

GLOBAL INNOVATION INDEX 2019

THE REPUBLIC OF KOREA

11th

The Republic of Korea ranks 11th among the 129 economies featured in the GII 2019.

The Global Innovation Index (GII) is a ranking of world economies based on innovation capabilities. Consisting of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation.

The following table shows the rankings of the Republic of Korea over the past three years, noting that data availability and the GII model influence year-on-year comparisons of the GII ranks. The confidence interval for the Republic of Korea's ranking in the GII 2019 is between 10 and 12.

The Republic of Korea's Rankings, 2017 - 2019

	GII	Innovation Inputs	Innovation Outputs
2019	11	10	13
2018	12	14	12
2017	11	16	9

- The Republic of Korea performs better in Innovation Inputs than Outputs.
- This year the Republic of Korea ranks 10th in Innovation Inputs, better than last year and compared to 2017.
- As for Innovation Outputs, the Republic of Korea ranks 13th. This position is worse than last year and compared to 2017.

11th

The Republic of Korea ranks 11th among the 50 high-income economies.

2nd

The Republic of Korea ranks 2nd among the 15 economies in South East Asia, East Asia, and Oceania.

The Republic of Korea (Korea) moves closer to the top 10 this year, gaining one position from last year. Its improvement this year is largely due to its relative performance and less so to new GII data or methods (page 9).

It improves the most in the variables that capture the sophistication of its business sector, for example in relation to firms' R&D efforts.

This year Korea becomes the first economy in the world in the GII area that measures the quality of human capital and research, thanks to top 3 ranks in variables such as RD expenditures and number of researchers. Korea achieves good results also in innovation outcomes, with top ranks in Patent applications by origin, PCT patents by origin, industrial designs by origin, and High-technology exports (pages 6 and 7).

Thanks to this good performance, Korea is the 8th world economy in terms of quality of innovation. It also hosts three of the top 100 science and technology clusters of the world, with the cluster of Seoul occupying the 3rd spot.

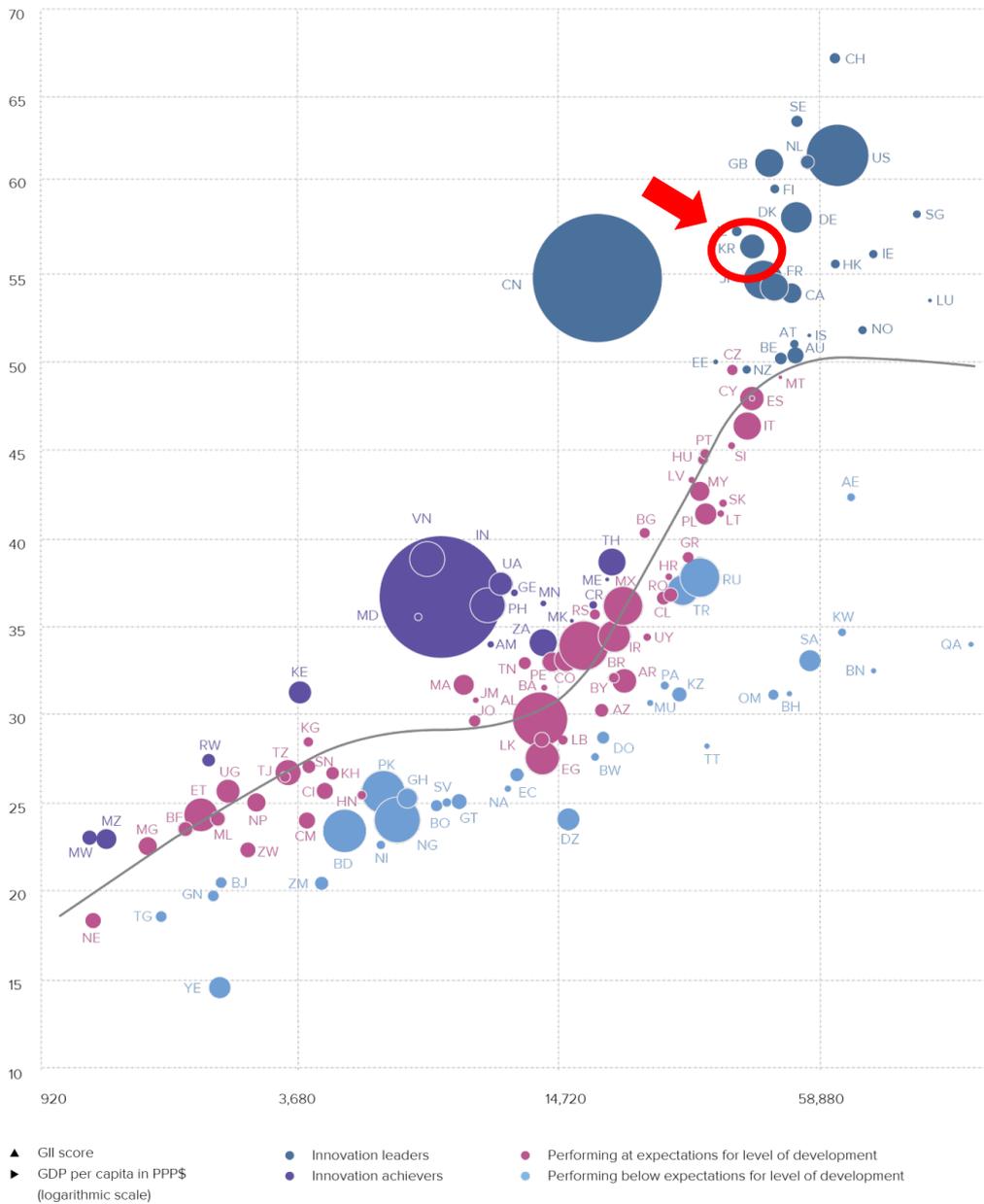
Despite this solid performance, Korea still presents some areas of relative weakness, which include indicators such as Tertiary inbound mobility, R&D financed by abroad, Information and communication technologies (ICT) services imports, and FDI inflows (pages 6 and 7).

