on current prices of the year
2) (Gross savings by sector / gross national disposable income) * 100
Source: Bank of Korea

Table 12-5 Gross National Disposable Income and Final Consumption Expenditures[1)]

(KRW billion)

	2010	2011	2012	2013	2014	2015	2016[P)]	Year-on-year increase (%)
Gross national disposable income	1,260,454.9	1,335,321.2	1,385,445.3	1,435,097.6	1,485,516.9	1,562,737.0	1,632,613.9	4.5
Final consumption expenditures	819,821.2	873,522.6	911,938.2	942,267.2	972,924.9	1,006,005.6	1,047,482.4	4.1
Private	636,712.7	679,141.5	707,614.0	727,799.9	748,200.8	771,239.2	798,364.1	3.5
Government	183,108.5	194,381.2	204,324.2	214,467.3	224,724.2	234,766.4	249,118.3	6.1

Note: Based on current prices of the year
Source: Bank of Korea

Table 12-6 Gross Regional Domestic Product[1)2)]

(KRW billion)

Region	2011	2012	2013	2014	2015	2016[p)]	Year-on-year in crease (%)	Composition (%)
Entire country	1,330,888.2	1,377,040.5	1,430,254.9	1,485,504.7	1,565,247.8	1,635,555.4	4.5	100.0
Seoul	303,812.5	313,478.5	318,607.0	328,660.9	344,426.0	357,080.7	3.7	21.8
Busan	66,647.6	67,999.0	70,337.9	73,673.6	78,238.1	81,198.4	3.8	5.0
Daegu	41,448.0	43,021.0	44,753.5	46,523.7	48,869.0	49,672.9	1.6	3.0
Incheon	61,854.4	62,207.9	64,654.2	69,500.6	75,674.8	80,862.3	6.9	4.9
Gwangju	27,789.0	28,913.8	29,763.2	31,294.7	32,516.3	33,669.9	3.5	2.1
Daejeon	29,683.9	30,884.5	31,455.7	32,798.8	34,061.8	35,922.1	5.5	2.2
Ulsan	68,747.9	70,783.4	68,347.7	67,018.1	69,673.9	71,236.4	2.2	4.4
Gyeonggi-do	276,155.0	288,146.8	313,670.6	329,559.0	352,856.9	372,343.9	5.5	22.8
Gangwon-do	32,438.5	33,853.5	35,357.5	37,170.3	39,565.6	41,709.1	5.4	2.6
Chungcheongbuk-do	42,488.9	43,628.0	47,401.8	49,790.7	52,655.7	56,121.7	6.6	3.4
Chungcheongnam-do	91,816.4	95,307.9	99,154.3	105,002.4	111,265.1	117,127.5	5.3	7.2
Jeollabuk-do	39,960.1	40,431.8	42,512.7	44,242.7	45,641.1	46,880.5	2.7	2.9
Jeollanam-do	62,689.4	64,642.2	62,289.5	62,456.7	65,454.2	68,209.3	4.2	4.2
Gyeongsangbuk-do	82,276.4	85,401.0	89,132.4	92,697.2	94,987.7	98,814.8	4.0	6.0
Gyeongsangnam-do	91,233.3	95,634.5	99,619.4	101,028.4	103,995.4	107,795.3	3.7	6.6
Jeju-do	11,847.1	12,706.8	13,197.5	14,086.9	15,366.1	16,910.6	10.1	1.0

Note: 1) Based on current prices of the year
2) Sejong is included in Chungcheongbuk-do and Chungcheongnam-do, according to the past administrative district system.
Source: Statistics Korea, *Regional Income Statistics*

13 Public Finance, Finance, and Insurance

Consolidated Budget Balance

Consolidated public finance is an accounting method of tracking all revenues and expenditures of the central government to understand the national economy at a glance. The consolidated budget balance is calculated by subtracting the consolidated public expenditures over a year from the consolidated public revenues for the same year.

In 2016, the consolidated public finance balance increased by KRW 17,075 billion to record KRW 16,910 billion of deficit.

Tax Burden Ratio

The tax burden ratio measures the extent of the tax burden that the people of a given country must shoulder, and it is calculated by measuring the ratio of gross tax (national taxes plus local taxes) against current GDP. In 2016, the tax burden ratio to current GDP (excluding social insurance programs) was 19.4%, an increase of 0.9 percentage points from 2015.

Official Development Assistance

In 2016, the scale of Korea's official development assistance (ODA) increased by 17.3% from the previous year to record US$2,246 million, and the ratio of ODA to gross national income (GNI), which indicates the level of a country's ODA compared with its economic scale, recorded 0.16%, an increase by 0.02 percentage points from the previous year.

Bilateral assistance, in which assistance funds and goods are de-

Figure 13-1 Trend of Consolidated Central Government Balance

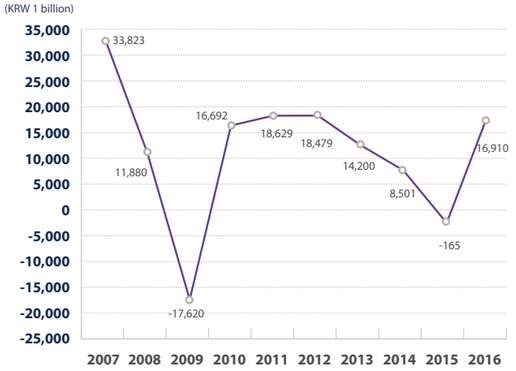
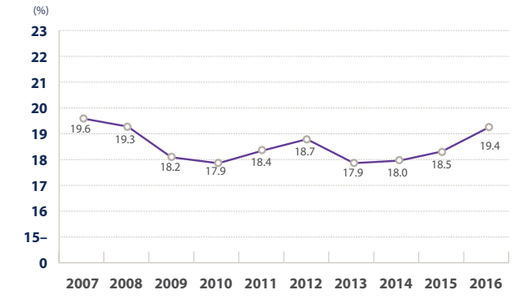


Figure 13-2 Tax Burden Ratio (to current GDP)



Source: Ministry of Strategy and Finance

Table 13-1 Consolidated Budget Balance

(KRW billion)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Consolidated budget balance	33,823	11,880	-17,620	16,692	18,629	18,479	14,200	8,501	-165	16,910
Total revenue	243,633	250,713	250,811	270,923	292,323	311,456	314,438	320,895	339,186	371,264
Total expenditure and net lending	209,810	238,834	268,431	254,231	273,694	292,977	300,238	312,394	339,351	354,354

Source: Ministry of Strategy and Finance

Table 13-2 Tax Receipt & Tax Burden Ratio

(KRW trillion, %)

		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Gross tax	Total	205.0	212.8	209.7	226.9	244.7	257.0	255.7	267.2	288.9	318.1
	National taxes	161.5	167.3	164.5	177.7	192.4	203.0	201.9	205.5	217.9	242.6
	Local taxes	43.5	45.5	45.2	49.2	52.3	53.9	53.8	61.7	71.0	75.5
Tax burden ratio (to GDP)	Total	19.6	19.3	18.2	17.9	18,4	18.7	17.9	18.0	18.5	19.4[p)]
	National taxes	15.5	15.1	14.3	14.0	14.4	14.7	14.1	13.8	13.9	14.8[p)]
	Local taxes	4.2	4.1	3.9	3.9	3.9	3.9	3.8	4.2	4.5	4.6[p)]

Source: Ministry of Strategy and Finance

livered directly to developing countries, increased 5.4% year on year to US$1,548 million; multilateral assistance, which is given through international organizations, increased by 56.2% year on year to US$698 million.

Money Supply

Monetary policy is an indirect method of controlling a country's economy by adjusting the money supply or interest rates, which affects the country's national income. The primary methods include open-market operations, rediscount policies, and so on. In such cases, an indicator for management of the money supply is necessary and base money can be used for such purpose.

Base money refers to cash held in the private sector, vault cash held by private banks, and private banks' deposits at a central bank. Narrow money (M1), which refers to the general money supply, is a combination of cash currency, demand deposits, and cash-management time and savings deposits. When financial instruments with maturities of less than two years, such as installment deposits and savings, are included in the previously mentioned combination, they are called broad money (M2). Broad money, when added to other types of deposits received by commercial banks and nonbank financial institutions, constitutes financial institutions' liquidity (Lf).

In terms of the scale of the money supply in 2017, the value of base money increased by 8.7% to reach KRW 155,881 billion, and M1 increased by 6.8% year on year. M2 increased by 5.1%, and Lf increased by 6.6% from the previous year.

Table 13-3 Official Development Assistance (based on Net Expenditures)

(USD million)

	Total ODA			ODA/GNI[1](%)
		Bilateral ODA	Multilateral ODA	
1995	116	71	45	0.02
2000	212	131	81	0.04
2005	752	463	289	0.10
2006	455	376	79	0.05
2007	696	491	206	0.07
2008	802	539	263	0.09
2009	816	581	235	0.10
2010	1,174	901	273	0.12
2011	1,325	990	335	0.12
2012	1,597	1,183	414	0.14
2013	1,755	1,310	446	0.13
2014	1,857	1,396	461	0.13
2015	1,915	1,469	447	0.14
2016[p)]	2,246	1,548	698	0.16
Year-on-year increase (%)	17.3	5.4	56.2	-

Note: Based on nominal figures
Source: The Export and Import Bank of Korea, Economic Development Cooperation Fund, *ODA in Numbers*

Table 13-4 Money Supply

(KRW billion)

	Bank notes and coins in circulation	Base money	Narrow money (M1)	Broad money (M2)	Financial institutions' liquidity (Lf)
2005	26,135.8	43,249.0	332,344.9	1,021,448.7	1,391,559.6
2009	37,346.2	67,779.1	389,394.5	1,566,850.0	2,018,785.0
2010	43,307.2	74,545.7	427,791.6	1,660,530.0	2,137,197.9
2011	48,657.6	80,055.9	442,077.5	1,751,458.4	2,277,679.0
2012	54,334.4	88,342.0	470,010.6	1,835,641.6	2,456,120.5
2013	63,365.9	104,262.0	515,643.4	1,920,795.0	2,615,093.5
2014	74,944.8	116,793.7	585,822.6	2,077,234.0	2,841,785.1
2015	86,757.1	131,438.8	708,452.9	2,247,375.0	3,098,929.4
2016	97,382.3	143,435.3	795,531.1	2,407,459.1	3,344,919.6
2017	107,907.6	155,881.0	849,862.4	2,530,353.6	3,565,196.8
Year-on-year increase (%)	10.8	8.7	6.8	5.1	6.6

Source: Bank of Korea

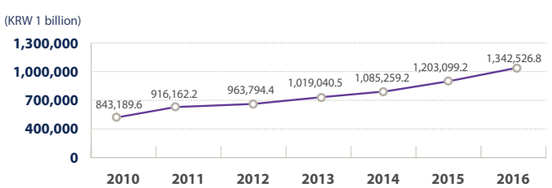
Table 13-5 Credit to Households

(KRW billion)

	2010	2011	2012	2013	2014	2015	2016[P)]	Year-on-year increase (%p)
Credit to households	843,189.6	916,162.2	963,794.4	1,021,357.6	1,085,259.2	1,203,099.2	1,342,526.8	11.6
Loans to households	793,778.9	861,387.9	905,944.1	962,896.8	1,025,076.2	1,137,953.1	1,269,808.2	11.6
Merchandise credit	49,410.8	54,774.3	57,850.3	58,460.8	60,183.0	65,146.1	72,718.7	11.6

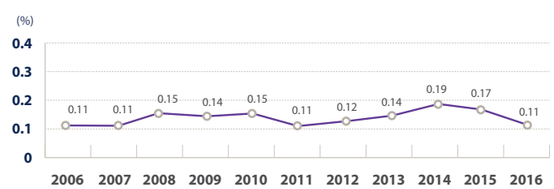
Source: Bank of Korea, *Monthly Statistical Bulletin*

Figure 13-3 Credit to Households



Source: Bank of Korea, *Monthly Statistical Bulletin*

Figure 13-4 Dishonored Checks and Bills Ratio



Source: Bank of Korea, *Regional Economic Statistics*

Credit to Households

Total credit to households as of the end of 2016 recorded KRW 1,342,526.8 billion, an increase of KRW 139,427.6 billion (11.6%) from the end of 2015. The rate increased by 0.7 percentage points from the rate at the end of 2015 (10.9%).

As of the end of 2016, outstanding loans to households recorded KRW 1,269,808.2 billion, an increase of 11.6% from the end of 2015, and outstanding merchandise credits increased by 11.6% compared with the end of 2015, to reach KRW 72,718.7 billion.

Dishonored Checks and Bills Ratio

One of the indicators of the current market-fund condition is the ratio of dishonored checks and bills. The ratio is calculated by dividing the dishonored bills and checks by the total amount of checks and bills that are due. A high ratio of dishonored checks and bills means that the financial situation on the market is not good.

The nationwide dishonored checks and bills ratio in 2016 was 0.11%, a decrease of 0.06 percentage points from 2015.

Transactions in Securities

As of the end of 2017, the Korea Composite Stock Price Index (KOSPI) recorded 2,467.5 points (p), an increase of 21.8% from 2,026.5p at the end of 2016.

Assets of Insurance Companies

In 2016, life insurance companies held KRW 782,162.1 billion worth of assets, a 7.9% increase from 2015 (KRW 724,901.4 billion). Nonlife insurance companies' assets in 2016 were KRW 252,005.3 billion, a 11.5% increase from 2015 (KRW 226,061.3 billion).

Table 13-6 Dishonored Checks and Bills Ratio[1)]

(%)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Nationwide dishonored checks and bills ratio	0.11	0.11	0.15	0.14	0.15	0.11	0.12	0.14	0.19	0.17	0.11

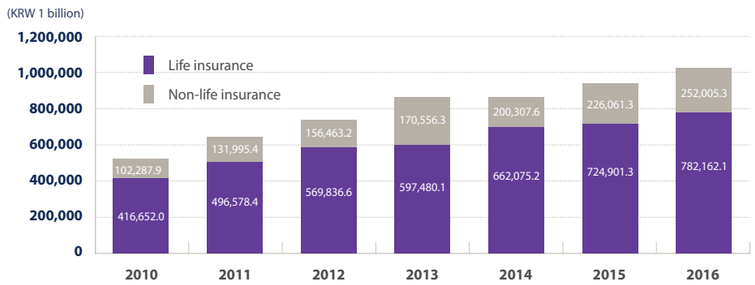
Note: Based on dishonored value
Source: Bank of Korea, *Regional Economic Statistics*

Table 13-7 Transactions in Securities

	Stocks		Bond market		KOSPI[1)] By end of the year
	Trading volume (million shares)	Trading value (KRW billion)	Trading volume (par value)	Traded value (KRW 1 billion)	
1995	7,656.0	142,914.1	1,353	1,430	882.9
2000	73,785.3	627,132.9	26,878	27,170	504.6
2004	92,850.8	555,795.1	377,443	384,069	895.9
2005	116,439.7	786,257.9	366,590	363,799	1,379.4
2006	68,936.8	848,489.6	295,450	294,933	1,434.5
2007	89,506.1	1,362,877.1	355,828	351,395	1,897.1
2008	88,149.1	1,287,164.8	376,373	374,007	1,124.5
2009	122,871.3	1,466,274.8	504,382	510,194	1,682.8
2010	95,595.7	1,410,561.8	584,268	585,206	2,051.0
2011	87,732.4	1,702,060.3	815,152	824,827	1,825.7
2012	120,646.9	1,196,263.4	1,351,281	1,376,365	1,997.1
2013	81,096.4	986,375.3	1,312,827	1,321,989	2,011.3
2014	68,130.1	975,977.1	1,373,214	1,394,893	1,915.6
2015	112,903.4	1,327,229.9	1,762,425	1,792,233	1,961.3
2016	92,680.0	1,112,668.7	3,200,333	3,245,004	2,026.5
2017	82,731.1	1,294,159.8	2,430,466	2,410,549	2,467.5
Year-on-year increase (%)	-10.7	16.3	-24.1	-25.7	21.8

Note: 1) January 4, 1980 = 100
Source: Korea Exchange

Figure 13-5 Assets of Insurance Companies



Source: The Financial Supervisory Service, *Monthly Financial Statistics Bulletin*

Table 13-8 Assets of Insurance Companies[1)]

(KRW billion)

	2010	2011	2012	2013	2014	2015	2016	Year-on-year increase (%p)
Total	518,939.9	628,573.8	726,299.8	768,036.4	862,382.8	950,962.6	1,034,167.4	8.7
Life insurance	416,652.0	496,578.4	569,836.6	597,480.1	662,075.2	724,901.4	782,162.1	7.9
Non-life insurance	102,287.9	131,995.4	156,463.2	170,556.3	200,307.6	226,061.3	252,005.3	11.5

Note: Based on a fiscal year from January 1 to December 31. Before 2013, standard fiscal year from April 1 to March 31 next year was applied. For 2013, the fiscal year was from April 1 to December 31.
Source: The Financial Supervisory Service, *Monthly Financial Statistics Bulletin*

14 Trade and International Balance of Payments

Trade Volume

The total trade volume in 2017 recorded US$1,052,170 million, an increase of 16.7% year on year. The value of exports recorded US$573,690 million, a 15.8% increase from the previous year, and the value of imports recorded US$478,480 million, a 17.8% increase from the previous year. The surplus in trade account in 2017 was US$95,220 million, a US$5,990 million increase from the previous year.

Exports and Imports by Country

When looking at exports and imports by country in 2017, exports to China accounted for the greatest proportion of the total at US$142,100 million. Imports from China also accounted for the greatest proportion as well, at US$97,900 million.

China was Korea's top export destination, followed by the United States, Vietnam, Hong Kong, and Japan. The largest proportions of imports, after China, came from Japan, the United States, Germany, and Saudi Arabia.

Table 14-1 Trade Volume

(USD100 million)

	Total trade volume	Export volume	Import volume	Export - import
2000	3,327.5	1,722.7	1,604.8	117.9
2005	5,456.6	2,844.2	2,612.4	231.8
2010	8,916.0	4,663.8	4,252.1	411.7
2011	10,796.3	5,552.1	5,244.1	308.0
2012	10,674.5	5,478.7	5,195.8	282.9
2013	10,752.2	5,596.3	5,155.9	440.5
2014	10,981.8	5,726.6	5,255.1	471.5
2015	9,632.6	5,267.6	4,365.0	902.6
2016	9,016.2	4,954.3	4,061.9	892.3
2017	10,521.7	5,736.9	4,784.8	952.2
Year-on-year increase (%)	16.7	15.8	17.8	-

Source: Korea International Trade Association

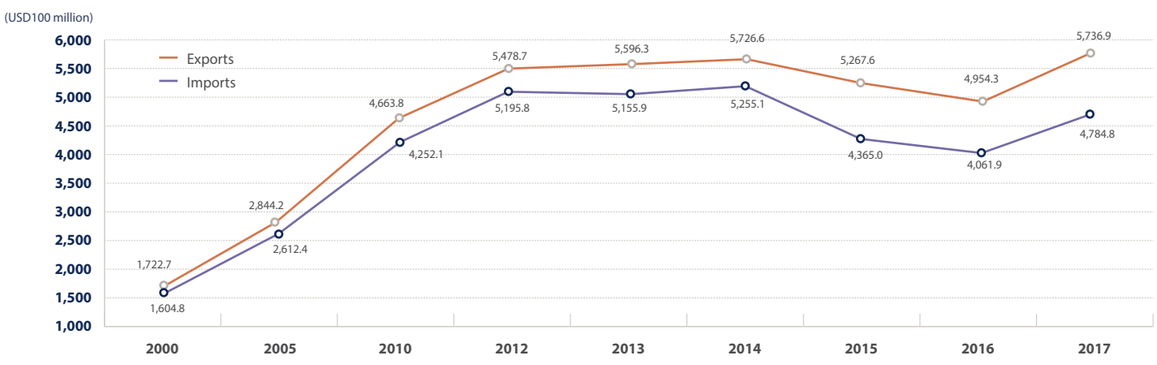
Table 14-2 Exports and Imports by Country (2017)[1)]

(USD100 million)

Ranking	Country	Exports	Ranking	Country	Imports
	Total	5,737		Total	4,785
1	China	1,421	1	China	979
2	U.S.A.	686	2	Japan	551
3	Vietnam	478	3	U.S.A.	507
4	Hong Kong	391	4	Germany	197
5	Japan	268	5	Saudi Arabia	196
6	Australia	199	6	Australia	192
7	India	151	7	Taiwan	181
8	Taiwan	149	8	Vietnam	162
9	Singapore	117	9	Russia	120
10	Mexico	109	10	Qatar	113

Note: Excludes countries ranked lower than 10th place
Source: Korea International Trade Association

Figure 14-1 Trade Volume



Source: Korea International Trade Association

Balance of International Payments

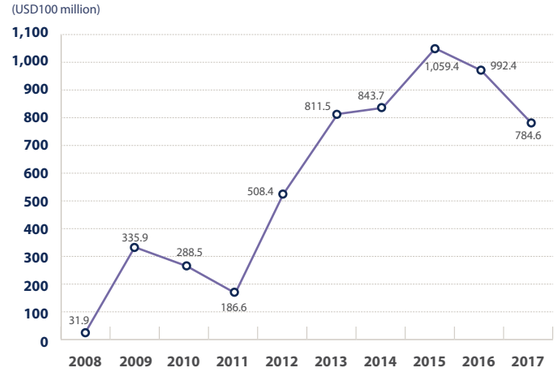
The current account surplus for 2017 showed a year-on-year decrease of US$20,780 million, having declined from US$99,240 million to US$78,460 million.

The goods account recorded a surplus of US$119,890 million, continuing the previous year's trend, while the service balance recorded a deficit of US$34,470 million, also continuing the previous year's trend.

Foreign Financial Assets and External Debts

At the end of 2017, Korea's foreign financial assets stood at US$1,453,690 million, a 16.8% increase from the previous year,

Figure 14-2 Current Account Balance



Source: Bank of Korea

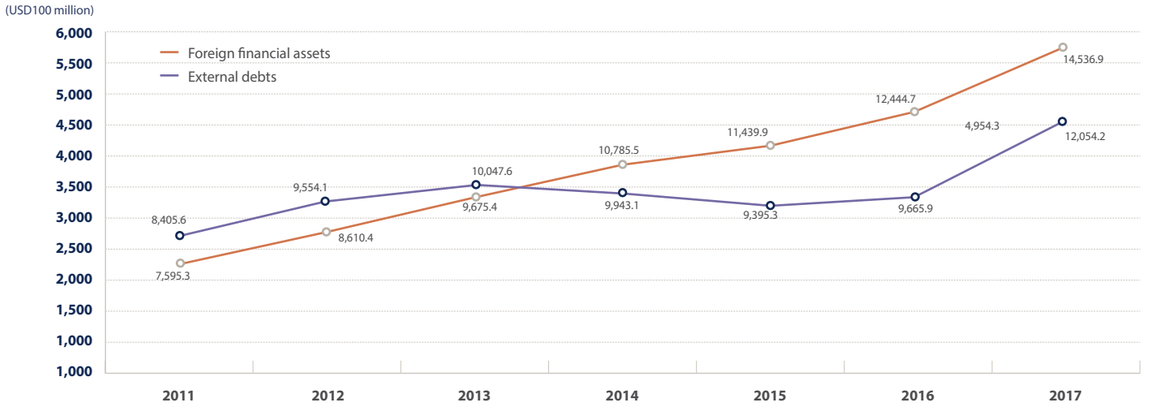
Table 14-3 Balance of Payments

(USD100 million)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017[p)]
Current account balance	31.9	335.9	288.5	186.6	508.4	811.5	843.7	1,059.4	992.4	784.6
Goods balance	122.0	478.1	479.2	290.9	494.1	827.8	888.9	1,222.7	1,189.0	1,198.9
Service balance	-65.4	-95.9	-142.4	-122.8	-52.1	-65.0	-36.8	-149.2	-177.4	-344.7
Income balance	-12.0	-24.4	4.9	65.6	121.2	90.6	41.5	35.7	38.5	1.2
Transfer balance	-12.7	-21.9	-53.2	-47.2	-54.7	-41.9	-49.8	-49.9	-57.7	-70.8
Capital balance	26.4	-69.6	-63.2	-112.0	-41.7	-27.0	-8.9	-60.2	-0.5	-0.3
Financial balance[1)]	-65.9	271.7	231.9	243.2	515.8	801.0	893.3	1,063.0	1,025.7	871.0

Note: Net assets (+) for increase in assets/debts, (-) for decrease in assets/debts
Source: Bank of Korea

Figure 14-3 Foreign Financial Assets and External Debts



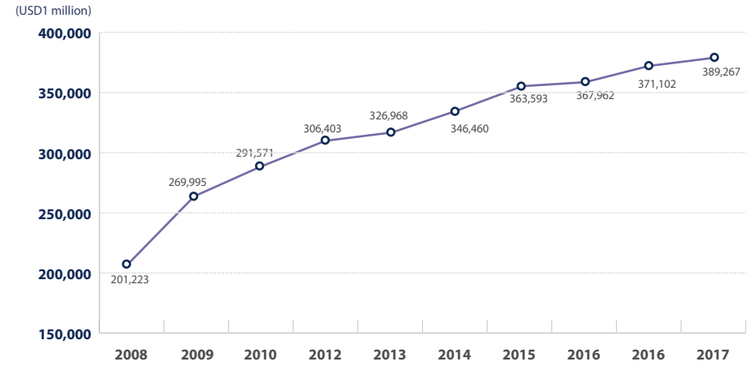
Source: Bank of Korea, *Monthly Statistical Bulletin*

and the volume of external debts was US$1,205,420 million, an increase of 24.7% year on year.

Foreign Reserves

At the end of 2017, Korea's foreign reserves recorded US$389,267 million, an increase of US$18,165 million from US$371,102 million at the end of the previous year.

Figure 14-4 Foreign Reserves



Source: Bank of Korea

Table 14-4 Foreign Financial Assets and External Debts

(USD100 million)

	2011	2012	2013	2014	2015	2016	2017[p]	Year-on-year increase (%)
Foreign financial assets (A)	7,595.3	8,610.4	9,675.4	10,785.5	11,439.9	12,444.7	14,536.9	16.8
External debts (B)	8,405.6	9,554.1	10,047.6	9,943.8	9,395.3	9,665.9	12,054.2	24.7
Net international investment position (A-B)	-810.3	-943.7	-372.2	842.4	2,044.6	2,778.8	2,482.7	-

Source: Bank of Korea, *Monthly Statistical Bulletin*

Table 14-5 Foreign Reserves

(USD100 million)

	Total	Gold	Special drawing rights	IMF reserve position[1]	Foreign currency reserves
2005	210,391	74	44	306	209,968
2007	262,224	74	69	311	261,771
2008	201,223	76	86	583	200,479
2009	269,995	79	3,732	982	265,202
2010	291,571	80	3,540	1,025	286,926
2011	306,403	2,167	3,447	2,556	298,233
2012	326,968	3,761	3,526	2,784	316,898
2013	346,460	4,795	3,490	2,528	335,648
2014	363,593	4,795	3,281	1,917	353,601
2015	367,962	4,795	3,241	1,412	358,514
2016	371,102	4,795	2,878	1,728	361,701
2017	389,267	4,795	3,374	1,621	379,477
Year-on-year increase (%)	4.9	0.0	17.2	-6.1	4.9

Note: Assets that can be drawn from the IMF on demand
Source: Bank of Korea

15 Science and Culture

Research and Development Investment

The total research and development (R&D) expenditures of Korea in 2015 amounted to KRW 65,959 billion, an increase by KRW 2,225 billion from the previous year (3.5%). The proportion of R&D investment in GDP was 4.23%, representing a decrease of 0.06 percentage point from the previous year (4.29%).

In 2015, the amount of R&D expenditures from the government and public financial resources was KRW 16,293.5 billion. The ratio of R&D expenditures financed by the government/public sector to R&D expenditures financed by the private/foreign sectors was 25:75. By the R&D stage, the expenditures for basic R&D accounted for 17.2%; applied R&D, 20.8%; and development R&D, 61.9%.

Research and Development Manpower

In total R&D manpower in 2015, the number of workers engaged in R&D was 619,907, an increase of 2.4% year on year. Among that number, there were 453,262 researchers, an increase of 3.6% from the previous year.

By sector, the number of researchers working for public research institutes increased by the greatest margin of 6.7%. This was followed by private companies (4.3%) and universities and colleges (0.6%). Meanwhile, the proportion of doctorate degree holders against total researchers was 21.7%, an increase of 0.6 percentage point from the previous year.

Table 15-1 R&D Investment

(KRW 1 billion, %))

	R&D expenditures	By source			By research stage			R&D expenditure to GDP
		Government/Public	Private	Foreign	Basic	Applied	Development	
2000	13,849	27.6	72.4	0.06	12.6	24.3	63.1	2.18
2005	24,155	24.3	75.0	0.71	15.3	20.8	63.8	2.63
2010	43,855	28.0	71.8	0.22	18.2	19.9	61.8	3.47
2011	49,890	26.1	73.7	0.22	18.1	20.3	61.7	3.74
2012	55,450	24.9	74.7	0.34	18.3	19.1	62.6	4.03
2013	59,301	24.0	75.7	0.30	18.0	19.1	62.9	4.15
2014	63,734	24.0	75.3	0.71	17.6	18.9	63.4	4.29
2015	65,959	24.7	74.5	0.75	17.2	20.8	61.9	4.23
Year-on-year increase (%)	3.5	0.7%p	-0.8%p	0.04%p	-0.4%p	-1.9%p	-1.5%p	-0.06%p

Source: Ministry of Science and ICT, Korea Institute of Science and Technology Evaluation and Planning, *Survey of Research and Development in Korea*

Table 15-2 Research and Development Manpower

(People)

	Total personnel engaged in R&D activities	Researchers	Doctors (%)	Number of researchers by agent of R&D		
				Public research institutions	Universities and colleges	Business enterprises
1995	201,661	128,315	27.4	15,007	44,683	68,625
2000	237,232	159,973	28.8	13,913	51,727	94,333
2005	335,428	234,702	24.7	15,501	64,895	154,306
2010	500,124	345,912	23.5	26,235	93,509	226,168
2011	531,131	375,176	22.6	28,800	95,750	250,626
2012	562,601	401,724	21.8	28,822	96,916	275,986
2013	569,333	410,333	21.7	31,140	97,319	281,874
2014	605,604	437,447	21.1	33,322	99,317	304,808
2015	619,907	453,262	21.7	35,550	99,870	317,842
Year-on-year increase (%)	2.4	3.6	0.6%p	6.7	0.6	4.3

Source: Ministry of Science and ICT, Korea Institute of Science and Technology Evaluation and Planning, *Survey of Research and Development in Korea*

Tourism Balance

In 2017, the number of foreign tourists visiting Korea recorded 13,336,000, a 22.7% decrease year on year, due to factors including China's ban on its people's travel to Korea. On the contrary, the number of Korean departures in 2017 increased by 18.4%, to 26,496,000. The increase was attributable to continuing popularity of overseas travel among the Korean people, longer-than-usual Chuseok holidays, and an increase in the number of substitute holidays.

In 2017, the tourism balance recorded a US$13,700 million deficit. In detail, tourism receipts decreased by 22.5% year on year to record US$13,300 million, while tourism expenditures rose by 14.3% to reach US$27,070 million.



Incheon Airport Robot Airstar

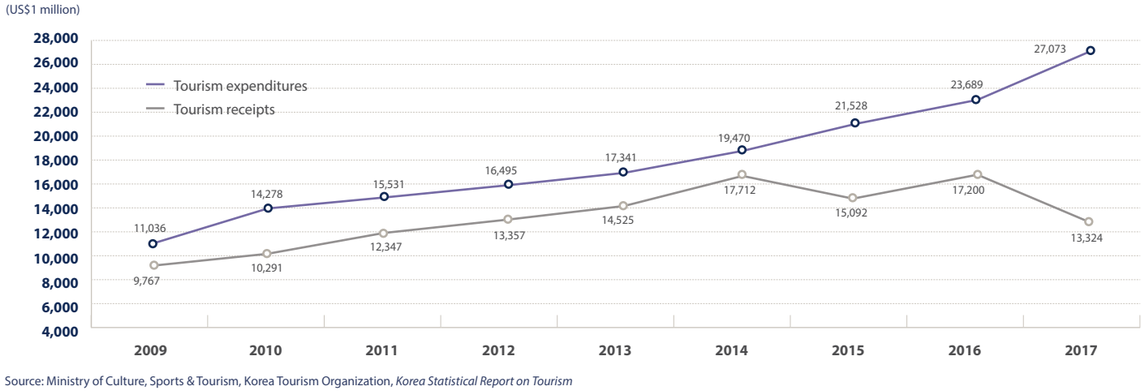
Table 15-3 Tourism Balance

(1,000 people, US$1 million)

	Visitor arrivals	Korean[1] departures	Margin (Korean departures–visitor arrivals)	Tourism balance[2] (receipts – expenditures)	Receipts	Expenditures
2009	7,818	9,494	1,676	-1,269	9,767	11,036
2010	8,798	12,488	3,690	-3,987	10,291	14,278
2011	9,795	12,694	2,899	-3,184	12,347	15,531
2012	11,140	13,737	2,597	-3,138	13,357	16,495
2013	12,176	14,846	2,670	-2,816	14,525	17,341
2014	14,202	16,081	1,879	-1,758	17,712	19,470
2015	13,232	19,310	6,078	-6,436	15,092	21,528
2016	17,242	22,383	5,141	-6,489	17,200	23,689
2017[p]	13,336	26,496	13,160	-13,749	13,324	27,073
Year-on-year increase (%)	-22.7	18.4	-	-	-22.5	14.3

Note: 1) Including crew members
2) Excluding expense of students studying overseas
Source: Ministry of Culture, Sports & Tourism, Korea Tourism Organization, *Korea Statistical Report on Tourism*

Figure 15-1 Tourism Balance



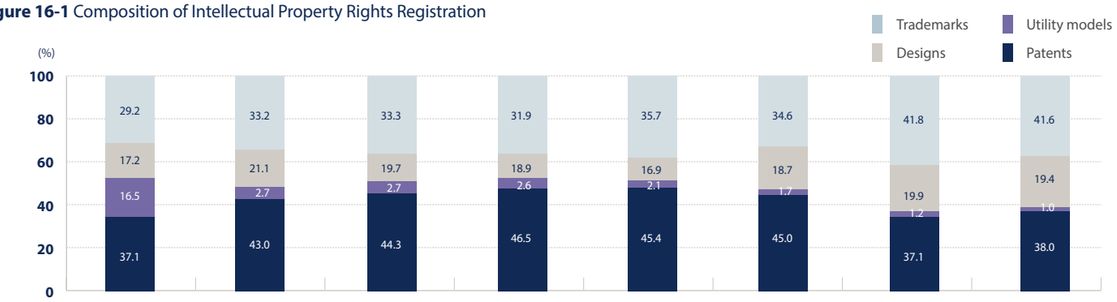
Source: Ministry of Culture, Sports & Tourism, Korea Tourism Organization, *Korea Statistical Report on Tourism*

16 Administration

Registration of Intellectual Property Rights

In 2016, a total of 286,586 intellectual property rights were registered, an increase of 4.4% from the previous year. In terms of composition of registered intellectual property rights, trademark registrations took up 41.6%, followed by patent registrations, 38.0%; design registration, 19.4%; and utility model registrations, 1.0%.

Figure 16-1 Composition of Intellectual Property Rights Registration



Source: Korea Intellectual Property Office, *Intellectual Property Statistics Yearbook*

Table 16-1 Intellectual Property Rights Registration

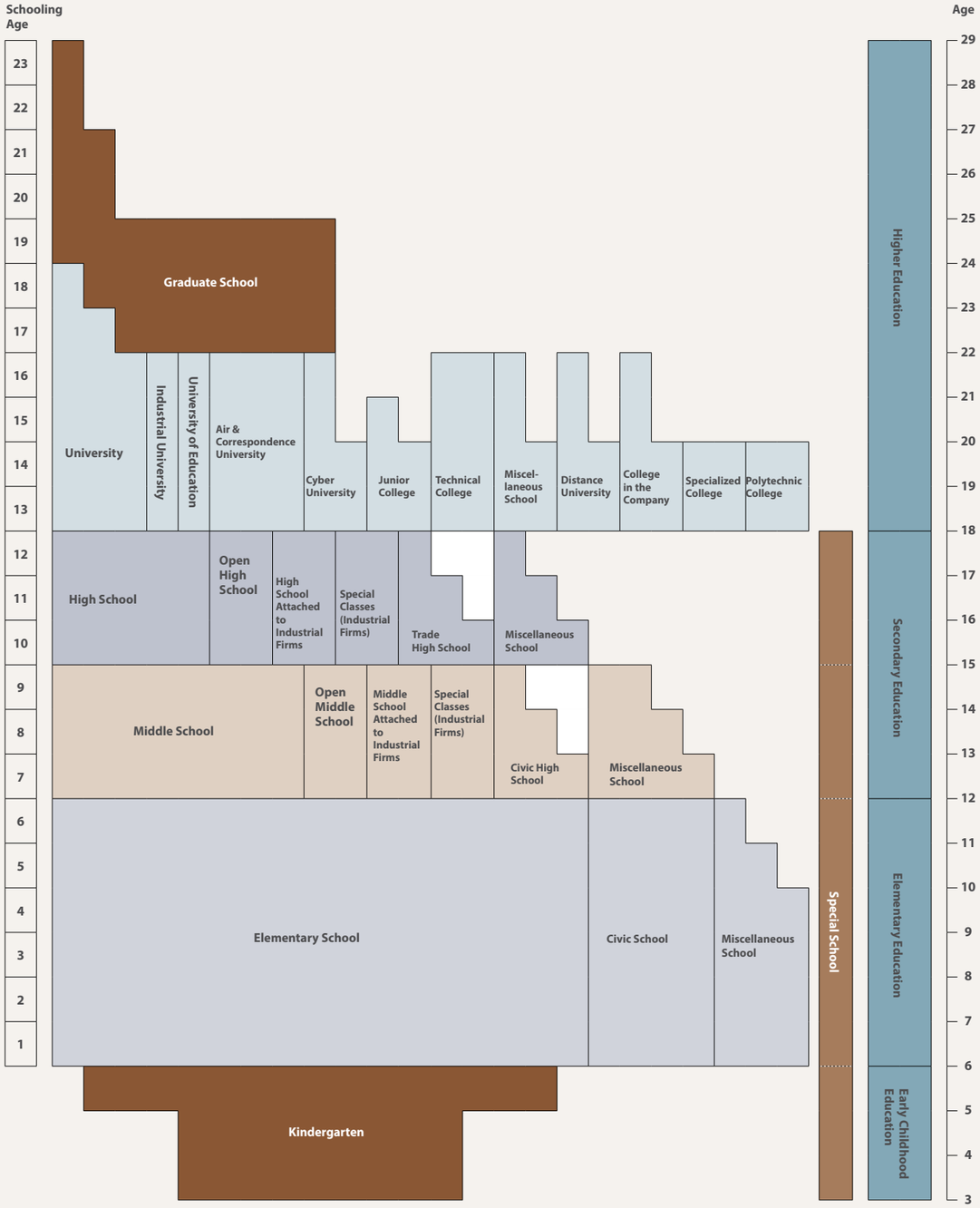
(EA)

	Total	Patents	Utility models	Designs	Trademarks
2005	198,094	73,512	32,716	33,993	57,873
2010	159,977	68,843	4,301	33,697	53,136
2011	214,013	94,720	5,853	42,185	71,255
2012	243,869	113,467	6,353	46,146	77,903
2013	280,691	127,330	5,959	47,308	100,094
2014	288,542	129,786	4,955	54,010	99,791
2015	274,424	101,873	3,253	54,551	114,747
2016	286,586	108,875	2,854	55,602	119,255
Composition (%)	100.0	38.0	1.0	19.4	41.6

Source: Korea Intellectual Property Office, *Intellectual Property Statistics Yearbook*

Statistics on Korean Education

1. School System



All statistics in this article refer to *2017 Brief Statistics on Korean Education.*



High school students in science lab



Smart learning

2. Schools, Students, and Teachers (2017)

(Schools, People)