EXPECTED VS. OBSERVED INNOVATION PERFORMANCE

The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected and those below are considered Innovation under-performers relative to GDP.

Relative to GDP, the Republic of Korea performs well above its expected level of development.

GII scores and GDP per capita in PPP US\$ (bubbles sized by population)

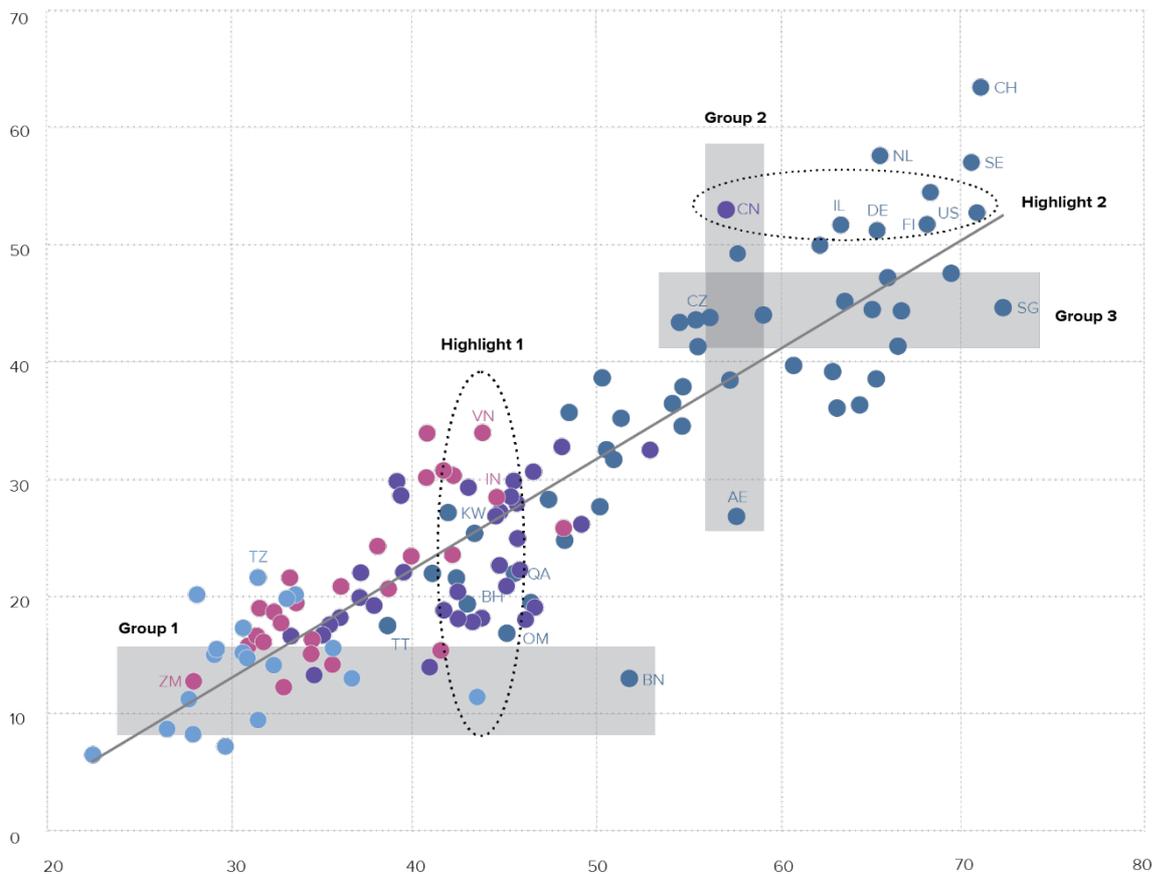


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs, indicating which economies best translate innovation inputs into innovation outputs. Economies appearing above the line are effectively translating their costly innovation investments into more and higher-quality outputs. In contrast, those below the line are not effectively translating innovation inputs into outputs.

The Republic of Korea produces more innovation outputs relative to its level of innovation investments.