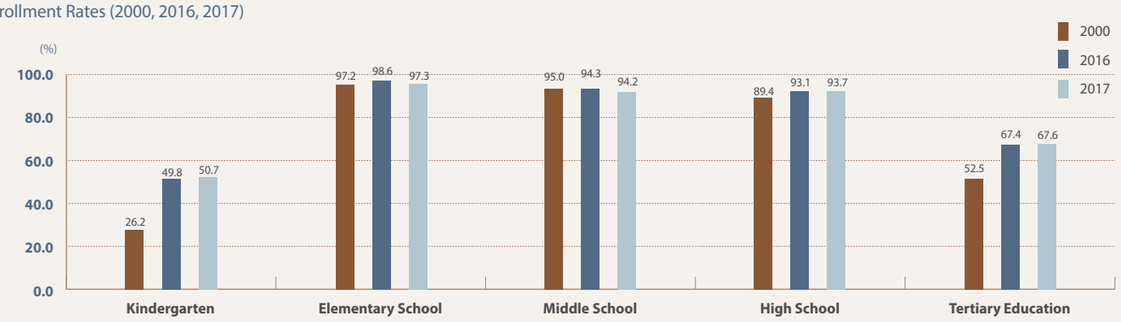
Classification		No. of Schools	No. of Students		No. of Teachers	
			Total	Female	Total	Female
Kindergarten, Elementary, Secondary School Subtotal		20,938	6,468,629	3,119,343	492,187	346,755
Kindergarten		9,029	694,631	342,070	53,808	52,922
Elementary school		6,040	2,674,227	1,294,670	184,358	142,064
Middle School Course	Subtotal	3,236	1,385,357	664,339	109,136	75,619
	Middle Schools	3,213	1,381,334	661,045	109,130	75,616
	Civic High Schools	3	53	35	6	3
	Air & Correspondence Middle School	20	3,970	3,259	-	-
High School Course	Subtotal	2,409	1,680,872	804,734	134,840	69,365
	High School	2,360	1,669,699	797,705	134,754	69,339
	General High School	1,556	1,193,562	595,811	91,064	48,454
	Special-Purpose High School	155	67,960	34,932	7,674	3,459
	Specialized High School	491	274,281	118,237	25,853	12,141
	Autonomous High School	158	133,896	48,725	10,163	5,285
	Trade High School	7	795	237	86	26
	Air & Correspondence High School	42	10,378	6,792	-	-
Special school		173	25,670	8,791	8,943	6,100
Miscellaneous school		51	7,872	4,739	1,102	685
Special classes requested by companies		[4]	[156]	[10]	[45]	-
Tertiary Education Subtotal		430	3,437,309	1,500,027	90,902	22,879
Undergraduate Course	Subtotal	226	2,384,090	1,045,562	68,876	16,029
	University	189	2,050,619	839,929	66,795	15,323
	Univ. of Education	10	15,839	10,988	841	231
	Industrial University	2	25,343	7,345	375	106
	Technical College	1	96	33	-	-
	Air&Corr. University	1	171,692	116,906	152	49
	Miscellaneous School	2	3,456	2,082	148	50
	Distance University	1	1,063	530	9	4
	Cyber University	17	115,695	67,645	555	266
	College in the Company	3	287	104	1	-
Junior College Course	Subtotal	158	726,904	292,457	13,999	5,167
	Junior College	138	677,721	278,246	12,804	4,906
	Technical College	-	1	-	-	-
	Miscellaneous School	-	-	-	-	-
	Distance University	1	1,848	1,245	14	6
	Cyber University	2	5,615	3,577	38	15
	College in the Company	5	318	49	3	-
	Specialized College	3	12,610	7,412	257	161
	Polytechnic College	9	28,791	1,928	883	79
Graduate Course	Subtotal	46	326,315	162,008	8,027	1,683
	Graduate School College	46	10,161	5,081	1,480	263
	Graduate School	[1,153]	316,154	156,927	6,547	1,420

Note 1) Figures in [ ] are not included in total
2) Special Classes by the Request of Industrial Firms survey only the total number of teachers without distinction of sex

3. Enrollment, Advancement, Employment and Discontinuation Rates

A. Enrollment

Enrollment Rates (2000, 2016, 2017)



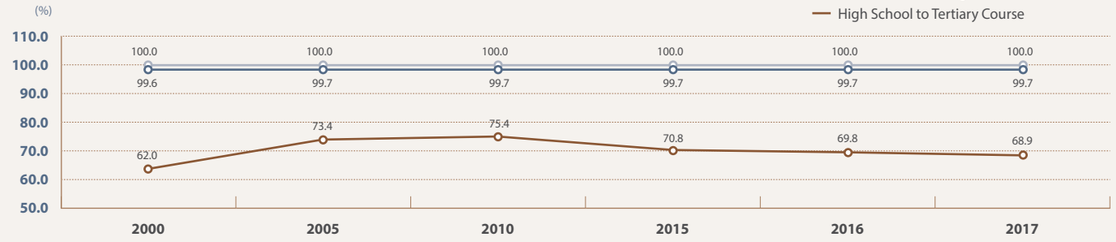
(%)

Classification	2000	2005	2010	2015	2016	2017
Kindergarten	26.2	31.1	40.3	48.9	49.8	50.7
Elementary School	97.2	98.8	99.1	99.1	98.6	97.3
Middle School	95.0	94.3	96.5	95.3	94.3	94.2
High School	89.4	92.1	91.7	92.5	93.1	93.7
Tertiary Education	52.5	66.1	69.3	67.5	67.4	67.6

Note 1) Enrollment Rates(%) = (The number of enrolled students of appropriate age /The number of people of appropriate age)×100
2) The basis for enrollment ages is from 'Population Projections for Korea', Korea National Statistical Office. Figures up to 2015 are fixed and figures from 2016 are estimated.
3) Age of enrollment : 3-5 for Kindergarten, 6-11 for Elementary school, 12-14 for Middle school, 15-17 for High school, and 18-21 for Tertiary education institutions
Source: Statistics Korea(http://kosis.kr), Population Projections and Summary indicators for Korea(date and year of reference is 1st of December, 2015)

B. Advancement Rates

Advancement Rates by Level of Education by Year



(%)

Classification		2000	2005	2010	2015	2016	2017
Elementary School to Middle School Course		100.0	100.0	100.0	100.0	100.0	100.0
Middle School to High School Course		99.6	99.7	99.7	99.7	99.7	99.7
High School to Tertiary Courses	Total	62.0* (68.0)	73.4* (82.1)	75.4* (78.9)	70.8	69.8	68.9
	General High School	-	-	-	78.9	78.0	77.3
	Special-purpose High school	-	-	-	58.4	55.9	56.9
	Specialized High School	-	-	-	36.1	35.0	32.8
	Autonomous High School	-	-	-	75.8	74.9	73.5
	General High School	(83.9)	(88.3)	(81.5)	-	-	-
	Vocational High School	(42.0)	(67.6)	(71.1)	-	-	-

Note 1) Advancement Rates(%) = (Advanced among graduates in a given year/Graduates in a given year)×100
2) Advancement Rates are rounded off to two decimal places, 100.0% of Advancement Rates from Elementary School to Middle School Course is approximate value
3) Middle school course : middle schools and other schools equivalent to middle school
4) High school course : high schools and other schools equivalent to high school
5) High school graduates : Students who have graduated after 2014 are graduates of the amended high school types (in 2011).
6) Tertiary course advancement includes junior college, university, industrial university, university of education, air&corr.university, polytechnic college and miscellaneous school(from 2005, outbound internationally mobile students are included)
7) Advanced students (High School→Tertiary Courses): Advanced students into tertiary courses as of 1st April of the reference year (Source: Pre-primary, Primary and Secondary Education Statistics)
* : High school graduates among new entrants into tertiary courses as of March of the reference year (Source: Higher Education Statistics)
( ) : Advanced students into tertiary courses of the reference year (Source: Pre-primary, Primary and Secondary Education Statistics)

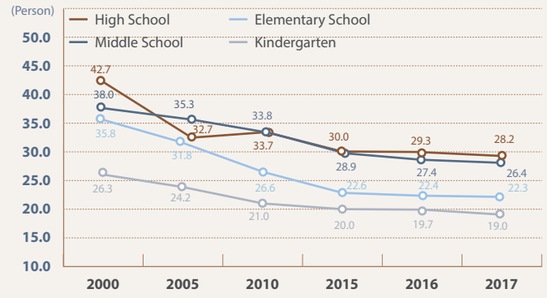
4. Major Indicators

A. Number of Students per Class by Year

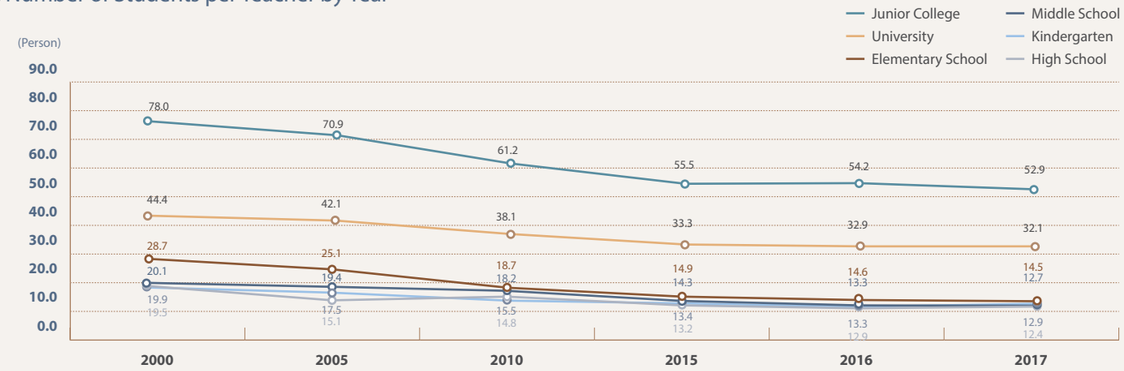
(Person)

Classification		2000	2005	2010	2015	2016	2017
Kindergarten		26.3	24.2	21.0	20.0	19.7	19.0
Elementary School		35.8	31.8	26.6	22.6	22.4	22.3
Middle School		38.0	35.3	33.8	28.9	27.4	26.4
High school	Total	42.7	32.7	33.7	30.0	29.3	28.2
	General High School	-	-	-	31.3	30.6	29.3
	Special-purpose High School	-	-	-	24.4	24.0	23.7
	Specialized High School	-	-	-	26.4	25.7	24.7
	Autonomous High School	-	-	-	30.3	30.2	29.6
	General High School	44.1	33.9	35.5	-	-	-
	Vocational High School	40.3	30.0	29.1	-	-	-

Note: The number of students per class = Number of enrolled students / Number of classes



B. Number of Students per Teacher by Year



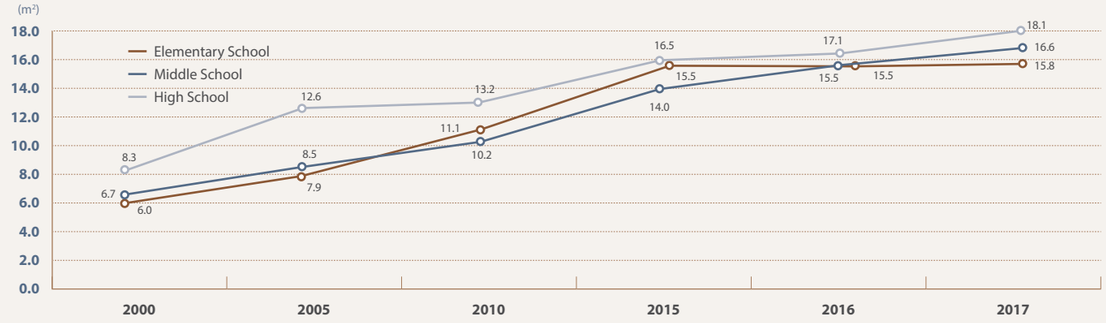
(Person)

Classification		2000	2005	2010	2015	2016	2017
Kindergarten		19.5	17.5	14.8	13.4	13.3	12.9
Elementary School		28.7	25.1	18.7	14.9	14.6	14.5
Middle School		20.1	19.4	18.2	14.3	13.3	12.7
High School	Total	19.9	15.1	15.5	13.2	12.9	12.4
	General High School	-	-	-	14.1	13.7	13.1
	Special-Purpose High School	-	-	-	9.3	9.1	8.9
	Specialized High School	-	-	-	11.4	11.0	10.6
	Autonomous High School	-	-	-	13.7	13.5	13.2
	General High School	20.9	15.9	16.5	-	-	-
	Vocational High School	18.2	13.5	13.1	-	-	-
Tertiary Education	Total	58.4	53.1	46.9	40.0	38.9	37.8
		(39.9)	(36.1)	(32.7)	(28.7)	(28.0)	(27.3)
	University	44.4	42.1	38.1	33.3	32.9	32.1
		(31.8)	(29.5)	(27.0)	(24.6)	(24.2)	(23.6)
	Junior College	78.0	70.9	61.2	55.5	54.2	52.9
		(51.2)	(44.1)	(39.4)	(36.1)	(35.5)	(34.7)

Note 1) The number of Students per Teacher = Number of enrolled students / Number of teachers
2) Figures in ( ) for tertiary education institutions indicates a ratio of students who are enrolled for pertinent semester among students registered (including students on the leave of absence)
3) University includes Graduate school faculty and students

C. Building, School Grounds, and Gym Area per Student

Building Area per Student by Year



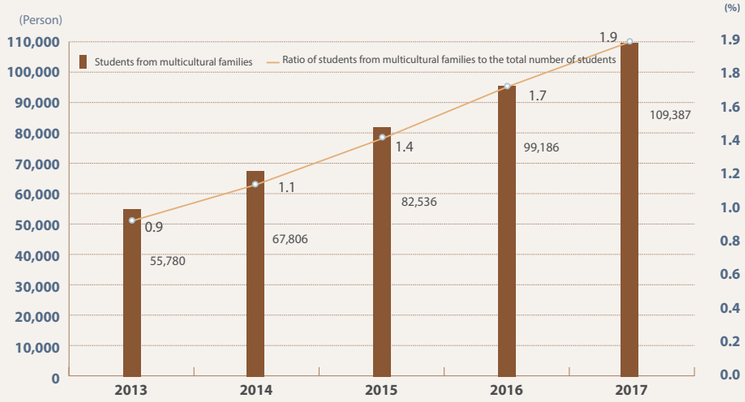
(m²)

Classification		2000	2005	2010	2015	2016	2017
Building Area	Elementary School	6.0	7.9	11.1	15.5	15.5	15.8
	Middle School	6.7	8.5	10.2	14.0	15.5	16.6
	High School	8.3	12.6	13.2	16.5	17.1	18.1
School Grounds Area	Elementary School	8.7	10.1	12.7	16.6	17.2	20.9
	Middle School	9.5	10.3	11.3	15.3	16.7	18.1
	High School	15.0	18.7	17.9	21.3	21.9	23.2
Gym Area	Elementary School	12.2	12.4	14.4	16.0	16.0	15.8
	Middle School	12.8	12.2	12.6	14.4	15.4	15.9
	High School	11.7	13.7	11.8	12.6	12.7	13.2

Note 1) Building area per student = Building area / Number of enrolled students
2) School ground area per student = School grounds area / Number of enrolled students
3) Gym area per student = Gym area / Number of enrolled students

5. Students from Multicultural Families

A. Students from Multicultural Family by Year





B. Students from Multicultural Families by Type/School Level (2017)

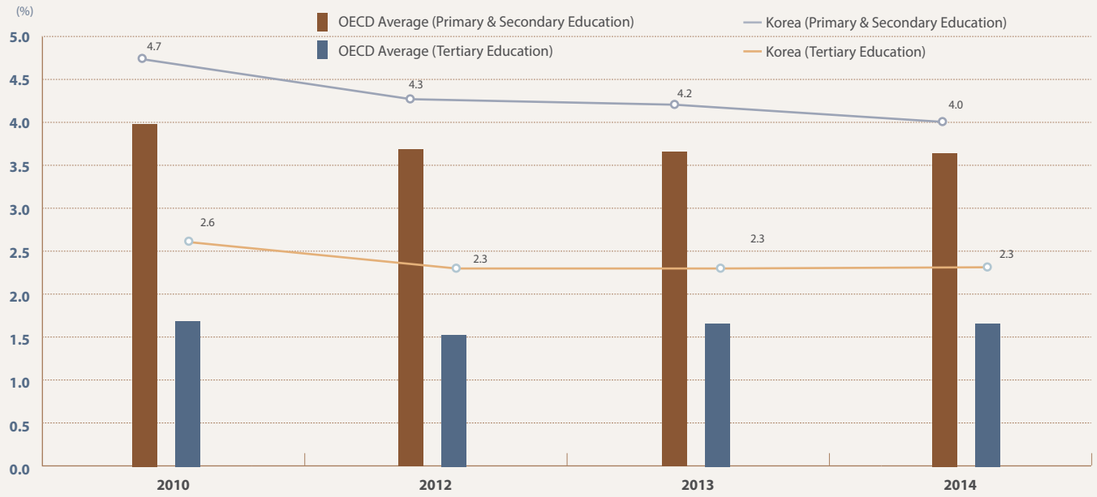
(Person)

Classification	Elementary School	Middle School	High School	Miscellaneous School	Total
Total	82,733	15,945	10,334	375	109,387
National Birth	68,610	12,265	8,335	104	89,314
Immigrated	4,843	1,722	1,063	164	7,792
Foreign	9,280	1,958	936	107	12,281

Note 1)Students from multicultural family = International marriage children (National birth + Immigrated) + Foreign
2) National birth : children born between a Korean and a foreign spouse
3) Immigrated : children born in a foreign country who has immigrated to Korea with International marriage parents
4) Foreign : children whose parents are foreigners

6. Expenditure on Educational Institutions as a Percentage of GDP

Trends in Expenditure on Educational Institutions as a Percentage of GDP by Year



(%)

Classification		Primary & Secondary Education			Tertiary Education		
		Total	Public Sources	Private Sources	Total	Public Sources	Private Sources
2000 (2003)	Korea	4.0	3.3	0.7	2.6	0.6	1.9
	OECD Average	3.6	3.4	0.3	1.3	1.0	0.3
2005 (2008)	Korea	4.3	3.4	0.9	2.4	0.6	1.8
	OECD Average	3.8	3.5	0.3	1.5	1.1	0.4
2010 (2013)	Korea	4.7	3.9	0.9	2.6	0.7	1.9
	OECD Average	4.0	3.7	0.3	1.7	1.1	0.5
2011 (2015)	Korea	4.3	3.8	0.5	2.3	0.8	1.5
	OECD Average	3.7	3.5	0.2	1.5	1.2	0.4
2012 (2016)	Korea	4.2	(3.7)*	(0.5)*	2.3	1.0	1.3
	OECD Average	3.7	*	*	1.6	1.1	0.5
2013 (2017)	Korea	4.0	3.5	0.5	2.3	1.0	1.2
	OECD Average	3.6	3.4	0.3	1.6	1.1	0.5

Note 1) Administrative agencies and undistributed programmes are pro-rated to each education level in EAG 2017. The figures of Korea for 2010 (2013), 2012 (2015) and 2013 (2016), however, are the data including pro-rated amounts, which is calculated by KEDI. (not published in EAG.)
2) Educational Institutions as a percentage of GDP = (Public Sources + Private Sources) / GDP × 100
3) Years in parentheses are the years of EAG (Education at a Glance) release
4) For the information of educational programmes for each educational level, refer to the introductory remarks
5) GDP of Korea is 522 trillion won in 2000, 811 trillion won in 2005, 1,173 trillion won in 2010, 1,377trillion won in 2012, 1,429 trillion won in 2013, 1,486 trillion won in 2014
6) * are unavailable because EAG does not provide corresponding figures. (Korea data for 2013 is calculated by KEDI.
Source: OECD (pertinent year), Education at a Glance: OECD Indicators

History of Korean Ceramics

Written by Namwon Jang (Ewha Womans University)

Introduction

Ceramics are born from the encounter between formless earth and water with an influence of fire. Most ceramic works do not indicate exactly when they were created, who made them, or where they were made, but their color, shape, size, and attributes make it possible to estimate the time and place of their production, as well as the material used. Such estimations can be made because ceramics are greatly influenced by natural conditions including the earth, water, and firewood used to make them, and they are utility wares that are continuously updated in accordance with the customs, lifestyles, culinary traditions, and social institutions of users. The elements and processes of the lives of people who use ceramics are the driving force for changing and improving the shape, size, thickness, weight, color, and quality of ceramics. People use ceramics to hold and carry foods or other items, to eat and drink, to spit foods out or dispose of, to support or cover other objects, or to appreciate as objets d'art and even adorn themselves. Whether intended or not, most ceramic works have their own purpose and use.

In the production of Korean ceramics, clay is generally used for earthenware and celadon, while kaolin (white earth) is used for white porcelain. As the ingredients of the earth used for different types of ceramics are different, the color of the each type of ceramics is rendered differently. Ceramics can be made with earth in its natural status, but refined (washed) earth is ideal for producing ceramics with a denser and smoother texture. In some cases, more than one type of earth is mixed together to achieve optimal proportions. The clay for ceramics must be viscous enough to be formed and shaped, and it must additionally be able to stand up to high temperatures as it goes through the process of firing in a kiln.

The most fundamental element for ceramics production in Korea, from prehistoric times up through today, is the selection of earth, the raw material for ceramics. Clay is used to build the body of ceramics. Some types of clay can be readily gathered in ordinary natural surroundings, while others can only be used for ceramics production after a complicated process including a rather difficult method of collection from the mountains, grinding, and refinement. Notably, kaolin, material used to create white porcelain, is collected only from specific mineral veins, so the process of its mining and refinement is more difficult than that of other ordinary types of clay.

For convenience, ceramics are categorized into clayware, earthenware, stoneware, porcelain, and so on, according to their density, whether they are glazed or not, the temperature of firing, and other qualities. In modern days, all these categories of ceramics exist together, but they appeared one after another throughout the long history of Korean ceramics.