Innovation input/output performance by income group, 2019

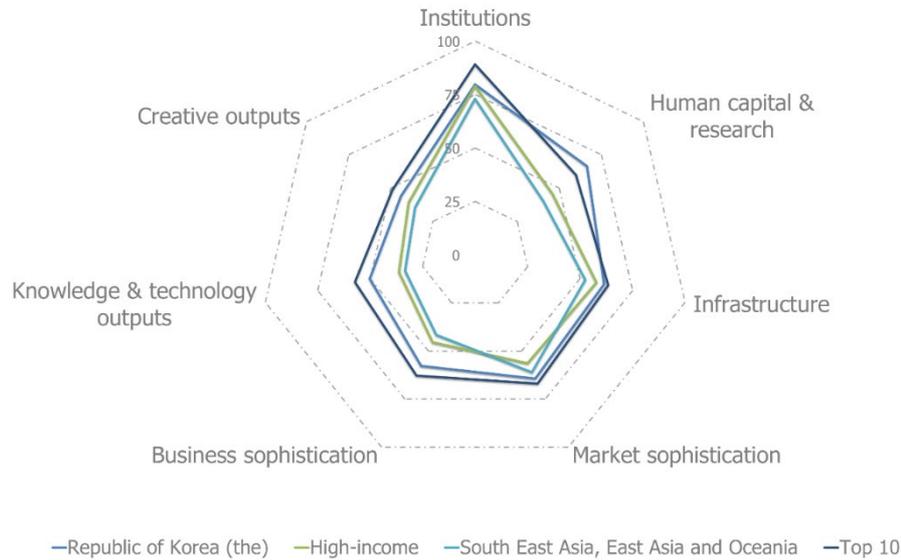


- ▲ Output score
- ▶ Input score
- High income
- Upper-middle income
- Lower-middle income
- Low income
- Fitted values

AE United Arab Emirates	CZ Czech Republic	NL Netherlands	TZ United Republic of Tanzania
BH Bahrain	DE Germany	OM Oman	US United States of America
BN Brunei Darussalam	FI Finland	QA Qatar	VN Viet Nam
CH Switzerland	IL Israel	SE Sweden	ZM Zambia
CN China	IN India	SG Singapore	
	KW Kuwait	TT Trinidad and Tobago	

BENCHMARKING THE REPUBLIC OF KOREA TO OTHER HIGH-INCOME ECONOMIES AND THE SOUTH EAST ASIA, EAST ASIA, AND OCEANIA REGION

The Republic of Korea's scores in the seven GII pillars



High-income economies

The Republic of Korea has high scores in all the seven GII pillars, which are above the average of the high-income group.