Earthenware is relatively softer than other types of ceramics, as it is fired at a temperature between 700℃ and 900℃. Chronologically, some of the pottery made in the prehistoric times and the era of the Three Kingdoms of Korea falls into this category. Unglazed flowerpots, earthen coffins, and earthen roof tiles are the most typical examples. Clayware and earthenware were regarded as different concepts in Korea, but more recently, they have been lumped together under the category of "earthenware," as it is difficult to distinguish between the two with bare eyes.

Stoneware is fired at a temperature between 1,000℃ and 1,200℃. Scientific analysis of the hard earthenware produced in the Unified Silla Kingdom era and Goryeo celadon reveals they were fired at a temperature for firing stoneware, approximately 1,150–1,200℃.

Porcelain generally refers to ceramics fired at over 1,200℃. More precisely, porcelain is a completely hard ceramic fired at over 1,250–1,300℃ and glazed. White porcelain made of kaolin is the most famous example. Other typical examples include the white porcelain of the Chinese Yuan, Ming, and Qing dynasties, as well as the hard white porcelain of Korea's Joseon Dynasty, the hard white porcelain produced in the Arita region in Japan after the 17th century, and the hard white porcelain produced in Europe after the 18th century.

Earthenware and the Life and Death of Ancient Peoples

Earthenware is the very foundation for the ceramics used in people's everyday lives from the prehistoric times all the way up through the current age. Even though it is not as beautiful or lustrous as celadon or white porcelain, earthenware has always been there for the life and death of the Korean people, for eating, housing, funerals, and many more purposes. Earthenware played a role in every stage of people's life from birth to death, representing the human journey through the flow of life until death. In ancient societies, ancestral rites or ceremonies were hosted to achieve societal unity. Different types of earthenware were used for such rituals for diverse purposes.

1. Earthenware of the Neolithic Age

People began to live in settlements in earnest in the Neolithic Age. As agriculture gradually began in this age, earthenware was used for the purpose of storing foods or cooking. Many pieces of comb-pattern pottery, with surfaces decorated in thin comb-pattern lines and sharply pointed bottoms, were discovered at the Amsa-dong Prehistoric Settlement Site in Seoul, the most famous historic site of the Neolithic Age in Korea. The shape of Neolithic earthenware discovered on the Korean Peninsula differs between regions; comb-pattern pottery with pointed bottoms was used in the mid-west and southern regions of the peninsula, while earthenware with flat bottoms was used in the east coast area. Those diverse types of earthenware were used to store food ingredients or used directly on fires for cooking. In addition to the earthenware used practically in the daily lives of Neolithic people, there were also different types of earthenware items produced as grave goods. A huge earthenware jar thought to have been used to bury the body of a dead infant was discovered in the shell mound in Dongsam-dong, Busan. An earthenware coffin with fragments of cremated human bones inside it was discovered at a historic site in Sangchon-ri, Jinju, Gyeongsangnam-do. These show historic proof that large earthenware jars were used as coffins from as early as the Neolithic Age on the Korean Peninsula.

In consideration of the distribution of the historic sites in Korea where comb-pattern pottery was discovered and the geographical characteristics of the locations of discovery, it has been determined that they were used during the times when people lived by hunting and gathering, before the beginning of primitive agriculture. Comb-pattern pottery is also called "fish bone-patterned pottery" or "geometric-patterned pottery," as diverse combinations of straight-line geometric patterns were carved on the surface with sharp tools. The comb-pattern pottery of Korea is believed



©National Museum of Korea

Comb-pattern pottery

to have originated from the Siberian region, due to their form and the decoration techniques. In such a view, it is thought that Kammkeramik, which proliferated in Finland and Germany in northern Europe, spread toward the east and was introduced to Korea. It is estimated that it entered the Korean Peninsula through the northeastern coastal area of the peninsula and spread southward alongside the east coast, passing across the southern coast before ultimately reaching the western coastal region. However, the details of Korean comb-pattern pottery, including the manufacturing method and composition of patterns, differ from those of Kammkeramik. In addition, radiocarbon dating has estimated the age of Korean comb-pattern pottery to be older than that of the pottery discovered in the region of the Maritime Provinces of Russia, so some claim that comb-pattern pottery appeared naturally on the Korean Peninsula.

The oldest comb-pattern pottery discovered in Korea is thought to have been produced in 4000 BCE according to radiocarbon dating, while the most recent examples are estimated to have been created in 1000 BCE. The 3,000-year era of comb-pattern pottery can be divided into early, middle, and late periods, and the shape and patterns of the pottery changed with each period over the course of time.

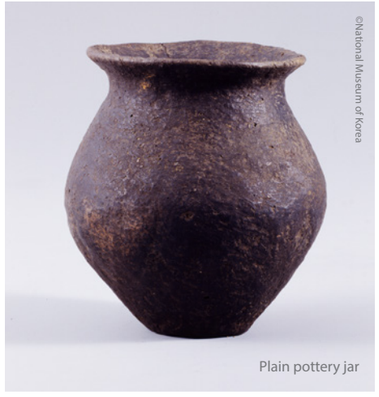
Comb-pattern pottery has most often been discovered at dwelling sites on the seashore or riverside. The shape of their bases is typically U-shaped with a slightly flattened bottom or V-shaped, with a bottom pointed like the tip of an egg. Most pieces have wide, open mouths. It is thought that they were crafted through the stacking of rings of clay, one after another, and then forming them into the desired shape. Repeated short or long lines or dots are etched on the top part of Korean comb-pattern pottery. For example, many pieces may have short parallel diagonal lines around the mouth and a fish bone pattern that seems to have been carved with a fish bone in the middle. In addition, some pieces have short lines densely stamped on the base as well. However, the pattern on the base was gradually omitted towards the later period of the Neolithic age. The most famous example of this is the comb-pattern pottery discovered at the Amsa-dong Prehistoric Settlement Site in the area of the Hangang River in Seoul.

2. Earthenware of the Bronze and Iron Ages

In the Bronze Age, large earthenware vessels were put into pits dug at one corner inside people's dwellings, in order to store food and other items. The shape of the earthenware vessels used for storage differed between regions. Other than such storage vessels, everyday earthenware including small bowls, plates, and cups were produced and used. The Iron Age began in earnest around the third century BCE on the Korean Peninsula. During the Iron Age, diverse types of earthenware without patterns were still in use following the Bronze Age. The earthenware of the Iron Age was harder than that of the Bronze Age, but the differences between them were not significant. Large earthenware jars, head-shaped earthenware vessels with high legs, and earthenware steamers were used throughout this period.



Dolmen



Plain pottery jar

Tombs of the Bronze Age included dolmens, stone-lined tombs, pit tombs, earthen coffin tombs, and fosse-girded tombs. Pieces of red earthenware made of fine clay, glazed with liquid oxidized steel, burnished with a smooth tool, and then fired are often discovered in those tombs. The earthen coffin tomb is the most typical type of tomb of the Bronze Age. Earthenware practically used in the daily lives of the Bronze Age people was used for those tombs as well, to bury dead bodies or bones. There were a number of diverse types of earthenware coffins: a combination of two earthen jars, an earthen jar laid on its side and covered with a stone lid, a jar erected straight up on a stone support and covered with a stone lid, and so forth.

In the Iron Age, dolmens disappeared, but other types of tombs still remained from the Bronze Age. There were huge differences in the quantity and quality of grave goods in various individual tombs with wooden coffins that were discovered in the Gyeongsang-do region in Korea. There were also differences between tombs of different groups. Generally, the tombs of the age show a trend of an increase in the number of earthenware grave goods. In the Iron Age, black earthenware with burnished surfaces were placed in graves.

In line with the increase in population and establishment of ancient states, the use of earthenware further increased. Ancient people used diverse earthenware items for different purposes, such as storage, cooking, and eating.

While most of the comb-pattern pottery from the Neolithic Age had rounded bases and only some had flat bottoms, the plain earthenware from the Bronze Age typically featured flat bottoms. It's also worth noting that most of the earthenware from the Bronze Age has been discovered at the dwelling sites located inland. Earthenware made in various forms has been discovered, making the estimation that earthenware was used for a wider variety of purposes in the Bronze Age than in the Neolithic Age plausible. In some regions, earthenware with simple patterns has also been discovered. Plain earthenware is thought to have been passed from overseas, along with bronzeware, which was newly introduced to the Korean Peninsula in the 10th century BCE. It appeared for the first time in the downstream area of the Amnokgang (Yalu) River. Then, it spread to the regions of Pyeongan-do and Hwanghae-do. In short, plain earthenware spread to the Korean Peninsula along with agricultural culture, taking root and then spreading to the southern region of the peninsula. The plain earthenware in the figure below was discovered at a historic site in Songguk-ri, Chungcheongnam-do. It is a typical example of Bronze Age earthenware, with no pattern and a flat bottom.

Plain earthenware is classified as bowls, dishes, plates, and pots, according to their usage. Many of them were produced by piling up rings of clay and then forming the final shape. The body is usually plain, but the mouth occasionally features small holes for decoration. Some others have decorative bands on the mouth or handle. In addition to plain earthenware, red or black burnished pottery from the Bronze Age has also been discovered.

3. Earthenware of the Goguryeo Kingdom

The Goguryeo people's use of earthenware for their daily lives can be surmised from pieces of earthenware excavated from the historic sites of Goguryeo and tomb murals. Anak Tomb No. 3, a Goguryeo tumulus built in the fourth century, has paintings of a kitchen, stable, barn, and well still remaining on one side of the wall. Earthenware used by the Goguryeo people is expressed in detail in the kitchen and well sections of the painting. A large earthenware pot is placed on a fire pit in the kitchen for cooking, and next to it are piled round, shallow dishes. In the mural that depicts a well, there are several large water jars near it. A mural painting discovered in the Muyongchong Tomb, most famous for a mural of dancers, expresses the indoor lifestyle of the times, as the owner of the tomb is shown treating his guests in a large room decorated with curtains. Various types of earthenware including small-sized bowls for eating and flat plates on which foods are piled up high are depicted in the painting.

The remains of a building with an *ondol* heating system from the time when the Goguryeo Kingdom was occupying the Hangang River area are still there within the Mongchontoseong Fortress located in Songpa-gu, Seoul. Many earthenware items used by the Goguryeo people were discovered from the remains, including jars, different types of pots, steamers, and three-legged pots.



Goguryo Tomb Mural (Anak Tomb No. 3)

Only a few earthenware grave goods from this age have been passed down until today. The reason is because the tombs of the Goguryeo Kingdom had stone rooms above ground, making them prone to robbery. Also, it is difficult to inspect and study those tombs as most of them are in areas that are in North Korea and China now. Burial accessories made by assembling clay plates have been discovered from some tombs of Goguryeo. Most of them were discovered from Goguryeo tombs in Ji'an in Jilin Province in China. They are similar to earthenware items that were discovered from the tombs of the Chinese Han Dynasty, indicating cultural correlation between the two states.



Goguryeo steamer

4. Earthenware of the Baekje Kingdom

The fact that the people of Baekje used diverse earthenware items for their daily lives was revealed from different types of historic remains and excavation investigation of dwelling sites. Wiryeseong Fortress in Hanam, which was the capital of Baekje in its early period, is now near the area of Pungnaptoseong Fortress and Mongchontoseong Fortress in Seoul. Earthenware items used as storage vessels were discovered in the residential areas of those sites. Notably, a large earthenware pot 76 centimeters in height that is thought to have been used for storage was unearthed at the residential site of Pungnaptoseong Fortress. An earthenware pot used as a well bucket was discovered in a well in the fortress as well.

Earthenware played a significant role in storing food ingredients. As earthenware has the advantage of keeping grains and fruits fresh longer than metal containers, and they can be made in any shape and size, earthenware was widely used by the people of Baekje in their homes. Multiple large earthenware pots buried deep in the ground to be used for storage were discovered from historic sites of the Baekje Kingdom. Baekje's people used diverse earthenware items beyond just pots, including dishes with feet, plates with triple legs, bowls with lids, and more. The people of Baekje held different types of large-scale national ceremonies, such as worship ceremonies for mountains and rivers and ancestral rituals held at the tomb of the founder of the kingdom, King Dongmyeong. Many pieces of earthenware used for those ceremonies were intentionally crushed and discarded at the end of the ceremonies, and those broken pieces were found at the historic sites of Baekje. Some of them are thought to have been used to contain offerings including liquor and foods. Long tube-shaped saucers and three-legged bowls are thought to have been used for those ceremonies of Baekje.



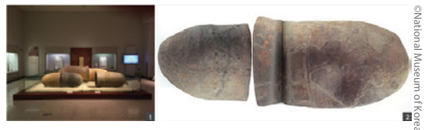
Baekje earthenware stand

Tombs of different forms, including stone mound tombs that implied the royal family of Baekje was descended from the Goguryeo Kingdom, were built throughout different times and regions of the Baekje Kingdom. Just as the form of tombs varied, a wide variety of earthenware was buried in those tombs. The Baekje ancient tombs in Seokchon-dong, Seoul, are the most famous example of stone mound tombs. They are thought to have been the tombs for the central ruling group of Baekje during the era the kingdom's capital was located at Hanseong (today's Seoul). Black earthenware with burnished surfaces, a whole new type of earthenware different from those in previous times, was discovered in Baekje's Tomb No. 2 in Garak-dong, Seoul, another stone mound tomb. This type of earthenware was made of very fine clay, and its surface became glossy when polished. Most of such earthenware was produced in the mid-third century. As evidenced by the fact that the shoulders of Baekje's black earthenware featured decorative patterns, which was popular for earthenware of the Qin Dynasty of China, Baekje's ceramics of those times were significantly affected by China.

The style of Baekje's tombs differed between ages and regions. Round-shaped pots, long-necked pots, and other types of earthenware were buried in the tombs of Baekje. Notably, tombs with earthen coffins were the most typical type of tomb used in Baekje territory. The mouth of two egg-shaped earthenware pots were put together to make a coffin in those tombs. The size and firing condition of those pots demonstrate how advanced Baekje's ceramics techniques were.

5. Earthenware of the Silla and Gaya Kingdoms

Most of the domestic earthenware items of Silla were discovered in the process of excavating the site of the kingdom's royal palace in Gyeongju. A variety of road facilities, building sites, dwelling sites, and wells that give a hint of the daily lives of Silla people were discovered at royal palace sites. Notably, large storage pots, oil lamps, tureens, bottles, steamers, and jars made by hand were discovered. Domestic earthenware items practically used for the everyday lives of the Silla people were also discovered at Wolji (Moon Pond, also known as Anapji) in Gyeongju, which was built near the end of the Silla period. At that time, a decorative style of stamping diverse designs on the surface of earthenware was in vogue. Different types of earthenware including bowls with covers, long-necked bottles, steamers, and ewers were made and used by the Silla people. The site of Silla's royal palace in today's Gyeongju drew keen attention when a large earthenware pot with its volume marked on the surface was discovered in it. The volume of the pot was 10 *seok*, a unit of volume used by the people of those times, or 520 liters in today's measurements. Most earthenware items buried near the burial mound of tombs were utensils used for ancestral rites of Silla and Gaya, such as in the case of Hwangnam Daechong (Great Tomb at Hwangnam-dong) of Silla and Daeseong-dong Ancient Tombs of the Gaya Kingdom.



Earthenware coffin

Most of the tombs of the top ruling class of Silla in the Gyeongju area were stone-compiled wooden chamber tombs. The coffin or outer coffin was covered by piling up pebbles and then by mounding earth on top of it. According to studies, those tombs were the most typical type in the Gyeongju area from the fourth to mid-sixth century. More than 1,500 pieces of earthenware were discovered from Hwangnam Daechong Tomb, the most famous tomb from Silla. As it was the tomb of a king, large earthenware pots full of grains and foods, as well as diverse earthenware items and kitchen utensils, were discovered in it, to give a hint of how rich and sumptuous a lifestyle the royal family of those times had.

Many pieces of earthenware figurines modeled after people, animals, and certain objects were discovered from stone-compiled wooden chamber tombs in the Gyeongju area. An earthenware figurine of a man riding on a horse and a figurine of ship, as well as earthenware items that were not used for a daily-life purposes but only as burial goods, including a very high stand, were unearthed from the Geumnyeongchong Tomb. Most of Silla's clay figurines of people and animals were excavated from small tombs in Hwangnam-dong, Gyeongju. The clay figurines of people do not merely portray the human figure, but express various human actions such as giving birth, dancing, playing musical instruments, and making love in a simple and symbolic manner. Animal figurines are classified into flying animals, land animals, and aquatic animals. They draw special attention, as they include the models of anteaters, water buffalo, and monkeys, which did not live in the territory of Silla back then. Many pieces of such clay figurines were discovered from the tombs of the Gaya Kingdom as well. Duck-shaped ewers that had first appeared in early fourth century near the mouth of the Nakdonggang River appeared later in a limited area including Gimhae, Masan, Haman, and Hapcheon. Not only duck-shaped ewers, but also horn-shaped cups, ship-shaped cups, clay models of houses, and straw shoes were buried in Gaya's tombs.

Many pieces of earthenware were buried in the tombs of Silla and Gaya, as ceramics symbolized wealth and social status, and some of them could be owned only by people with a status above of a certain level.

Jars with a voluptuously round body, long neck, and figurines decorating the shoulder were mostly produced during the era of the Three Kingdoms and they have been discovered in tombs. The *Long-Necked Jar with Clay Figurines*, estimated to have been made in Silla by the fifth century, has a round bottom without legs. Its neck is stretched up almost vertically but curves outward slightly toward the mouth. A thin ring is carved on the tip of the mouth. Below the ring on the tip, there are two pairs of two thin rings. Between the rings, five straight lines and concentric circles alternate horizontally. The thin rings are placed to divide the neck and shoulder, shoulder and body, as well as in the middle of the body. Between the rings on the neck, shoulder, and body, a pattern of five lines and concentric circles is placed. Those patterns are thought to have been carved by using tools such as a sharp sawtooth knife and compass. Nineteen clay figurines of a man playing *gayageum* (twelve-stringed plucked zither), a man and woman making love, a bird, amphibians including a snake and frog, a fish, a rabbit, and a turtle were made separately and put on the neck and shoulder of the jar. Even though they look rather clumsy, they humorously capture the appearance and characteristics of the things they depict and express them in a simple style. Other than such jars decorated with clay figurines, there are other earthenware objects whose lids are decorated with figurines. Most of the clay figurines model animals and persons. The clay animals are usually birds, dogs, horses, and wild boars, while the clay humans are seen singing, dancing, or lamenting.

The clayware decorated with separately-produced clay figurines are discovered not only from tombs in Korea but also in other regions, including China. The custom of burying such clayware goods in tombs originated from the beliefs and worldview of the people of those times, who thought that the wealth, joy, and life they enjoyed while alive would continue in their afterlife. In Korea, they are discovered in diverse regions of the Three Kingdoms, mostly in the area of Gyeongju, a city that was the cultural center of Silla.

This pair of human figures was unearthed in 1924, from the Geumnyeongchong Tomb in Nodong-dong, Gyeongju, Gyeongsangbuk-do. They are charcoal gray clayware burnt to be hard. Such earthenware models found in tombs are a type of burial goods buried with the body, which were believed to play a shamanistic role of guiding the spirit of the dead.

Human figures that look like a master and his servant are dressed in suits and riding harnessed horses, attached to a rectangular base. Goblet-shaped containers are attached on the rump of the horses, and cylindrical spouts are attached to the chests of the horses near the front, forming the structure of the ewers.

The size of the human figure, the size of the horse, the attire, and the harnessing of the horse differ between the two men, according to the difference in their social status as master and servant. The horse of the master is heavily decorated with its mane in a topknot and equipped with stirrups, harness pendants, bells, a saddle flap, and so on. Interestingly, the square saddle flap attached under the saddle looks very much like the birch saddle flap that was unearthed from the Cheonmachong Tomb in Gyeongju, which is famous for its painting of a heavenly house.

The master is wearing a conical hat decorated with a sash and



Long-Necked Jar with Clay Figurines



Earthenware Funerary Objects in the Shape of a Warrior on Horseback

ornaments, as well as armor hanging all the way down toward his legs. On the other hand, the servant is wearing only a head towel above which his topknot is shown. He is not wearing a shirt, holding a bundle on his back and a bell on his right hand to guide his master. Both horses are wearing tethers that connect the saddle to the chest and rump. They are adorned in a set of harness including a bit, screen, and saddle flap. Their tails are tied upward and their hoofs are shoed. The figures are a good example that reveals the living culture of the people of those times, as they demonstrate the details of those people's view of the afterworld, as well as their clothing, arms, and horse equipment.

Celadon of Goryeo

The celadon of Goryeo is a type of earthenware made of clay, glazed, and then fired at a high temperature around 1,150℃. Iron is contained in the clay and glaze used for celadon. Celadon and white porcelain began to be produced from the 10th century when Goryeo was in its early period. From the 11th century, double-stage firing became common. The first stage of firing was done at 700–800℃, and the second stage was done after glazing. There was a technical prerequisite for the production of celadon: kiln facilities that could render a high temperature over 1,000℃ and the technique of glazing with lye that dissolves at a high temperature. Another technical prerequisite was firing with a minimum oxygen supply in the kiln for rendering of the jade-green color of celadon.

Earthenware that was glazed with enamel and then fired at over 1,000℃ was already being produced on the Korean Peninsula in the Unified Silla period. Therefore, the completion of the celadon technique in the Goryeo era may have been a natural consequence of technical development. However, it is thought that not only technical factors but also others including political and cultural changes artificially advanced the completion of the celadon-production techniques during the Goryeo period.

1. Background of the Production of Goryeo Celadon

A lot of changes took place in society, the economy, and culture by the end of the Silla period and the beginning of Goryeo. In neighboring China as well, dynasties changed in the Central Plain area from Tang to the Five Dynasties and then to Song. In the area north of the Korean Peninsula, the Khitans were expanding their territory. Goryeo, founded by Wang Geon by the end of the Silla period, grew in the region of the mid-west coastal area on the Korean Peninsula, as well as in Gyeonggi-do, Gangwon-do, and Hwanghae-do. Wang Geon was a member of an influential family that accumulated huge wealth from trade, mainly in the area of Gaeseong in the North Korean region. Goryeo not only engaged in political exchanges with China but also accumulated great wealth through international trade. The dynasty also learnt and accepted advanced foreign culture and technology. Goryeo learned about celadon and white porcelain, which were totally different from earthenware that had been used before then, and actively accepted those new types of ceramics. This eventually laid the foundation for the domestic production of celadon and its emergence as a new industry.

By the end of the Unified Silla period, Zen Buddhism, which had created a sensation in China around that time, was introduced to Korea in earnest through Silla's Buddhist pilgrims who studied abroad in Tang China. In line with the introduction of Zen Buddhism, tea and tea drinking culture also became popular. Such culture spread throughout China during the Tang Dynasty era and drew great popularity, to an extent that books about tea such as *The Classic of Tea* by Lu Yu (733–804) were published. The most famous tea bowls in China produced at that time were the Yuezhouyao celadon bowls and Xingzhouyao white porcelain bowls. Indeed, many pieces of Chinese ceramics including the Yuezhouyao and Xingzhouyao tea bowls were discovered from the historic sites of Unified Silla. Notably, ceramics for tea drinking imported from China were mostly discovered from the remains of royal palaces, large-scale Buddhist temples, and bases of major maritime powers, which indicates that they were used by upper-class people and Buddhist priests. It seems that the ceramics for tea drinking, which were imported from China, were treasured by the people of those times, and the demand for the domestic production of those ceramics rose under such cultural circumstances.

2. Origin and Characteristics of Celadon Techniques in the Early Goryeo Period

The most important step for understanding the technical aspects of the production of Korean celadon is to understand the structure of the kiln, the facility for ceramics production. How Goryeo could succeed in producing celadon and where its techniques originated can be understood by looking into the attributes and changes in the early forms of celadon kilns.

The kilns used to produce Goryeo celadon were largely divided into two types: brick kilns and clay-built kilns.

Brick kilns and clay-built kilns were different in many aspects. First, brick kilns were much bigger than clay-built kilns, as most brick kilns were approximately 40 meters long in total and 2 meters wide, while the total length of clay-built kilns was about 10–20 meters and the width approximately 1.2 meters. Therefore, the number of ceramics that could be made in one round of firing, the volume of firewood required, and the necessary labor were different between the two types of kilns.

Secondly, the two types of kilns were located in different regions. Many brick kilns were discovered in the Gyeonggi-do area including Yongin, Siheung, Yeoju, Goyang, and Yangju. Some others were located in Hwanghae-do and Chungcheongnam-do, indicating that most of the brick kilns were used in the mid-west region of the Korean Peninsula. Most clay-built kilns were found in Gangjin, Haenam, and Goheung in Jeollanam-do and some others in Gochang, Jeollabuk-do, and Chilgok, Gyeongsangbuk-do, so they were mostly used in southwestern region of Korea.

Thirdly, different forms and types of ceramics were produced from those kilns. Then, what is the reason for such differences in almost all aspects of the two types of kilns? The answer is because their technical origins were different. Brick kilns were discovered to have been influenced by Chinese celadon techniques, more precisely, the Yuezhouyao technique developed in Zhejiang Province, while clay-built kilns are thought to have been made based on the foundation of Korea's traditional ceramics technique with a partial



Kiln

integration of new Chinese kiln techniques.

One of the most famous types of celadon produced in the early Goryeo era was bowls with a halo-shaped foot. Such a name was given as the area of the foot contacting the ground is wide that it looks like a halo. It is called *yùbìdǐ* (round bowl with round foot) in Chinese.

Such celadon was mainly produced in the eight century during the Tang Dynasty era. Before precise archaeological investigation on the remains of the kiln sites from the early Goryeo period was conducted, the time of the birth of Goryeo celadon had been estimated to be the eighth century, during the Unified Silla period. Such estimation was made based on the fact that many celadon bowls with halo-shaped feet were discovered on the surface of the sites where kilns were located in the early Goryeo period and their form was similar to Chinese ones from the Tang Dynasty.

However, active discussions about the time of the birth of celadon were initiated after excavation investigations on kiln sites in Seo-ri in Yongin and Wonsan-ri in Baecheon were conducted. There, a sedimentary layer with a clearly identifiable archeological strata was examined. Interestingly, not the bowls with halo-shaped feet but bowls with a narrower contact area on the foot in the style of the Five Dynasties Era in China of the 10th century, called *yùhuándǐ* (round bowl with narrower ring-shaped foot), was discovered in the lowest strata, which was formed the earliest. This discovery revealed that the time of the production of first celadon in Goryeo was around the 10th century during the Five Dynasties Period in China.

3. Jade-Green Celadon

From the 10th century, when the production of celadon began mainly in the central region of the Korean Peninsula, until the 11th century, when Gangjin emerged as the center of the ceramics industry, the quality, shape, and design of celadon were stabilized. The celadon produced in the 11th century shows stronger color and characteristics unique to Goryeo, rather than an exotic tone, as the diplomatic relationship between Goryeo and Northern Song China was severed due to invasion from the Khitans. By the 12th century, the relationship with Northern Song Dynasty was recovered and more of Goryeo's unique color was expressed in the process of creating celadon as well, based on the accumulated techniques. In other words, celadon at that time was already widely used in the daily lives of people and further developed in new forms unique to them as they actively accepted and blending in the formative and functional merits of earthenware or metalware that had long been in used.

The circumstances of those times can be guessed from *Xuānhwafengshi Gaolitujing* (宣和奉使高麗圖經, Xuanhe Commissioner's Illustrated Account of Goryeo), a journal written by Xu Jing, who was an ambassador of Song China sent to Goryeo in the first year of King Injong's reign (1123). Xu Jing explained about Goryeo's celadon incense burner and celadon pot as seen in the eyes of the Chinese in detail in *Xuānhwafengshi Gaolitujing*, saying, "The people of Goryeo call earthenware with greenish color jade-green." His statement shows that the people of Goryeo distinguished their own celadon from Chinese ones by calling their own "jade-green (翡色)," differently from the Chinese perception of the color of their celadon as "celadon-green (秘色)." Such a difference in the name of the color of celadon can be seen as an expression of Goryeo's own aesthetic sense of celadon distinguished from China. *Jingdezhen Taolu* (Book of Ceramic Works Produced at Jingdezhen Kiln) written in the era of the Qing Dynasty of China says that Goryeo's celadon has all the characteristics of the Chinese ceramics of Yuezhou-yao, Nansong Guanyao, and Ruyao, the famous ceramics workshops of China, but out of them, gourd-shaped bowls and glasses, as well as lion-shaped incense burners, are quite different from Chinese ones. This explanation implies that Goryeo had an independent celadon production system and technique but absorbed influences from China as well.

As such, the jade-green color of Goryeo's celadon was admired and extolled by the Chinese most ardently in the 12th century. *Xiù Zhōng Jǐn*, a book written by an old man of Southern Song who was called an "old man of great peace," includes Goryeo celadon in the list of the world's masterpieces, saying, "tea of Jiànzhōu, silk of Shu, white porcelain from Dingzhou, tea of Zhejiang . . . Goryeo celadon's jade-green color. . . . They are the world's best which can never be imitated by others." Notably, the book deems the white porcelain from Dingzhou from Hebei Province of China as the world's best porcelain, while recognizing Goryeo's jade-green celadon as the world's best celadon. Recently, excavation of a considerable volume of Goryeo celadon from the ruins of buildings sites or royal palaces in a region of the capital of Southern Song near Hangzhou in Zhejiang has been reported. Most of those excavated celadon are jade-green Goryeo celadon of the top quality. As such, Goryeo succeeded in achieving a celadon technique even better than that of China in only a century from the import of celadon producing techniques from China.

The completion of the "jade-green" color for Goryeo celadon is the proof of the kingdom's outstanding aesthetic sense that pursued the best celadon that even looked like jade gemstone, as well as an advanced ceramics technology that made the realization of such pursuit possible, as the jade-green color can be rendered only by blocking the inflow of oxygen and producing reduced flame atmosphere inside the kiln at the right timing during firing. In addition, as celadon became more widely used for people's daily lives, the formative and functional merits of the metalware and earthenware that had long been used generally for people's lives were blended into celadon, giving birth to Goryeo's unique formative art.



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Inlaid celadon



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Celadon Incense Burner with Lion-Shaped Lid

"The incense that the lion blows out is also jade-green. On the top, the animal is crouching, and below it, there is a lotus blooming upward," says Xu Jing, who was an ambassador of the Emperor of Song China sent to Goryeo in the first year of King Injong's reign (1123), in the "Ceramics and Braziers" chapter of volume 32, *Utensils for Daily Use*, of his journal *Gaolitujing* (高麗圖經, Illustrated Account of Goryeo). The shape of the incense burner depicted by Xu Jing is different from the *Celadon Incense Burner with Lion-Shaped Lid*, but the writing shows how celadon incense burners decorated with animal figures were used in the royal palace of Goryeo in early 12th century.

The *Celadon Incense Burner with Lion-Shaped Lid* has a lion-shaped lid placed on the bowl in which incense is burnt. The body of the burning bowl is cylindrical. Three animal-shaped legs made by pressing clay into a form are put under the body. A wide, nearly horizontal plate is put around the top of the body. There is also a raised lip on the body, which is made to prop up the lid. The body and the plate are decorated with a cloud pattern engraved in thin lines. On the side of the lid and the edge of the upper side are engraved a flower pattern and *yeouidu* pattern (a bracken-shaped geometric decorative pattern that was a lucky sign of fulfilling wishes). On them, the lion figure is perched.

The lion is looking towards the front, sitting with one of his legs bent upward. The eyes of the lion are painted to look realistic with red earth that contains much iron. Long whiskers stretch from the jaw, and curly hair is expressed on the side and back of the neck and on the rump. Its wide tail is straightened upward, to touch the back.

The color is light greyish green with a soft luster. The clear color is rendered from pure clay. A silica stone prop, used to support the piece during firing, still inside the lid demonstrates that it was fired as a top-quality product.

The smoke from the incense burnt in the body of the burner passes through the body of the lion and then comes out through its open mouth. Fragments of similar incense burners have been discovered from the kiln sites in Yongun-ri and Sadang-ri, Daegu-myeon, Gangjin-gun in Jeollanam-do, indicating where such incense burners had been produced in the past.

4. Diverse Decorative Techniques

The remains of the largest kilns that produced Goryeo celadon during its golden days are mostly located in Gangjin in Jeollanam-do and Buan in Jeollabuk-do. The kiln site in Gangjin is famous as the place where celadon was produced throughout the entire Goryeo period. A large proportion of Goryeo celadon discovered from those kiln sites are tableware, including tea instruments, but they also include building materials such as roof tiles and decorative tiles, makeup tools, and stationery, demonstrating the fact that celadon was widely used for many parts of the daily lives of the Goryeo people.

Celadon has its own originality different from earthenware and metalware in terms of its shape and production method. A wide variety of production methods different from those of earthenware were tried for celadon, in accordance with the quality of earth and purpose of production; the shapes were made by using molds based on wheel-thrown pieces, patterns were engraved, or parts with different shapes were separately produced and then joined together. Celadon can be categorized as plain celadon, engraved celadon, relief celadon, iron-underglazed celadon, copper-underglazed celadon, gold-painted celadon, iron-painted celadon, and so on. Plain celadon is celadon without any decorative patterns on the surface. Engraved celadon is plain celadon onto which flowers or other plant patterns or other types of decorative patterns are engraved. Relief celadon uses an embossed carving technique to create patterns to make them stand higher than the background. Iron-underglaze celadon is ones on which patterns are painted chemically by using a brush and iron coloring before glazing. Other than these types of celadon, there are also ones decorated in an openwork method, a technique of carving designs through the surface of a vessel, leaving the center hollow; ones with surfaces decorated by painting patterns with white clay; marbling wares for which clay of different colors are mixed together to make the surface of the celadon look like marble; celadon figurines that model persons or animals; as well as celadon illustration plates. In a word, the ceramists of Goryeo tried almost everything that man can do with earth and repeatedly experimented with different production methods. Those diverse techniques demonstrate the stages of completing the outstanding quality of Goryeo celadon.


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Celadon Tube-shaped Bottle with Willow Design in Underglaze Iron

Now, let us look into famous techniques of Goryeo celadon.

(1) Engraving: The engraving technique creates patterns on the surface of celadon by carving away the material of the pattern. Engraving is largely divided into a technique of carving the pattern in thin lines at the same depth and a technique of carving patterns with thick lines at a greater depth to express a sense of volume by applying knife obliquely. A tool like a saw tooth was also used to properly express the volume of flower designs. A variety of plants, animals, and insects were carved on celadon with the technique of thin lines, among which the pattern of parrots was most widely used. Over the same period, similar techniques and patterns became popular for Yuezhouyaoin Zhejiang and Dingyao in Hebei Province, China. Engraved designs carved with a knife laid obliquely are seen in many pieces of Goryeo celadon.

(2) Relief technique: This method puts patterns on celadon by carving away the surface, similar to the engraving technique. According to the method of carving, the relief technique split between a carving relief technique for which a knife is used and a molded relief technique in which the design is imprinted by using a mold. While the most famous design created with the engraving technique was parrots, the pattern most widely made using the relief technique was lotus petals. Many layers of lotus petals decorated cups, glasses, plates, water droppers for calligraphy, ewers, and other pieces. Lotus petals were most often expressed across the entire surface of the celadon in three dimensions, to make the design look like a real lotus flower.

The molded relief technique is a method of obtaining the relief effect by imprinting designs on the inside or outside of objects by using molds. It is a way of putting a design into relief by imprinting from the inner surface of objects such as dishes or bowls or imprinting a design onto the outer surface of objects such as incense burners with a mold. When using design molds, objects with the same size, shape, and decoration can conveniently be produced repeatedly. As earthenware with delicate relief designs that require complicated techniques could be manufactured at a large volume within a short period of time, and potters other than skilled craftsmen could produce them using design molds, the relief technique was actively used from the mid-Goryeo period onward. The technique was most widely used in the northern region of China. Yaozhouyao produced in Shaanxi Province in the Northern Song period was the most famous for the technique.

(3) Iron-underglazing technique: For iron-underglaze celadon, the design is painted with iron pigment on the surface of the ceramic before glazing and firing. The first iron-underglazed earthenware produced in Goryeo was mostly white porcelain from brick kilns in the mid-west region of the Korean Peninsula. However, iron-underglaze earthenware began to be produced in earnest in the Haenam region in the form of celadon. There exist more than 80 celadon kiln sites in Jinsan-ri in Haenam. Low-grade celadon made of rough clay in tan or yellowish green color was produced mostly at these kilns. As bowls with halo-shaped feet, the indicator artifact for the early Goryeo period, were discovered from those kilns, they are estimated to have been in operation from the early period to the mid-Goryeo era. Double-headed drums, prunus vases, and long-necked bottles decorated with iron-underglaze designs were discovered from many of those kilns. The iron-underglaze decoration in the early Goryeo period is mostly seen in special objects such as double-headed drums or pillows. This is the case for inlaid designs as well, so the use of black iron-underglaze decorations and inlaid designs are thought to have been limited only for objects with special usages in the early period of Goryeo. However, by the middle of the Goryeo era, not only diverse inlaid designs but also iron-underglaze decorations were applied to many different types of objects from utensils for daily life to larger goods manufactured at many different kilns. High-quality iron-underglaze celadon with beautiful designs on the surface, comparable to famous iron-underglaze celadon made in Haenam, have been passed down in Gangjin all the way until today.

However, iron-underglaze celadon with complicated designs across the entire surface of a large piece became very rare after the middle of the Goryeo period. Most of the iron-underglaze celadon produced from then onwards was small goods such as bowls, glasses, and plates simply decorated with flower designs of a few lines or dots. Glasses, plates, and inkstones decorated in the iron-underglazing method were included in the celadon brought up to the surface of the sea in the Taean area from a celadon transport ship of the Goryeo era. Those celadon are thought to have been manufactured in the Gangjin area in the mid-Goryeo era. When putting a simple design on the surface of celadon in the iron-underglazing method, in most cases, it was applied together with the technique of painting or spotting patterns with white clay liquid, a trend shown by the double-headed drums of the early Goryeo period.

The decoration of painting black and white designs on the surface of celadon with brushes was widely applied to ceramics produced at kilns located in northern China. Notably, Cizhouyao, a kiln that manufactured ceramics made by creating an effect of white porcelain by covering the clay body with white clay liquid and then putting black-colored designs on the surface, seems to have had exchanged influences with Goryeo ceramics, in terms of design and figure.

(4) White clay painting technique: This is a technique of decorating an object by panting or spotting a design on the surface by using a gel-like white clay liquid. This technique is applied both independently and as a supplement to other decorative techniques. It was frequently applied together with the previously mentioned iron-underglazing technique, mostly as a simple auxiliary decorative technique of marking additional dots around iron-underglaze designs or adding lines. The tradition of putting designs on ceramics like painting by using brush and black and white pigments already appeared in the early period of Goryeo, as well as in ceramics created at kilns located in northern China. On the other hand, iron-underglazing and white clay liquid painting decorations were also widely used in combination. The ceramics produced in that way looked like ones decorated in the black-and-white inlaying technique that had advanced in a full-blown scale from the middle of the Goryeo period. This indicates that diverse decorative techniques for ceramics developed together and exchanged influences with one another and that multiple techniques were used in combination during the Goryeo period.

(5) Copper-underglazing technique: The copper-underglazing technique is a method of putting a design on the surface of ceramics by using oxidized copper as a pigment. It gives a deep red color in the state of reduced flame in a kiln. When used together with black-and-white inlaying, iron-underglazing, and white clay liquid painting techniques, the copper-underglazing technique enables decoration on celadon in different colors. As the technique came to be used along with other decorative techniques, ceramics gained a more colorful and splendid appearance. In some exceptional cases, celadon pieces with the entire surface painted with copper pigment were produced, too.

(6) Gold-painting technique: Celadon painted entirely with gold also exist, although they are very rare. These are mostly celadon of the top grade, whose insides and outsides are decorated with inlaid designs. After glazing and complete firing, gold is painted on the surface and then fired at a low temperature once again to help coloration and add splendor. Records in *Goryeosa* (History of Goryeo) confirm that gold-painted celadon was manufactured at the end of the 13th century and they were offered to the Yuan Dynasty China.

5. New Inlaid Celadon

At a certain point during the 12th century when the beauty of the jade-green color of Goryeo celadon reached its peak, the people of Goryeo boldly applied a new craft technique called "inlaying" to ceramics and achieved success. After a design of a line or face is carved on the body of celadon, the engraved part of the design or the background is filled with white clay or red earth and polished, and the celadon is glazed and fired. Then, the design is rendered on the surface in a white or black color, to create a strong color contrast on the greenish background of celadon.

The inlaying technique is an universal craft technique that has long been used in both Western and Eastern worlds of putting a substance whose properties, colors, or material are different from that of the background as decoration on the main body of an object. In Egypt, iron-inlaid ivory products or ceramics with inlaid decoration existed from before the Common Era. In Goryeo's metal craft, a metal-inlaid technique called "*ipsa*" (inlaying metal thread) was used. The use of such a technique is seen in ceramics discovered at the kiln sites for the early form of celadon, including the kiln site in Bangsan-dong, Siheung, and the kiln site in Seo-ri, Yongin, in Gyeonggi-do. There is also a very rare example of the technique being used for ceramic double-headed drums decorated with designs such as flower patterns simply made in the inlaying technique.