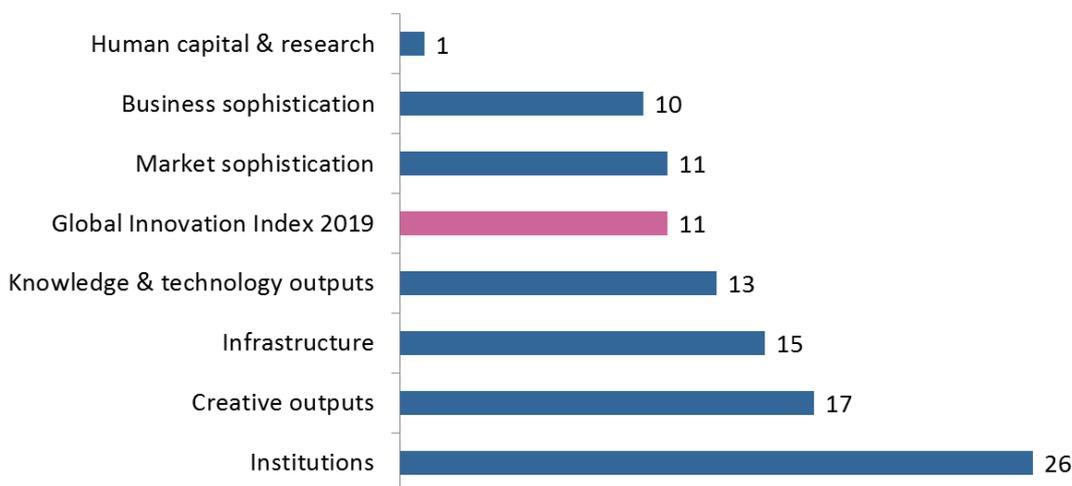
South East Asia, East Asia, and Oceania Region

Compared to other economies in the South East Asia, East Asia, and Oceania region, the Republic of Korea performs above average in all the seven GII pillars.

The Republic of Korea ranks in the top 10 in sub-pillars Business environment, Research & development (R&D), Information & communication technologies (ICTs), General Infrastructure, Knowledge workers, Knowledge creation, and Intangible assets.

OVERVIEW OF THE REPUBLIC OF KOREA'S RANKINGS IN THE 7 GII AREAS

The Republic of Korea performs the best in Human capital & research and its weakest performance is in Institutions.



*The highest possible ranking in each pillar is 1.

THE REPUBLIC OF KOREA'S INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the Republic of Korea's strengths and weaknesses in the GII 2019.

Strengths

Code	Indicator name	Rank
2	Human capital & research	1
2.3	Research & development (R&D)	1
2.3.1	Researchers, FTE/mn pop.	3
2.3.2	Gross expenditure on R&D, % GDP	2
2.3.3	Global R&D companies, top 3, in mn US\$	4
3.1	Information & communication technologies (ICTs)	1
3.1.2	ICT use*	4
3.1.4	E-participation*	1
5.1.3	GERD performed by business, % GDP	2
5.1.4	GERD financed by business, %	3
5.3.5	Research talent, % in business enterprise	2
6.1.1	Patents by origin/bn PPP\$ GDP	1
6.1.2	PCT patents by origin/bn PPP\$ GDP	1
6.3.2	High-tech net exports, % total trade	1
7.1	Intangible assets	3
7.1.2	Industrial designs by origin/bn PPP\$ GDP	1

Weaknesses

Code	Indicator name	Rank
1.2.3	Cost of redundancy dismissal, salary weeks	107
2.1.5	Pupil-teacher ratio, secondary	62
2.2.3	Tertiary inbound mobility, %	76
3.3	Ecological sustainability	77
3.3.1	GDP/unit of energy use	98
4.3.1	Applied tariff rate, weighted mean, %	88
5.2.3	GERD financed by abroad, %	89
5.3.3	ICT services imports, % total trade	105
5.3.4	FDI net inflows, % GDP, 3-year average	113
6.3.3	ICT services exports, % total trade	90
7.2.4	Printing & other media, % manufacturing	98

STRENGTHS

- The Republic of Korea's strengths are found in five of the seven GII pillars.
- Pillar Human capital & research (1) is a notable strength for the country.
- In Human capital & research (1), additional strengths are sub-pillar Research & development (R&D) (1) and three of its four indicators – Researchers (3), R&D expenditures (2), and Global R&D companies (4).
- In Infrastructure (15), the Republic of Korea ranks 1st in the world in Information & communication technologies (ICTs), a strength for this country. In this sub-pillar, two indicators – ICT use (4) and E-participation (1) – are also strengths for this economy.
- In Business sophistication (10), R&D performed by business (2), R&D financed by business (3), and Research talent (2) are GII strengths.
- In Knowledge & technology outputs (13), the Republic of Korea ranks 1st worldwide in Patents by origin, PCT patents by origin, and High-tech exports – all GII strengths for this country.
- Sub-pillar Intangible assets (3) and indicator Industrial designs by origin (1) are strengths in Creative outputs (17).