There were some examples of applying the inlaying technique to ceramics at some kilns located in Hebei Province or Shanxi Province in northern China from the Tang Dynasty until the Jin Dynasty period. However, a method of covering ceramics made of low-quality clay with bad color and texture by using white clay to hide its surface and putting inlaid decoration on it was mostly used by those Chinese kilns, which was totally different from Goryeo's technique of putting inlaid decoration directly on jade-green celadon.

Goryeo's inlaid celadon began to be produced in earnest by the mid-12th century when the jade-green celadon technique reached its zenith. It was continuously manufactured through the end of the 12th century and 13th century, until the 14th century. In the Goryeo inlaid celadon that developed greatly mostly in the regions of Gangjin-gun and Buan-gun in Korea, the white and black clay put in the carved-out designs creates a stark color contrast against the jade-green background, presenting a new colorful and decorative aspect of ceramics different from the simple appearance of the celadon produced before then.

Most celadon was produced as tableware, and various celadon objects are thought to have been used by the royal family, aristocrats, and Buddhist priests, rather than by ordinary people. It is thought to have been used mostly at the royal palace. The outstanding techniques of Goryeo's exquisite and sophisticated craftwork that gave birth to eye-catching Buddhist paintings, lacquered ware inlaid with mother-of-pearl, inlaying with gold and silver,

and silk were much reflected in celadon, demonstrating what the daily life of wealthy people was like at that time.

After the 13th and 14th century when Yuan invaded Goryeo, the quality of celadon was degraded except for a few top-notch products, and the outstanding beauty of the transparent jade-green color could no longer be seen. The reason was because the exhaustion of state resources from wars against the Mongolian invasions resulted in difficulty in the production of celadon. High-level control and concentration for the process of celadon production was not possible any more, which resulted in lesser feelings of tension in design and slackened figurative beauty, glazing, and firing techniques. The consequence was downward leveling of celadon manufactured at small-scale kilns with simple decorative design. Surveys into kiln sites revealed that plates used to support ceramics during firing in kiln were used less and less, and low-grade firing techniques for easy manufacturing became widespread. Eventually, production of celadon with dark glazing color, many alien substances, and dull figures increased.

The inlaying technique has existed for a long period of time in the history of the world's ceramics, but there was no other era than the Goryeo period when such high-quality inlaying techniques were realized. The component composition was different for the clay for the body of celadon and the black and white clay used for inlaying, so the rate of their contraction and expansion when fired was also different. Therefore, there exist cases in which the inlaid part of design sinks lower than or extrudes over the background after the process of firing. However, the inlaid celadon of Goryeo has a smooth and even surface, as if the inlaid design was painted with white or black pigment. It shows how advanced was the understanding and technology about the properties of different types of earth the people of Goryeo had.

A prunus vase is a type of liquor container with a tall body and small mouth. It is found commonly in China, Korea, and Japan. The name is thought to have come from the figure of its mouth, which looks like an apricot flower, or from the custom of appreciating a branch of apricot flowers put in such a vase during the period of the Yuan and Ming dynasties of China.

The *Celadon Prunus Vase with Inlaid Cloud and Crane Design*, Korea's National Treasure No. 68, is the most typical type of celadon prunus vase. Its small and short basin-shaped mouth contrasts with its round, inflated upper body. The body narrows downward and then gets wider at the bottom again. It has more strongly inflated shoulder and slimmer waist than other typical Goryeo celadon prunus vases like National Treasure No. 97 and National Treasure No. 245, adding a feeling of tension.

The pattern is inlaid over the entire surface by using black (deep red) earth and white clay. Two white rings are inlaid under the neck and the pattern of *yeouidu* (a bracken-shaped geometric decorative pattern that was a lucky sign of fulfilling wishes) is put alongside the rings. The pattern of lotus petals is inlaid in black and white at the bottom of the vase. Between the *yeouidu* pattern on the top and lotus petals at the bottom, the cloud and crane patterns are carved. There are two types of the cloud and crane pattern: those inside circles and others outside the circles. The expression of the pattern is done in a sophisticated and artistic style. The circles have double lines; the inner one is inlaid in black while the outer one is inlaid white. The circles are inlaid to make six rows, to alternate with others in the layer above and below. Cranes and clouds ascending to the sky are inlaid inside the circles, while cranes and clouds descending to the ground are inlaid outside the circles.

As such, the direction of cranes' movement crisscrosses in an X-shaped trajectory. In such a way, the spatial limitation that might have given a sense of tightness is widened and the surface even gains a sense of depth. The sophisticatedly calculated composition and distribution of patterns give a hint about the Goryeo people's brilliance expressed in craft.

"Inlaying" is a common name for the ceramic decorative technique of cutting grooves and then filling them with another material. Inlaid celadon mostly produced during the Goryeo period is the most famous example of Korea's ceramic products. In inlaid celadon, diverse patterns or the background of patterns are carved off at a consistent depth and clay in a different color is used to fill in the carved areas. Then, the entire surface is trimmed and smoothened to an even depth, to reveal the pattern put in diverse colors. After this process, the celadon is glazed and fired and ultimately, the pattern is displayed in white or black colors against the bluish-green background.

The inlaying technique was widely applied not only to ceramics but also to diverse fields of craft. For example, some metalware was decorated by cutting grooves or boundaries into the surface and then filling the grooves with diverse gemstones or other types of metal. The inlaying technique was also actively applied to woodcrafts, in a way of carving the background wood and then embedding wood of a different color, turtle shell, clamshell, or metal in it.

As for the origin of Goryeo celadon's inlaying technique, different opinions have been suggested. Some believe that the inlaying decorative technique was unique to Goryeo and it had been affected by the silver inlaying technique or the technique of lacquerware inlaid with mother-of-pearl.

6. Tea Drinking and Celadon

There are several reasons for the development of celadon over the Goryeo period, one of which is the popularity of a certain beverage that required the use of celadon. Notably, tea was serviced for ceremonies of the royal palace and Buddhist temples and for treating guests, according to records left in history and collections



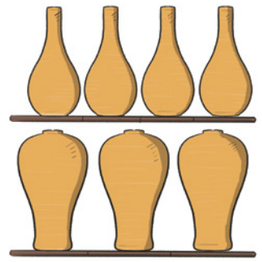
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Celadon Prunus Vase with Inlaid Cloud and Crane Design
National Treasure No. 68

Process of Inlaid Celadon Production:



(1) Forming: A vessel is made with clay.



(2) Drying: The clay vessel is dried slightly so that carving can be done on its surface.



(3) Drawing the pattern: A rough sketch of the desired pattern is drawn on the surface of the vessel using a thin and sharp tool.



(4) Carving the pattern or the background off: The surface of the areas on which the pattern will be inlaid is carved off shallowly.



(5) Inlaying: White clay or black clay is used to fill in the carved-off sections.



(6) Leveling the surface: The surface of the inlaid part is leveled to be even. Then, the pattern is expressed clearly in a color different from the background.



(7) Biscuit firing: The vessel is fired at a low temperature of 700–800℃.



(8) Glazing: The biscuit-fired vessel is glazed.



(9) Second firing: The vessel is fired once again at a high temperature of approximately 1,200℃. White color is rendered in the part where white clay is inlaid and black is rendered in the part where black clay is inlaid.

of private writers. Even though there are few records that directly mention celadon tea instruments, it can be reasonably presumed that celadon was used for important utensils for tea service, as tea was an important part of royal ceremonies including banquets and ancestral rituals and was given as royal gifts or wedding presents. In addition, tea was drunk at Buddhist temples and Taoist temples; the literati and even ordinary people loved it.

Goryeosa recorded that tea was used as royal gifts and ceremonial goods along with herbal medicine and incense, so it is thought that tea instruments were made in a wide variety of types and materials. Goryeo had a "tea department" as an organization of the royal palace to help court tea ceremonies, as well as king's royal tour and attendance at Buddhist ceremonies. The organization played the role of preparing burners and teas for the tea ceremony for king's formal excursions. For most of the ceremonies and procedures hosted by Goryeo's royal palace, customs for tea service were strictly set and the tea department was the supervisor of the rules and formalities.

Records about the tea ceremony of Goryeo's royal palace can be found in many writings. There exists an article that warned the students of Seonggyungwan National Academy near the end of the Goryeo period for not studying hard and not attending regular rituals and tea ceremonies. It suggests that tea ceremonies were hosted at Seonggyungwan National Academy until the end of Goryeo. In addition, there was a procedure of serving tea to the king and vassals right before making the final decision about a felon's punishment.

Tea ceremonies were also hosted when envoys of the Khitans and Jurchens came to Korea to visit the king. When the list of gifts brought by envoys was given to the king, the king spoke a message of greeting. After completion of the procedure of delivering the gifts, the king treated the envoys to tea, wine, and food. Notably, when serving tea for envoys, the first cup was directly given by the king. Envoys also offered tea to the king, took two deep bows to the king, and then sat down to drink the tea. Then, the king and envoys stood up to take a bow to each other again with their hands put together and then went back to their own seats. The same procedures were performed at banquets hosted by the crown prince for vassals.

At the ceremony hosted on every New Year's Day, the royal tea department held a tea ceremony in which music, tea, and drinks were serviced in order. Tea ceremonies were also held for congratulatory ceremonies at the birth of the king's first son or for banquets for all vassals held at the Daegwanjeon Hall at the royal palace. Vassals were seated at different positions according to their public posts, and the tea department served tea at banquets where tea, drinks, and incense were serviced in sequence along with music performances. Tea ceremonies with tea, drinks, music, and dance were also hosted for the investiture ceremonies for princes and princesses, as well as for Palgwanhoe (Festival of the Eight Vows: a national memorial service for Heaven, holy mountains, the spirits of noted mountains and large rivers, and the dragon god of the ocean) and Yeondeunghoe (Lotus Lantern Festival: a national ceremony that honors the Buddha's virtue), hosted by the royal palace. As such, tea was always included in the list of gifts offered to soldiers, subjects, diplomatic representatives, and Buddhist priests. *Gaolitujing* contains an account about a banquet hosted by king for envoys returning from China, where cups, bowls, and pots brought by them from China were used.

Tea was drunk for certain rituals and daily routines at Buddhist temples. Tea was the most important item among the six offerings to Buddha made at Buddhist temples, along with incense, lanterns, fruits, and flowers. Participants of diverse Buddhist ceremonies including a tea ritual hosted by the head priest of a Buddhist temple or a tea ceremony held at a Buddhist monastery drank tea in accordance with the nature of the ritual and their social positions, which also required a wide diversity of tea instruments. This can be guessed from the celadon artifacts unearthed from the sites of Buddhist temples from the Goryeo period.

Among celadon, major items related with tea drinking included cups, bowls, glasses, ewers, spittoons, tube-shaped cups, boxes with covers, mortars, and double-headed drums. Of course, ewers and glasses are believed to have been related with drinking liquor, but bowls are thought to have been used as the container for tea when considering some examples of China. Many other celadon items such as ewers to pour water for tea and mortars for grinding tea leaves are thought to have been related with tea drinking or tea making.

7. Circulation of Celadon and Sea Routes

Over the last several years, tens of thousands of ceramics manufactured in the Goryeo period have been discovered and brought to the surface off the southwestern coast of the Korean Peninsula, providing new information about the history of Korean ceramics. Metal artifacts and wooden tablets discovered along with them also offer much information not only about the type and forms of ceramics from that time but also about people's lives on the ship and circulation of ceramics.

According to the Cultural Heritage Administration of Korea, the largest proportion (50 percent) of relics reported to be buried under the sea are from Goryeo, including many pieces of celadon. This indicates that the shipping of ceramics through near-coast routes was more active in Goryeo than in any other era. During the Goryeo period, taxes were levied in kind from across the kingdom; minerals, animals, seafood, agricultural products, and handicrafts were collected from their places of best origin. Ceramics including celadon were manufactured in places where quality clay was produced and then transported to cities including Gaegyeong. This may have been possible because of the geographical environment of Goryeo, where shipping through waterways toward the capital of Gaegyeong and the second capital Namgyeong, with their large demand for handicrafts, was easy. Therefore, the circulation and logistics through sea routes seems to have played an important role in the process of the production and use of ceramics in the Goryeo era. It can also be estimated that the establishment of kilns and the shipment of ceramic products were implemented in consideration of convenient and effective circulation.

In short, it is estimated that ceramic production sites increased as ceramic goods began to be levied as a tax from across the kingdom due to insufficient supply of them from kilns near Gaegyeong. Then, by the end of the 10th century and the beginning of the 11th century, when the nationwide governing system and tax system were completed, kilns would have begun to be actively operated in the southwestern coastal area near sea routes. That seems to be deeply connected with the fact that most of large-scale Goryeo kiln sites are located in areas near sea routes, including Haenam, Goheung, Gangjin, Yeonggwang, Buan, and Boryeong.

Ceramics of Joseon

1. Background of Production of *Buncheong* Ware

Buncheong ware is a generic term that refers to the ceramics of the Joseon Dynasty, which were made of celadon clay, dressed with white clay, and then fired. After Mongolian and Japanese invasions, the working environment at celadon kilns was degraded at the end of the Goryeo period. The central control of top celadon production sites in Gangjin and Buan was weakened, and the advancement of techniques was halted due to various economic and political difficulties. Master potters scattered across the country, leading to a geographical expansion of celadon production throughout the kingdom. Then, the quality of ceramics was diminished, but the base of their use was widened. As master celadon potters from Gangjin and Buan scattered to different regions and settled down there, ceramics came to have special features in different regions. In such circumstances, the glazing color and clay quality of celadon were downgraded by the end of Goryeo, and their patterns became much simpler, making the decorative design rather rough. In order to cover up such poorer quality, the grayish-blue clay body was covered with white clay and glazed with transparent enamel. Then, patterns were also added on the surface in a variety of methods. In short, ceramics were covered with white clay in order to conceal the body that had become rougher.

However, in the process of organizing the in-kind tax system collected from different regions to be delivered to the capital after the founding of the Joseon Dynasty, *buncheong* ware was selected as one of the most typical in-kind tax items. Then, *buncheong* ware with its common designs and decorations began to be produced, and they were used not only by the central and local government agencies but also by ordinary people. Most of the *buncheong* ware used at that time were inlaid ceramics that had also been widely used during the Goryeo era, as well as ceramics with stamped designs.

2. Various Techniques for *Buncheong* Ware

Buncheong ware was widely used over 200 years until the end of the 16th century, as the degraded quality of Goryeo celadon was recovered and the court of Joseon accepted it. At first, *buncheong* ware followed celadon's shape and decorative techniques, but it gradually came to have its own features. There were diverse decorative techniques for *buncheong* ware, which differed between regions and time periods.

The decorative techniques for *buncheong* ware were largely divided into inlaying, stamping, scraping, engraving, iron-painting, brushing, submerging, and so on.

The inlaying technique drew directly from the technique of Goryeo's inlaid celadon, so the designs applied were similar to those of Goryeo's inlaid celadon. The two main techniques used in inlaying were line inlaying, which uses white clay only, and surface inlaying, which can be used, for example, to express petals. Joseon's inlaying technique differed from that of Goryeo in that the area of the white-inlaid surface was larger and the proportion of surface inlaying increased.

In the stamping technique, designs are stamped on the surface of still-hardening ceramics after forming the figure, and then white clay is applied on the design and scraped out to allow the design to be expressed on the stamped part. As the same stamp can be applied to many pieces, the stamping technique is advantageous in that the size and quality of ceramics produced by it can be evenly maintained at a certain level. It was because of such merits that the *buncheong* ware manufactured in the stamping technique was selected as an in-kind tax item. Then, similarly stamped *buncheong* ware was produced from across the dynasty and various inscriptions were engraved on them for the sake of convenient management. Stamping was conducted to express diverse patterns such as chrysanthemums, butterflies, lotuses, flowers, circles, straw ropes, and more, which were stamped tightly over the entire surface of the ceramics. Those stereotypical decorations were applied to stamped *buncheong* ware without any significant change in the type or composition of the pattern. As the quality of the stamped decoration became rougher and gradually degraded, stamped *buncheong* ware almost disappeared by the beginning of the 16th century.

The brushing technique is to paint white clay liquid on the surface of ceramics with an uneven brush made of pig bristles or horse hair in order to make the grain and texture of the brushstrokes naturally expressed as part of the design.

The submerging technique is a method of dipping the entire piece or part of the piece into white clay liquid. When it is done perfectly, the ceramics produced in this technique obtain a decent quality that can even be mistaken for white porcelain. The *buncheong* ware manufactured in the submerging technique became widespread in the latest period of *buncheong* ware's production, and it is understood as the outcome of pursuit of "whiteness" for ceramics.

There was also a scraping technique of first covering all or part of the ceramic with white clay by brushing or submerging and then creating patterns by scraping off parts of the white clay. This is similar to the engraving technique, in which the artisan covers all or part of the ceramic with white clay and then scrapes thin lines off to make a design and reveal the color of the body.

The most unique and dynamic decorative technique for *buncheong* ware was iron-painting. In this technique, the surface of the piece is covered with white clay and a pattern is painted on it

using a high iron-content pigment. When fired, the pattern is rendered in a dark brown or black color. As the pattern is painted with a brush, even the same designs could be expressed in diverse styles including abstract, pictorial, or schematic. This technique was used mostly in the region of Hakbong-ri, Banpo-myeon, Gongju, Chungcheongnam-do, in the latter half of the 15th century. There exist more than 40 kiln sites in the area.

As such, a wide variety of decorative techniques were applied to *buncheong* ware, and, as explained above, different techniques were preferred by each region. Most of the *buncheong* ware of Gyeongsang-do were stamped *buncheong* ware, while most of the *buncheong* ware made in the Gyeryongsan Mountain area in Gongju, Chungcheong-do, were iron-painted *buncheong* ware. Also, *buncheong* ware decorated in the scraping and engraving techniques were mostly manufactured in the Jeolla-do region. Different techniques were popular in different ages. In early period, the most popular techniques were inlaying and stamping, and from the later 15th century, *buncheong* ware decorated in the brushing and submerging techniques became more popular.

Buncheong ware used rougher clay and had a darker color than celadon or white porcelain, but they show greater vitality with freer and rather informal designs that expressed unique individuality. Notably, brush-painted *buncheong* ware, in which patterns are actively painted with a brush on a surface covered with white clay, gives a dynamic and rhythmical feel. Iron-painted *buncheong* ware, on which flowers and fishes are freely painted, reveal a more modern, relaxed, and witty beauty.

There existed a wide variety of decorative techniques for *buncheong* ware. They differed between regions and times. Stamped *buncheong* ware was the most widely-used *buncheong* ware for government offices. Stamped *buncheong* ware was produced by stamping patterns on the surface of the still-drying body after forming the shape of a vessel, covering the body with white clay, and then scraping it off to reveal the pattern in white. When compared with inlaid celadon, whose quality differed greatly according to the technique of the potter, stamped *buncheong* ware had an advantage of guaranteeing at least a certain level of quality and standards, as the same stamp was used repeatedly for many pieces *buncheong* ware. That was why stamped *buncheong* ware was selected as a ceramics item to be offered as a tribute to the government. Stamped *buncheong* ware in a similar form was produced across Korea, and diverse inscriptions were carved on them for the sake of convenient management. Various patterns including chrysanthemums, lotus flower cups, lotus flowers, circles, and straw ropes were stamped on them to fill the entire surface tightly. Stamped *buncheong* ware maintained a standardized type and pattern, but its stamping became rougher and gradually degraded, leading to *buncheong* ware's disappearance in the end.

Another type of *buncheong* ware that well reveals the specificity of Joseon's *buncheong* ware is scraped *buncheong* ware. The scraping technique is done by coating the surface of a vessel in white clay liquid by using a brush or dipping the body, drawing pattern on it, and then scraping the white clay off the background to reveal the clay of the body. In such a way, the pattern is expressed distinctly in white. This technique was usually applied along with the engraving technique. As the entire surface except for the pattern should be carved off, the technique required more devotion from the potter. Also, the technique was mostly used for large vessels such as vases or double-headed drums, since the area of the pattern carved on them is larger because of their characteristics. The patterns used for *buncheong* ware were usually peonies, peony vines, lotus flowers, lotus vines, or fish. Scraped *buncheong* ware was produced largely at kilns in Jeolla-do: Yongsan-ri, Gochang, Jeollabuk-do; Udong-ri, Buan, Jeollabuk-do; Chunghyo-dong, Gwangju, Jeollanam-do; and Undae-ri, Goheung, Jeollanam-do.

While the body of the white porcelain bottles of the Joseon Dynasty were created by spinning on the wheel with the flat side facing the floor to make it flat, the bodies of *buncheong* ware flat bottles were first formed by spinning on the wheel and then pushing both sides of the body lightly, like other earthenware flat bottles produced since the era of Unified Silla.