WEAKNESSES

- The Republic of Korea's weaknesses are found in all seven GII pillars.
- In Institutions (26), the country's only weakness is indicator Cost of redundancy dismissal (107).
- In Human capital & research (1), indicators Pupil-teacher ratio (62) and Tertiary inbound mobility (76) are relative weaknesses for the Republic of Korea.
- In Infrastructure (15), sub-pillar Ecological sustainability (77) and indicator GDP per unit of energy use (98) are GII weaknesses.
- In Market sophistication (11), the only relatively weakness is indicator Applied tariff rate (88).
- Indicators R&D financed by abroad (89), ICT services imports (105), and FDI inflows (113) are weaknesses in Business sophistication (10).
- Only two relative weaknesses are found in the innovation output side of the GII: Indicator ICT services exports (90) in Knowledge & technology outputs (13) and indicator Printing & other media (98) in Creative outputs (17).

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$	GDP per capita, PPP\$	GII 2018 rank	
13	10	High	SEAO	51.2	2,139.7	41,350.6	12	
INSTITUTIONS 79.7 26 ◊				BUSINESS SOPHISTICATION 57.6 10				
1.1	Political environment	77.2	27	◊	5.1	Knowledge workers	75.3	5
1.1.1	Political and operational stability*.....	86.0	21		5.1.1	Knowledge-intensive employment, %.....	39.1	28 ◊
1.1.2	Government effectiveness*.....	72.8	28	◊	5.1.2	Firms offering formal training, % firms.....	n/a	n/a
1.2	Regulatory environment	72.4	45	◊	5.1.3	GERD performed by business, % GDP.....	3.6	2 ●◆
1.2.1	Regulatory quality*.....	71.6	29	◊	5.1.4	GERD financed by business, %.....	76.2	3 ●◆
1.2.2	Rule of law*.....	77.2	23		5.1.5	Females employed w/advanced degrees, %.....	16.2	39 ◊
1.2.3	Cost of redundancy dismissal, salary weeks.....	27.4	107	○◊	5.2	Innovation linkages	46.1	18
1.3	Business environment	89.4	6		5.2.1	University/industry research collaboration*.....	56.5	26 ◊
1.3.1	Ease of starting a business*.....	95.8	11		5.2.2	State of cluster development*.....	59.6	29
1.3.2	Ease of resolving insolvency*.....	83.0	10		5.2.3	GERD financed by abroad, %.....	1.3	89 ○
					5.2.4	JV-strategic alliance deals/bn PPP\$ GDP.....	0.0	40 ◊
					5.2.5	Patent families 2+ offices/bn PPP\$ GDP.....	14.4	4 ◆
HUMAN CAPITAL & RESEARCH 66.5 1 ●◆				KNOWLEDGE & TECHNOLOGY OUTPUTS50.2 13				
2.1	Education	60.8	21		6.1	Knowledge creation	63.1	8
2.1.1	Expenditure on education, % GDP.....	5.3	37		6.1.1	Patents by origin/bn PPP\$ GDP.....	78.2	1 ●◆
2.1.2	Government funding/pupil, secondary, % GDP/cap... 28.5	14	◆		6.1.2	PCT patents by origin/bn PPP\$ GDP.....	8.0	1 ●◆
2.1.3	School life expectancy, years.....	16.4	24		6.1.3	Utility models by origin/bn PPP\$ GDP.....	3.2	7
2.1.4	PISA scales in reading, maths, & science.....	519.1	7		6.1.4	Scientific & technical articles/bn PPP\$ GDP.....	20.4	24
2.1.5	Pupil-teacher ratio, secondary.....	13.8	62	○	6.1.5	Citable documents H-index.....	43.3	18
2.2	Tertiary education	49.4	16		6.2	Knowledge impact	43.8	31
2.2.1	Tertiary enrolment, % gross.....	93.8	4	◆	6.2.1	Growth rate of PPP\$ GDP/worker, %.....	2.1	42
2.2.2	Graduates in science & engineering, %.....	29.9	14	◆	6.2.2	New businesses/th pop. 15-64.....	2.6	43
2.2.3	Tertiary inbound mobility, %.....	1.9	76	○◊	6.2.3	Computer software spending, % GDP.....	0.2	62 ◊
2.3	Research & development (R&D)	89.3	1	●◆	6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP.....	6.2	49
2.3.1	Researchers, FTE/mn pop.....	7,514.4	3	●◆	6.2.5	High- & medium-high-tech manufactures, %.....	0.6	7
2.3.2	Gross expenditure on R&D, % GDP.....	4.6	2	●◆	6.3	Knowledge diffusion	43.8	16