The *Buncheong Flat Bottle with Sgraffito Lotus and Fish Design* was made with the scraping technique of covering the body with white clay with a brush except for its mouth and foot, drawing the design, and then scraping the white clay from the background around the design to reveal the original color of the clay. Therefore, it has a white pattern and dark background, which creates a strong color contrast. Two rings are put around its shoulder, and petals are put under the rings. On either of the widely bulging sides are blossoming lotus flowers between lavish lotus leaves, yet-to-blossom flower buds, and fishes swimming between lotus pips, drawn in a vivid and free touch, displaying the outstanding skills and the potter's confidence in his own proficiency. The narrower sides of the body are divided into three layers; a flower pattern is drawn in the first two layers, while a lotus flower cup is drawn in the lowest layer. The boundary between each layer and pattern is marked with two lines. The scraping technique and the technique of drawing flowers on ceramics are appropriately applied to enable free expression and demonstration of the unique savor of *buncheong* ware from the rough texture revealed in the design rendered in white color. The glazing of the bottle is tinged brown, and the color of the body itself is dark.


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Buncheong Placenta Jar with Stamped Chrysanthemun Design

3. *Buncheong* Ware with Inscriptions and Their Meanings

Unlike *buncheong* ware produced in other techniques, many pieces of stamped *buncheong* ware had inscriptions on them. There are many types of inscriptions including the name of the government agency to which the *buncheong* ware was to be offered, the name of the place of its manufacturing, the time of manufacturing, the place of its use, marking of its grade, the name of its producer, and so forth. Notably, the name of the government agency and name of the production site were inscribed on many pieces of *buncheong*


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Buncheong Flat Bottle with Incised Fish Design

Production process of stamped *buncheong* ware

(1) Forming: A vessel is made with clay.
(2) Drying: The vessel is dried slightly so that stamp can be applied on it.
(3) Placing the pattern: Stamps of the desired patterns are applied on the surface of the vessel.
(4) Covering: White clay is brushed on the surface of the vessel.
(5) Leveling the surface: The white clay is scraped off from the entire surface except for where the pattern is placed, to level the surface. Then, the pattern is revealed in a white color.
(6) Biscuit firing: The vessel is biscuit-fired at a low temperature of 700–800℃.
(7) Glazing: The biscuit-fired vessel is glazed.
(8) Second firing: The glazed vessel is fired again at a high temperature.


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Buncheong Flat Bottle with Sgraffito Lotus and Fish Design

Production process of scraped *buncheong* ware

(1) Forming: A vessel is created with clay.
(2) Covering: The entire surface or part of the vessel is coated with white clay, by brushing it or dipping the vessel in white clay liquid.
(3) Placing the pattern: The pattern is engraved on the surface of the vessel covered with white clay.
(4) Scraping: The white clay on the background of pattern is carved off with a knife. Then, the pattern remains white and the background is dug out slightly to reveal the color of the clay of the body.
(5) Biscuit firing: The vessel is biscuit-fired at a low temperature of 700–800℃.
(6) Glazing: The biscuit-fired vessel is glazed.
(7) Second firing: The vessel is fired again at a high temperature of 1,200℃.

ware used for the in-kind tax system in which ceramics needed by government agencies were collected as tax.

Since its founding, the Joseon Dynasty implemented a system of receiving completed ceramic products to be used at the royal palace, by the central government, and by local governments after their manufacture in different regions. However, the management of those ceramics offered from different regions continued to fail due to the social confusion at the end of Goryeo and the absence of a well-operating system in the early Joseon period. In order to resolve the problem, the central government required inscriptions on ceramic products. The inscription of the name of government agencies to use the *buncheong* ware was done for the purpose of clarifying who was responsible for the process of its use from manufacturing to post-manufacturing management, and the inscription of the name of each place of use from the even the manufacturing stage made the grouping of those ceramic products possible to be managed efficiently.

Inscription of letters that are presumed to be the surnames or given names of potters were found on the feet of ceramics discovered from the kiln site in Chunghyo-dong, Mudeungsan Mountain in Gwangju, Jeollanam-do, which is known to have been one of the leading kiln sites for *buncheong* ware. Such inscriptions seem to have been made in the interest of efficient collection of the ceramic offerings.

4. Joseon Dynasty's Royal Palace and White Porcelain

Joseon's white porcelains are compact ceramics fired at a high temperature of over 1,250–1,300℃ after making the body with clay and then glazing. Notably, as kaolin-type clay was used for them, the selection and refinement of earth, as well as the process of molding and firing, was very complicated for the completion of high-purity white porcelain. As the clay used for white porcelain had a high level of viscosity and low level of plasticity, it was not easy to form large pieces. White porcelain began to be produced from the early period of Goryeo. It was manufactured along with celadon from around the 10th century at kilns in the central region of the Korean Peninsula.

However, it was from the later 15th century when the royal palace of Joseon established the Bunwon ceramics workshop under Saongwon in Gwangju, Gyeonggi-do, that the full-fledged production of white porcelain began in accordance with the establishment of an institutional framework and standards of ceramic products. As Saongwon was a government agency in charge of food-related tasks that required formalities and procedures, including the king's daily meals, palace banquets, and envoy reception, Bunwon under Saongwon led the production of Joseon's white porcelains from the 15th century until the end of the 19th century.

One of the purposes for establishing the royal kiln in Gwangju, Gyeonggi-do, in the later 15th century was to manufacture quality ceramics to be used at the royal palace and different government agencies. The use of the royal ceramics manufactured at the royal kiln was strictly restricted according to users' social status and ranks from the early period of Joseon. White porcelain with top quality were for kings. *Gyeongguk daejeon juhae* (a compilation of interpretation and notes on the *Gyeongguk daejeon*, which was the book of Joseon's codes) defined that "white porcelains are used for king's eating." *Yongjae chonghwa* (a collection of miscellaneous writings that describe Korean culture from the Goryeo period until the reign of King Seongjong of Joseon, written by a man named Seong Hyeon), published in the early period of Joseon, recorded, "The usage of white porcelain dishes was exclusive for the king during the reign of King Sejong."

Joseon's awareness of the importance and necessity of ceramics from before the establishment of a royal kiln is also proven from *Sejong Sillok* "Jiriji" (Annals of King Sejong—Geography) that mentioned the establishment of 139 porcelain workshops and 185 earthenware workshops. The 324 ceramics workshops marked in *Sejong Sillok* "Jiriji" were important sources of tax income, as ceramics were an important in-kind tax item of local products offered to the central government. They were also needed as tribute demanded by Ming China. Mass production of ceramics as utensils for the daily lives of people at the royal palace became desperately needed, so the operation of a ceramics workshop exclusively for royal ceramics was a critical issue.

The demand for ceramic products for daily use at the royal palace increased substantially from the reign of King Taejong until the years of King Sejong. During the years from King Taejong to King Sejong's reign, the use of gold and silver tableware, which were in short supply, was banned, and white porcelain tableware was used for everyday life at the palace. Notably, King Sejong himself used porcelain tableware or wooden lacquered ware instead of gold or silver tableware that promoted extravagance. Records in *Yongjae chonghwa* which say that "white porcelain was used from King Sejong's reign" suggest the fact that a large volume of white porcelain was needed by the royal palace from the days of King Sejong. Records also say that the silverware used at ancestral shrines was also replaced with white porcelain from sixth month in the 29th year of King Sejong's reign (1447). So it is possible that the majority of tableware used for royal ceremonies was white porcelain from around 1447.

This is why ceramics of Joseon developed differently from the splendid colorful ceramics that achieved great commercial success in China and Japan at that time. It is thought that the institutions and conservativeness of Joseon were materialized in the mostly white single-color design, to distinguish the beauty of Joseon's porcelain from the ceramics of China or Japan.

The reason for the location of Bunwon in Gwangju, Gyeonggi-do, seems to have been because of the distance to Hanyang (now Seoul) and the matter of transport. The records in *Goryeosa jeoryo* (Essentials of Goryeo History) for the first year of King Gongyang (1389) say that there were many difficulties in producing royal ceramics in far-away areas and transporting them to the capital. Therefore, it is believed that an area near the capital of Hanyang of Joseon from which completed ceramics could be easily transported was selected for the location of the royal ceramics workshop in the Joseon Dynasty period.

The practice of Confucian formalities and Confucian hierarchical order were the foundation of the Joseon Dynasty. For all its people, from the royal family to ordinary citizens, many different utensils were needed for the exercise of formalities systemized in *orye* (five national rituals). Those utensils were used to visibly display the authority and justification of the royal family. That is why much effort was made to produce craftwork that satisfied a certain standard of quality in compliance with the Confucian rules and formalities. For example, white porcelain and design items were used in line with the rules for the 60th birthday banquets of kings or queen mothers, in order to fulfill the filial duty. In the same context, wine was contained in white porcelain pots, and flowers were put in white porcelain vases, for the purpose of realizing the philosophy of "peace with everyone" by creating an ideal space for banqueting. Actually, records about the white porcelains and objects used for diverse banquets and ceremonies hosted at the royal palace were left in the checklist for royal ceremony items or illustrated accounts included in *uigwe* (The royal protocol of the Joseon Dynasty), revealing the quantity, type, and procurement method of the necessary white porcelain.

The color, size, and pattern of white porcelain were restricted according to the nature or participants of banquets. While diverse decorative techniques including blue and white coloring were applied, the basic principle of respecting Confucian hierarchical order and frugality was kept for the production of white porcelain. For example, different varieties of foods were served to the royal family members of different ranks, including Lady Hyegyeong, King Jeongjo, *daegun* (princes), and guests, at the 60th birthday banquet for Lady Hyegyeong, the mother of King Jeongjo, which was hosted in 1795 at Hwaseong Fortress in Suwon. The type and number of white porcelains used to serve the foods also differed according to the ranks of the guests.

Formalities were also important for funeral rites, so the number and type of porcelains used as burial goods and memorial stones for a memorial service held in front of a grave were also restricted. The number of white porcelains produced for the burial of placenta after the birth of babies increased in line with the spread of the placenta burial ceremony. Notably, it was deemed that the funeral rites and placenta burial ceremonies of the royal family were tied to the fortunes of the country, so their procedures and utensils were important. This resulted in the development of various white porcelains for burial.

Therefore, the royal family and different government departments' concern and interest in the entire process of producing white porcelains, from the collection and transport of white clay used at Bunwon for the production of white porcelains to their refinement and firing, rose continuously from the early Joseon Dynasty period. The deep concerns over the structure of kilns are seen in the remains of kilns, based on the fact that the length and slope of kilns were specified for effective firing; the cleanliness within kilns was maintained by covering the inside with white clay; high temperatures and purity were secured by using plates used to support ceramics inside kilns; and filtering was conducted multiple times, as mentioned in written records and as can be seen from the remains at the kiln sites.

5. Various Decorative Techniques for White Porcelain

The proportion of plain white porcelains without any design on them was high for the white porcelains of the Joseon Dynasty, but a wide variety of designs were also applied in diverse techniques. In some cases, white porcelains served as the means to display their owners' social rank, as the design on them indicated the social class of their user. Some of them were produced to express the taste or desire of their users, thereby reflecting certain trends or values of the times. The technique or materials used for decorating white porcelains with patterns were chosen selectively in accordance with the social circumstances of the times. As a hierarchy existed between the decorative techniques and materials, the value and status of white porcelains were perceived differently according to how they were made.

The technique of adding decoration to white porcelains can be divided into two-dimensional and three-dimensional expressional methods. The two-dimensional expression methods include an inlaying technique of expressing a pattern by adding clay of a different color to the white body, as well as blue and white, iron-painting, and copper-painting techniques that use pigments to paint designs on the surface of white porcelain. When the wide porcelain surface is painted by using such pigments, they are also called blue and white, iron-painted, or copper-painted porcelains. The methods of expressing a design in a three-dimensional way include relief and openwork techniques. In addition, white porcelains modeling certain three-dimensional figures, not just putting patterns on the surface, were produced, too. Some pieces utilized a singular decorative technique, while others made simultaneous use of multiple techniques.

(1) Inlaid white porcelain: It was not only the blue and white technique that was used to decorate white porcelain from the early period of the full-fledged production of white porcelains in the Joseon Dynasty. The inlaying technique that was an important decorative technique for celadon and *buncheong* ware developed before it continued to be applied to the white porcelains of Joseon. The inlaying technique is thought to have been used for Joseon's white porcelains around the 15th to 16th centuries. Most of the inlaid pattern was expressed with black lines. Flat bottles and memorial stones decorated in the inlaying technique were discovered among burial goods of a grave made in the mid-15th century, increasing understanding of the time period when inlaid white porcelains were produced.

(2) Iron-painted white porcelain: For iron-painted white porcelain, the design is painted with pigment that bears a brown-black color from an oxidized iron substance on the surface of biscuit-fired white porcelain, and then they are glazed and fired

again. The pigment was called "iron red" in the records of the Joseon Dynasty. The iron red pigment made from earth that contains an oxidized iron substance was able to be obtained relatively more easily than iron red pigment imported from China. It was after the 17th century that the iron red pigment was used as an important decorative element for white porcelains. Reconstruction of the ruined foundations of the country was the most urgent task for Joseon, devastated after the Japanese and Manchurian invasions from the end of the 16th century into the early 17th century. Diverse utensils for royal and national ceremonies and rituals had to be newly produced. However, royal kilns did not have enough source materials to make the necessary amount of ceramic products. Blue and white porcelain, such as the Dragon Jars used for important royal ceremonies, could not be manufactured because it was difficult to supply the blue pigment. Records from the early 17th century indicate that the central government of Joseon continued its effort to secure the blue pigment for the production of blue and white porcelain and tried to import completed blue and white porcelain products from China. But such efforts do not seem to have been successful. In such circumstances, Dragon Jars, the most luxurious utensil used at the royal palace, began to be manufactured with iron pigment instead of the blue pigment. As the production of such iron-painted white porcelains was a temporary measure taken to fill the shortage of blue and white porcelains, luxury utensils for royal use such as Dragon Jars were not manufactured in the iron-painted technique any longer after the production of blue and white porcelains was resumed. The design expressed in deep brown or black colors on the white background gives a feel like ink wash painting or calligraphy. That is why the artistic taste of literary men was expressed by putting such pictorial pattern or lines of poems on iron-painted white porcelains.

(3) Copper-painted white porcelain: Copper-painted white porcelains are those painted with pigment made from oxidized copper and then glazed and fired to express a design in a reddish brown or purple color. This technique is also called the *jinsa* technique, but the origin of the word has not yet been clearly identified. No case of copper-painted white porcelains from the early period of Joseon have been discovered, which indicates that they developed mostly in the later period of the dynasty. Copper-painted white porcelains left until today mostly have simple flower or stem designs or the subjects of folk paintings, hoping for good luck.

(4) Relief white porcelain: Relief white porcelains are decorated not by painting with pigment, but by relief-engraving a design to stand higher that the background in a three-dimensional way. It is a method of expressing a design to protrude, by shaving the surroundings of the design part off or stamping the design, or attaching a separately-stamped design on the surface. In other cases, design was expressed by painting and applying a goopy white clay on the surface with a tool. It was in the later period of Joseon when the relief technique began to be used to decorate white porcelains. The relation between the production of relief white porcelains and blue and white porcelains has been drawing attention. Many of relief white porcelains have a design of flowers, such as peonies or apricot flowers, inscribed letters, or symbols of longevity.

There were also openwork white porcelains on which the design was expressed by carving the surroundings of design or the design itself through the surface, leaving the center hollow, as well as white porcelains that are modeled after certain figures. Even though there are not many pieces of such white porcelain left today, they are known to be the ones with the highest level of difficulty and diversity of production. Most of the openwork white porcelains are stationery items, ornaments, and ritual goods, and they are thought to have been produced based on an idea borrowed from other types of handicrafts like jade, ivory, or wood. They were mostly produced in the later period of Joseon when the demand for luxury stationery goods was high.

6. Blue and White Porcelain

Blue and white porcelains were sought after as a luxury ornament item throughout the Joseon Dynasty period. After biscuit-firing, the design was painted in a cobalt mineral pigment called *Hoehoecheong* (blue pigment from Arabia) on white porcelains, to be glazed and fired. The design in blue stands out against the white background. The design on the blue and white porcelain is thought to have been painted by royal painters dispatched to Bunwon. *Sinjeung Dongguk yeoji seungnam* (a government-published geography completed in the early 16th century after surveying the geography and local products nationwide from the early period of Joseon) mentions ceramics as the local product of Gwangju, Gyeonggi-do, where the royal kiln was located, recording that "government officials from Saongwon go to Bunwon with royal painters" to supervise the firing of royal ceramics. Royal painters participated in the process of producing the blue and white porcelains, because the blue pigment imported from China was a very precious product and excellent painting capabilities were required to skillfully paint on the curved surface of the ceramics. Indeed, the popular subject matters for painting, such as bamboo, apricot flowers, chrysanthemums, and pine trees, were expressed sophisticatedly with the blue pigment on the surface of white porcelain pieces discovered from the site of the kiln operated in the early Joseon period.

The time of the first production of blue and white porcelains in Joseon has yet to be determined, but a blue and white porcelain memorial stone produced in the mid-15th century has been passed down until today. In addition, as people had a great interest in blue and white porcelains imported from China, the upper class of Joseon seems to have had an awareness of them. Blue and white porcelains began to be produced in Joseon in earnest in line with the introduction of the cobalt pigment as the pigment for white porcelains during the era of the Yuan Dynasty of China. Blue and white porcelains that advanced during the Yuan and Ming dynasty periods of China spread to Joseon early. According to records written during the reign of King Sejong, blue and white porcelains were introduced to the royal palace of Joseon in the early period of the Dynasty as gifts from the royal court of the Ming Dynasty


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White Porcelain Jar with Plum and Bamboo Design in Underglaze Iron

or products purchased by Joseon's envoys during their visit to China. After their introduction, Joseon tried the production of blue and white porcelains for the first time themselves, and they were deemed as a luxury item.

Yongjae chonghwa, written by Seong Hyeon in the mid-Joseon period, includes a record that goes, "From the reign of King Sejo, colored ceramics were used together. The Arabian cobalt blue pigment was imported from China to paint figures on liquor pots, liquor jugs, wine glasses, and goblets." The liquor pots, liquor jugs, wine glasses, and goblets stated in the book were used for rituals and memorial services to contain liquor. This statement indicates that blue and white porcelains were used as the top-quality tableware for special purposes at the royal palace in the early Joseon period, along with white porcelains.

The fact that blue and white porcelains were used as the highest quality tableware at the royal palace in the mid-15th century is revealed from the records in the *Sejo Sillok* (Annals of King Sejo) written in 1455. It talks about an episode wherein the kitchen of the queen resort's palace called *junggung* requested manufacture of golden glasses, but Gongjo, a department in charge of the production of objects for the use at the royal palace, ordered to the golden tableware to be replaced with painted ceramics. As those painted ceramics had to substitute for golden tableware to be used by the queen, they must have been valuable high-quality products comparable to golden utensils. The use of white porcelains was limited only for the top ranks among the people at the royal palace, so it can be presumed that the kind of painted ceramics that could replace golden glasses were the blue and white porcelains.

This fact is also indicated by records left in books, relics discovered in the capital of Hanyang, and privately-produced blue and white porcelains discovered in Jingdezhen in China. It can also be conjectured from records written in the sixth year of King Seongjong's reign (1475) which went, "The scholar-gentry houses do profligate spending habitually day after day and they compete with one another to boast their luxury, to an extent that they don't use other ceramics than expensive blue and white porcelains for small or large banquets. . . . Blue and white porcelains are mostly produced in China, so it is difficult to transport them from China to Joseon, but still, every scholar-gentry house has them. . . . Please prohibit the use of blue and white porcelains by them." The record shows that blue and white porcelain was a very precious and luxury item, even though it is not clear whether the porcelain mentioned was made in China or Joseon.

As the cobalt pigment was an expensive product imported from China, it was of course not easy for Joseon's craftsmen to skillfully paint blue and white porcelains, because of lack of experience. That is why only a few pieces were manufactured by royal kilns in the early period of Joseon and royal painters painted the design on them. Accordingly, blue and white porcelains made in the early Joseon period and passed down today are mostly those with special figures, such as bottles, saucers, or jars.

This seems to be why there existed grades for the pigments used for white porcelains of Joseon. White porcelains with blue-colored designs were mostly high-quality products. This is shown in how different blue and white porcelains and plain white porcelains were used according to the social rank of guests of royal banquets, as well as from the fact that the main design in a white porcelain item with both main and subsidiary designs was painted in blue, as in the case of *White Porcelain Jar with Mountains and Lightening Design in Underglaze Cobalt Blue and Iron* (Treasure No. 1056), kept by Leeum, Samsung Museum of Art. In other words, the existence of design on ceramics and the rarity of the pigment used for them was not just a matter of people's taste or preference, but served as an indicator of the users' social status and the tool to fulfill the objective of ceremonies.