2.3.3	Global R&D companies, avg. exp. top 3, mn US\$.....	92.6	4	●	6.3.1	Intellectual property receipts, % total trade.....	1.1	18
2.3.4	QS university ranking, average score top 3*.....	74.1	9		6.3.2	High-tech net exports, % total trade.....	26.4	1 ●◆
					6.3.3	ICT services exports, % total trade.....	0.7	90 ○
					6.3.4	FDI net outflows, % GDP.....	2.0	29
INFRASTRUCTURE 61.6 15				CREATIVE OUTPUTS 44.1 17				
3.1	Information & communication technologies (ICTs) 94.0	1	●◆		7.1	Intangible assets	65.8	3
3.1.1	ICT access*.....	90.0	7		7.1.1	Trademarks by origin/bn PPP\$ GDP.....	89.1	23
3.1.2	ICT use*.....	88.1	4	●◆	7.1.2	Industrial designs by origin/bn PPP\$ GDP.....	29.7	1 ●◆
3.1.3	Government's online service*.....	97.9	4		7.1.3	ICTs & business model creation*.....	79.7	10
3.1.4	E-participation*.....	100.0	1	●	7.1.4	ICTs & organizational model creation*.....	64.0	32 ◊
3.2	General infrastructure	55.4	7		7.2	Creative goods & services	25.7	42
3.2.1	Electricity output, kWh/mn pop.....	10,910.4	11		7.2.1	Cultural & creative services exports, % total trade.....	0.4	54
3.2.2	Logistics performance*.....	72.4	25		7.2.2	National feature films/mn pop. 15-69.....	8.7	22
3.2.3	Gross capital formation, % GDP.....	31.2	18	◆	7.2.3	Entertainment & Media market/th pop. 15-69.....	47.8	19
3.3	Ecological sustainability	35.4	77	○◊	7.2.4	Printing & other media, % manufacturing.....	0.3	98 ○◊
3.3.1	GDP/unit of energy use.....	6.3	98	○	7.2.5	Creative goods exports, % total trade.....	3.6	16
3.3.2	Environmental performance*.....	62.3	53	◊	7.3	Online creativity	19.0	37
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP..	2.6	38		7.3.1	Generic top-level domains (TLDs)/th pop. 15-69.....	8.1	43 ◊
					7.3.2	Country-code TLDs/th pop. 15-69.....	9.6	41 ◊
					7.3.3	Wikipedia edits/mn pop. 15-69.....	17.7	51 ◊
					7.3.4	Mobile app creation/bn PPP\$ GDP.....	46.6	12
4.1	Credit	67.6	15		4.3	Trade, competition, & market scale	76.7	17
4.1.1	Ease of getting credit*.....	65.0	54		4.3.1	Applied tariff rate, weighted avg., %.....	5.1	88 ○◊
4.1.2	Domestic credit to private sector, % GDP.....	144.8	11		4.3.2	Intensity of local competition*.....	83.9	4 ◆
4.1.3	Microfinance gross loans, % GDP.....	n/a	n/a		4.3.3	Domestic market scale, bn PPP\$.....	2,139.7	14
4.2	Investment	48.7	43					
4.2.1	Ease of protecting minority investors*.....	73.3	21					
4.2.2	Market capitalization, % GDP.....	97.8	13					
4.2.3	Venture capital deals/bn PPP\$ GDP.....	0.0	39	◊				

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◊ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. Ⓞ indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at <http://globalinnovationindex.org>. Square brackets [] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

DATA AVAILABILITY AND GII MODEL

The following tables list data that are missing or are outdated for the Republic of Korea.

Missing data

Code	Indicator name	Country year	Model year	Source
4.1.3	Microfinance gross loans, % GDP	n/a	2017	Microfinance Information Exchange
5.1.2	Firms offering formal training, % firms	n/a	2013	World Bank

Outdated data

Code	Indicator name	Country year	Model year	Source
2.1.5	Pupil-teacher ratio, secondary	2016	2017	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2016	2017	UNESCO Institute for Statistics
5.1.5	Females employed w/advanced degrees, %	2015	2017	International Labour Organization
7.2.2	National feature films/mn pop. 15–69	2016	2017	UNESCO Institute for Statistics

Model changes

The table below provides a summary of the adjustments to the GII 2019 framework.