In the 19th century, Bunwon began to produce more blue and white porcelains to meet the increasing demand. *Bunjuwonbodeung* records the operation of Bunwon by the end of Joseon, saying that there were as many as 14 master painters who painted on white porcelains with blue pigment at Bunwon. It was a quite different situation from the early Joseon period when royal painters were dispatched to Bunwon each spring and autumn so that they could commit themselves to painting on white porcelains. Craftsmen specialized in painting on ceramics stayed at the workshop for mass production.

Blue and white porcelains were very rare even at the royal palace at first, but their use gradually spread to the ordinary people of

Joseon in a few centuries. Ordinary people became able to use them regardless of their social rank, even though those ceramics were still expensive, to widen the spectrum of blue and white porcelains' use from royal rituals to the daily lives of ordinary people. Furthermore, copper-painted porcelains painted with oxidized copper were used in parallel with blue and white porcelains, and such an expansion of the use of patterned white porcelains was the most remarkable signal for changes in the society of Joseon—the breakdown of the boundaries and barriers between different social classes and their culture.

Blue and white porcelains began to be used at the royal palace again after the 18th century in line with the increase in their production volume, resulting in the production of white porcelain used for appreciation, apart from rituals. The most prominent examples of such porcelains include white porcelains that express pictorial composition or subject matters such as the Four Gracious Plants (plum, orchid, chrysanthemum, and bamboo), landscapes, flowers and birds, and verses of poems. Notably, the style of ceramics on which lines of poems are written as a design, which had already emerged in the Goryeo period, was more actively produced after the founding of Joseon, showing that ceramics were not only daily utensils but also expressed the tastefulness of *seonbi* (Confucian scholar-cum-government officials). Some of those ceramics had the poems written by *seonbi* themselves or famous lines from poets of the Tang or Song periods. A substantial proportion of them sang about daily activities such as drinking, to arouse many people's interest.

Such tastefulness is also seen in blue and white porcelains painted with landscapes. Those porcelains draw attention in that they express ideal natural spaces. Considering statements about blue and white porcelains painted with landscapes in historical records and materials, the chance of their use for rituals seems to be low. Rather, it seems that they were produced for the purpose of appreciation, by reflecting pictorial compositions, much like landscape picture books, landscape painting folding screens, and landscape painting items, to maximize both practicality and decorativeness. It is also related to the royal family's trend of sightseeing around natural landscapes, as well as the popularity of the landscape poems and paintings among the new scholar-official class.

In addition, a wide variety of patterns or decorative figures that symbolize good luck were applied to blue and white porcelains. Designs made with the figure of Chinese character 壽 (longevity) and 福 (luck), as well as figures of peaches, which symbolize life, and bats, which symbolize luck, were drawn on them. Also, white porcelains modeled after peaches and turtles were created. Notably, decoration with Chinese characters such as 壽 and 福 is thought to have been spread in line with the social atmosphere in the later Joseon period, when people followed many trivial rituals in their everyday lives to wish for good luck, as well as growing focus on filial duty that followed the process of expansion of the royal palace's ceremonies and rituals.

The mouth of the *White Porcelain Jar with Grape Design in Underglaze Iron* (National Treasure No. 107), which stands high and upright, its round shoulder, and dramatically narrowing base together create a noble look, giving a breathtaking feeling of tension. The entire surface of the jar itself works as a canvas without any special decoration, just showing vines rambling between wide leaves, grape fruits, and branches naturally hanging down from the shoulder toward the middle of the body of the jar in bold lines and natural composition, as well as appropriately placed white space. The comfortable scene even gives a feel of the movement of the vines swinging with the wind. The carefree brushstroke and elegant atmosphere look like that of a painting rather than a design on a jar. Notably, the effect of light and shade created by controlling the use of iron pigment is expressed very realistically and appropriately as in black and white grape paintings. The thick part is colored brown while the lighter parts are in a more greenish brown to look realistic, indicating that the one who painted on this jar was very adept in painting.

The "Porcelain" chapter of the "Local Products" section in the part about Gwangju-mok, Gyeonggi-do, in *Sinjeung Dongguk yeoji seungnam* said, "Every year, officials of Saongwon go to Bunwon with royal painters to supervise the production of ceramic vessels to be used at the royal palace." As such, it is highly likely that royal painters directly went to ceramics workshops to put such pictorial designs on porcelains until the late Joseon Dynasty period.

There remains a trace in the middle of the body of the jar that indicates that the upper body and lower body were manufactured separately and then put together. The light blue enamel with almost no cracks also looks beautiful in harmony with the shape of the body and the design, to make the jar a masterpiece.

7. Spread of Joseon's Potters and Ceramic Techniques to Japan

The Kyushu region of Japan emerged as the biggest center of ceramics manufacturing in Japan since the 17th century. While it is largely attributable to Japan's exchanges with China, Joseon's potters kidnapped to Japan during the Japanese invasions of Joseon in 1592 and 1597 also played a significant role in the formation of the tradition. Toyotomi Hideyoshi ordered Japanese generals going to war with Joseon to kidnap the people of Joseon, the key point of such order being to kidnap useful technicians. That is why the Japanese randomly kidnapped Joseon's people and sorted through them for technicians. Approximately 50,000–100,000 people of Joseon, including master craftsmen with expertise in diverse traditional techniques of Joseon such as pottery, were kidnapped by the Japanese in the process.

The Japanese invasion to Korea in 1592 is also called the "war of ceramics," which demonstrates Japan's great interest in new ceramics techniques and their obsession with Joseon's ceramics culture. Japanese generals separately sorted master potters with knowledge of ceramic production techniques out of the Joseon people they kidnapped. The potters kidnapped from Joseon stayed in those Japanese generals' territories and received their financial support to produce ceramics, staying under their strict control for prevention of the leakage of the techniques. The Joseon potters kidnapped to Japan were mostly from Gyeongsang-do, Jeolla-do, and Chungcheong-do provinces, and most of them settled down in the Kyushu region in Japan. Kyushu is still the center of Japan's ceramics culture. Famous Joseon potters who went to Japan during those times included Yi Sam-pyeong from the Geumgang area (near Gongju in Chungcheongnam-do) and Sim Dang-gil from Namwon, who was the progenitor of the house of today's famous potter Sim Soo-gwan.



White Porcelain Jar with Grape Design in Underglaze Iron

The potters of Joseon kidnapped to Japan used the style of Joseon's white porcelains in the 16th–17th centuries. Their techniques were outstanding, to the extent of resulting in the restructuring of the system of Nabeshima territory that had jurisdiction over Arita in early 17th century with focus on the potters from Joseon. Notably, Yi Sam-pyeong, who was one of the Joseon potters kidnapped to Japan, discovered a kaolin white clay vein in Izumiyama in 1616, making a great contribution to the advancement of Japan's ceramics industry.

Yi Sam-pyeong and Sim Dang-gil were included among the Joseon potters who were kidnapped to Japan during the Japanese invasion to Korea in 1592. Sim Dang-gil was the progenitor of Satsuma ware. Shimazu Yoshihiro, the daimyo (lord) of Satsuma Province, now Kagoshima, kidnapped approximately 40 potters of Joseon from Namwon in Jeollabuk-do and other regions in 1598, and Sim Dang-gil and Bak Pyeong-ui were among the group of those kidnapped Joseon potters. The two manufactured ceramics in the same region in the same age and the lord of Satsuma Province treated them with respect comparable to that for samurai. The ceramics created by those Joseon potters were named after the name of the region: Satsuma ware.

Yi Sam-pyeong was kidnapped to Nabeshima Province, now Saga Prefecture, and he settled down in the Arita region in the province. Yi Sam-pyeong discovered a kaolin white clay deposit for the first time in Japan in 1616 in Izumiyama in Zohakukawa in the Arita region, advancing Japan's production of white porcelain. Three decades later, numerous potters gathered in the region, resulting in the prosperity of the ceramics industry there. Then, government-owned kilns and private kilns in Nabeshima Province produced not only high-quality white porcelains exported to Europe, but also blue and white porcelains targeting diverse consumer groups in Japan, evolving into one of the world's most famous countries for the origin of ceramics.

It is known that many more than 100 Joseon potters were kidnapped to Japan along with Yi Sam-pyeong. As those potters came to own and operate the kilns in the Sarayama area in Arita, Japan's own production of hard ceramics became possible. Ultimately, Arita is even now famous as the hometown of Japanese ceramics, while Yi Sam-pyeong is revered as the father of Japanese ceramics. A shrine and monument were built in Arita to honor his achievement.

Privatization of Bunwon and Changes in Traditional Ceramic Production

The number of ceramic utensils used for royal ceremonies greatly increased as they were hosted more frequently after the 19th century. In addition, ceramic products were stolen in the process of being moved to Hanyang as in-kind tax, due to laxity of the tax collection and transportation system. Those changes resulted in increase in the production volume at Bunwon over a certain level. As ordinary people came to have a greater preference for ceramics produced by Bunwon following the development of the commodity economy and increase in private kilns, while profits accumulated from ceramics products also increased, ceramic shops opened all over the peninsula. The ceramic tableware produced at Bunwon that had been limited to use by the privileged class including kings and royal family members in principle came to be sold at markets, making anyone who could afford it able to use them. In 1883, the royal palace implemented restructuring of the ceramics industry, to permit private production of Bunwon ceramics. Then, it established a ceramics company and newly appointed 12 official royal merchants for the supply of ceramics to the royal palace. The 12 royal merchants took charge of the operation of Bunwon and supervised the delivery of ceramics products to the royal palace and their sales on the market.

The royal merchants took charge of operating Bunwon after the

permission of private ceramics production in 1883 when the accumulated unpaid amount from the royal palace was incurring much loss to them. However, they were able to offset the loss with the profits from the market sales. While ceramics were sold nationwide, the largest market for them was Jongno market in downtown Hanyang. Bunwon, operated by royal merchants, was given the exclusive privilege of ceramics sales on the markets in the capital and Gyeonggi-do in return for the delivery of ceramics to the royal palace and government agencies, as well as the privilege of cracking down on unauthorized sales of ceramics. They also put pressure on other merchants in order to prevent the sales of ceramics imported from foreign countries including Japan in the markets of Hanyang. However, by the year 1894, profitability of ceramics sales deteriorated and debts continued to increase, becoming the fundamental obstacle for Bunwon's transformation into a modern company. Eventually, Bunwon came to be operated in the form of a company in 1897 by those who owned capital.

The thickness of white porcelains produced by Bunwon increased by the end of the 19th century, while bold, dynamic, or unconventional designs such as the ten traditional Symbols of Longevity, fish, lotus ponds, clouds and cranes, water plants, and other plants were applied to them. Blue and white porcelains and copper-painted porcelains increased, along with white porcelain pieces richly decorated in both blue and copper painting. Furthermore, stationery items such as water droppers modeled after *haetae* (mythical unicorn lions), peaches, or toads and pencil cases made to imitate the texture of wood or stone were manufactured in at large volumes. Tableware in angular shapes was manufactured in a large volume, too, as the techniques became more advanced. Their decorativeness stands out, with designs put on the entire surface. Such a change is thought to have been induced by the spread of the demand for ceramics to ordinary people and introduction of diverse trends from overseas.



Modern Arita ware



Modern Satsuma ware



Shrine that honors Yi Sam-pyeong, in Arita, Japan

Conclusion

Earth is the most long-used and familiar craft material for all of humanity. The Korean Peninsula is home to a time-honored history of ceramics, comparable even to that of China. The very basis for Korean ceramics used in the lives of its people has been earthenware, from the pre-historic times to today. Even though earthenware is not as beautiful as snow-white white porcelain, it has always been there throughout the entire process of Korean people's life from birth to death. As such, earthenware can be deemed as a symbol of human being's conformity to the natural journey of life from birth to death. The quality of earthenware was diversified in Korea until the end of the 9th century, although of course, there existed differences in the quality and form of earthenware according to their firing temperature, glazing, and usage. In these days, it still had maintained a mutually complementary relationship with metalware and woodenware. Over the period of the Three Kingdoms and Unified Silla, newly-introduced Chinese celadon and white porcelain began to be used on the Korean Peninsula, leading to the diversification between high and low quality ceramics. Such a change in the ceramics environment became the catalyst for the domestic manufacturing of celadon and white porcelain.

Korea had sufficient technical proficiency for the production of ceramics, but its development languished behind China. By the beginning of Goryeo, demand for diverse ceramics for the new dynasty increased, and ceramics techniques introduced from China advanced the domestic production of celadon and white porcelains in Korea.

Celadon began to be produced in earnest from around the 10th century, mostly in the mid-west coastal region on the Korean Peninsula. By the 11th century, which was the time of full-fledged advancement of celadon, the quality, shape, and designs put on the surface were stabilized. By the 12th century, unique characteristics of Goryeo celadon appeared based on the technical skills accumulated by then. In other words, celadon had already been used for the daily lives of people by that time and artisans began to create new forms unique to ceramics by actively borrowing and applying the formative and functional advantages of past kinds of earthenware or metalware. The formative art of ceramics further advanced, as diverse decorative techniques such as inlaying, iron underglazing, openwork, and relief were newly developed. Goryeo's jade-green celadon and inlaying technique were excellent, even when compared to China's ceramics techniques of the same era. Over the Goryeo period,, the nature and usage of ceramics were expanded, going beyond just use for eating and drinking. They came to be used as interior decoration goods, utensils for daily life, and construction materials.

From the era of the Joseon Dynasty, white porcelain began to be used exclusively at the royal palace, and the workshop for royal white porcelain called Bunwon was operated in an area of Gwangju in Gyeonggi-do from the late 15th century. As Saongwon was a department at the royal palace that was in charge of king's meals and all the foods served at banquets hosted at the royal palace, it took the responsibility of supervising the royal ceramics workshop Bunwon to fulfill their duty. As such, Bunwon under Saongwon was a workshop of producing ceramics to be used at the royal palace and government agencies and it was run until the end of the Joseon Dynasty in the 19th century. While the focus of ceramics manufacturing at Bunwon was plain white porcelains, white porcelains decorated in the inlaying, engraving, iron-painting, openwork, and relief techniques were produced as well. Notably, blue and white porcelains enjoyed great popularity over the longest period of time from the early period until the last moments of Joseon.

The official royal ceramics production system introduced in the 15th century was maintained until Bunwon's privatization in the 19th century. Even though some white porcelains were manufactured to be sold to ordinary people for the sake of potters' livelihoods or for fulfilling the increasing demand for top-class white porcelains for people, ceramics production was basically under the control of the royal palace for more than 400 years, as the central government was strong-willed for the maintenance of Joseon's Confucian order that was expressed through ceramics.

The color, size, and design of white porcelains were limited according to the nature of occasions in which they were used, including rituals, funerals, banquets, and congratulatory ceremonies. While diverse decorative techniques including blue and white coloring were used for white porcelains, the endeavor to stay within the basic principle of pursuing Confucian order and frugality was maintained. That is why the advancement of Joseon's ceramics was headed into a new direction distinct from China and Japan, where colored ceramics became mainstream after their commercial success. Joseon's social institution and conservativeness were materialized in the snow-white color of white porcelains decorated with solid-colored designs, creating the unique beauty of Joseon's white porcelains distinguished from those of China and Japan.

Founded in 1978, the Academy of Korean Studies (AKS) has been a leader in Korean studies in the nation and around the world. The AKS is one of the world's most important institutions of research and a distinguished learning environment for scholars and graduate students in Korean studies. For 41 years, the AKS has been devoted to promoting broader understanding of Korea. It seeks to support research and teaching on Korean issues in a range of scholarly fields, to create academic relationships with many countries and regions, and to advance knowledge and a greater public awareness of Korea.

As Korea is widely recognized with its growing importance in today's world affairs,, people from all over the world are greatly interested in various parts of Korea, including its history, economy, politics, religion, literature, language, and culture. In spite of this global trend, some people outside Korea have limited knowledge. In order to fulfill our mission, the Center for International Affairs (CEFIA) has worked hard to promote a better understanding of Korea to the world. In this line of work, the Understanding Korea Project at CEFIA has played a pivotal role in developing useful materials in foreign languages to integrate Korea into education in the broader context of the world. This magazine, *2018 InfoKorea*, consists of the most recent data in many sectors, ranging from the Korean population to welfare, and a feature article that offers a detailed explanation of the history of Korean ceramics. We hope that it serves as a bridge between Korean studies and the most recent work of the international community. Our center will continue the work of improving people's understanding of Korea in order to promote a broader vision of Korea as a whole.

Center for International Affairs
The Academy of Korean Studies



Training Fellowships for Textbook Experts



The AKS's Understanding Korea Project held several training fellowships for international educators in 2018. From October 28 to November 4, it hosted the "Fellowship for Textbook Specialists of Costa Rica." The participants in the training program included representatives from the Ministry of Education of Costa Rica and Santillana Publishing House, a major textbook publishing company in Costa Rica, and persons involved in the publication of textbooks at National Costa Rica University. During the Textbook Seminar held as part of the training together with the Korean speakers, including researchers from the Division of Understanding Korea Project, the participants discussed the educational and textbook systems of the two nations, the content about Korea presented in the textbooks of Costa Rica, and the possibility of introducing new content about Korea in the textbooks. The visitors also attended lectures on the history and culture of Korea and the relationship between South and North Korea. They were also taken on a tour of the Gyeongju Historic Areas to see Cheomseongdae Observatory, Bulguksa Temple, and Seokguram Grotto, traveled to Busan to experience the modern history of Korea at the UN Memorial Cemetery in Korea, and also visited the Temporary Capital Government Building and Gamcheon Village, among others. They also deepened their knowledge of Korean history and culture at a traditional Korean art performance titled *Shimcheong*. By participating in a training program on Korean culture, the Costa Rican textbook specialists deepened their interest in and understanding of Korean education, history, economy, and culture, and afterwards expressed their intention to continue making efforts to promote exchanges and understanding between students from the two countries through textbooks and other useful materials.

Graduate School of Korean Studies

The AKS's Graduate School of Korean Studies opened on March 5, 1980, in order to promote Korean culture and nurture talented individuals in contributing to the globalization of Korean studies based on research and teaching in the fields of humanities and social sciences related to Korea. The Graduate School of Korea Studies at AKS has made a great effort in fostering new generations of scholars in the field of Korean studies. Since the first graduation ceremony held in 1982, the school has produced more than 900 MA and 500 PhD graduates, who form the foundation for further development of Korean studies by carrying out teaching and research activities at major universities, research, institutes, and cultural organizations across Korea and abroad. A total of 295 students are currently enrolled in the school's MA and PhD programs, about half of whom are foreign students from around the world.

The 9th World Congress of Korean Studies



The 9th World Congress of Korean Studies was held at the AKS from September 12 to 14. Celebrating the 40th anniversary of the opening of the Academy of Korean Studies, the World Congress was attended by Korean Studies scholars from 25 countries from around the world, who presented 156 theses through 45 panels. The numbers are by far the highest in the congress's history. At the special session held during the opening ceremony, some of the most outstanding scholars in the field of Korean Studies in Korea and abroad, Donald L. Baker (University of British Columbia), Kwon Heon-ik (University of Cambridge), Michael J. Pettid (Binghamton University), Lee Eun-jeong (Free University at Berlin), and Park Tae-gyun (Seoul National University), presented and discussed their theses, under the theme "Human Civilization and Korean Studies."

The congress this year included one presenter from Africa and six from South America, because special support was available to presenters in South America and Africa, the regions considered to be weak spots in Korean Studies. Certainly, the hot topic in Korean Studies in South America was Korean popular culture, popularly known as the Korean Wave. In addition to South American presenters, many researchers from other regions also presented theses on the Korean popular culture represented through the Korean Wave. At the congress, a total of 13 theses were presented under the Popular Culture Panel.

In addition, next-generation Korean Studies scholars presented 53 theses on various themes, of which five presenters, including Kim Yeong-yeon (Seoul National University), were given the Next-Generation Scholars of Korean Studies Thesis Award. A number of institutions, including the Publishing Department of the Academy of Korean Studies, European Journal of Korean Studies and S/N Korean Humanities, exhibited books on Korean Studies to promote important contents to scholars from around the world.

The event provided a chance for scholars to seek a direction for Korean Studies, as was participated in by the chairpersons of all Korean Studies Societies representing various regions, including International Society for Korean Studies, Association for Korean Studies in Europe, Korean Studies Association of Australasia, and Association of Asian Studies—Committee for Korean Studies. The 9th World Congress of Korean Studies was a place where participants shared results of their research on Korean Studies in the world and confirmed the development of Korean Studies, leaping forward to the next level.



On 22 November, 2018, the 15th Anniversary of
the Understanding Korea Project was celebrated in Seoul.

The Academy of Korean Studies created the Center for International Affairs (CEFIA) in March 2003. The Center's mission is to promote a better understanding of Korean history, society, and culture throughout the world.

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