Changes to the GII 2019 framework

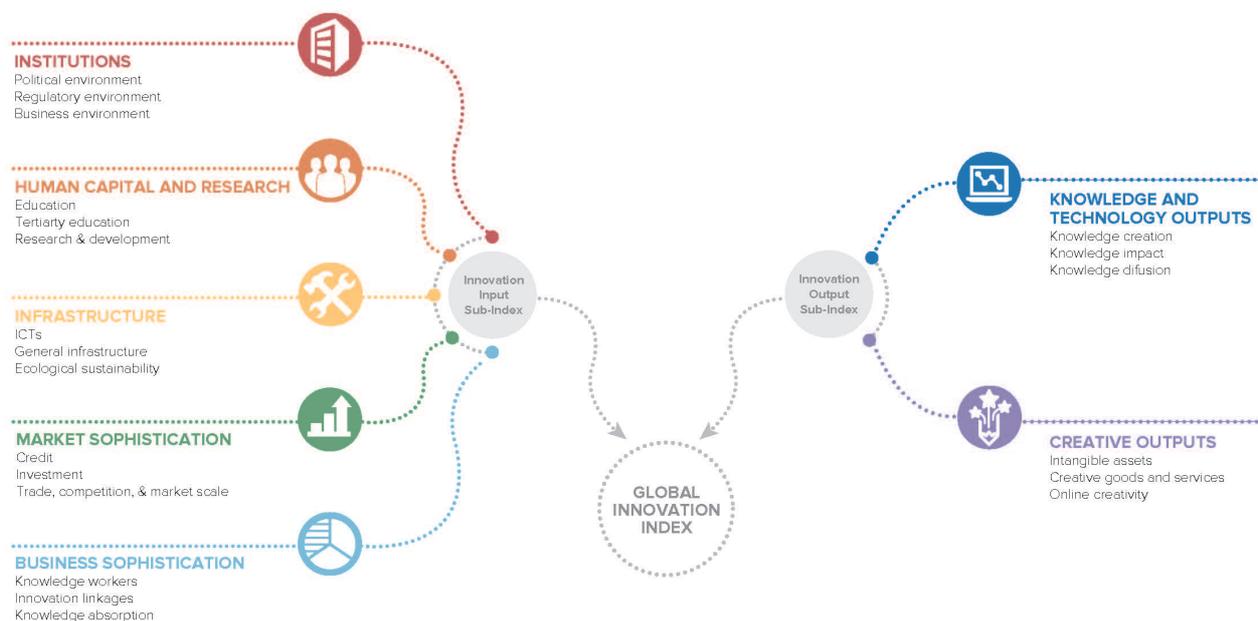
GII 2018		Adjustment	GII 2019	
1.1.1	Political stability & safety	Replaced	1.1.1	Political & operational stability
3.3.2	Environmental performance	Indicator changed at source	3.3.2	Environmental performance
5.3.1	Intellectual property payments, % total trade	Methodology change	5.3.1	Intellectual property payments, % total trade (3 year avg.)
5.3.2	High-tech imports, % total trade	Methodology change	5.3.2	High-tech imports, % total trade
6.2.1	Growth rate of PPP\$ GDP/worker, %	Methodology change	6.2.1	Growth rate of PPP\$ GDP/worker, % (3 year avg.)
6.3.1	Intellectual property receipts, % total trade	Methodology change	6.3.1	Intellectual property receipts, % total trade (3 year avg.)
7.3.4	Mobile app creation/bn PPP\$ GDP	Methodology change	7.3.4	Mobile app creation/bn PPP\$ GDP

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations. In 2019, the GII presents its 12th edition devoted to the theme **Creating Healthy Lives—The Future of Medical Innovation**.

Recognizing that innovation is a key driver of economic development, the GII aims to provide a rich innovation ranking and analysis referencing around 130 economies. Over the last decade, the GII has established itself as both a leading reference on innovation and a “tool for action” for countries that incorporate the GII into their innovation agendas.

Framework of the Global Innovation Index 2019



The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that includes institutions, human capital and research, infrastructure, credit, investment, linkages; the creation, absorption and diffusion of knowledge; and creative outputs.

The GII has two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index, and seven pillars, each containing three sub-pillars.

