

GLOBAL INNOVATION INDEX 2019

SINGAPORE

8th

Singapore ranks 8th 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 Singapore 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 Singapore's ranking in the GII 2019 is between 7 and 11. Between 2018 and 2019, the rank decrease for Singapore is the result of a mix of decreased performance, changes to the underlying GII model, and new data becoming available (page 8).

Singapore's GII Rankings, 2017 - 2019

	GII	Innovation Inputs	Innovation Outputs
2019	8	1	15
2018	5	1	15
2017	7	1	17

- Singapore performs better in Innovation Inputs than Outputs.
- This year Singapore ranks 1st in Innovation Inputs, the same as the previous two years.
- In Innovation Outputs, Singapore ranks 15th. This position is the same as last year and better compared to 2017.

8th

Singapore ranks 8th among the 50 high-income economies.

1st

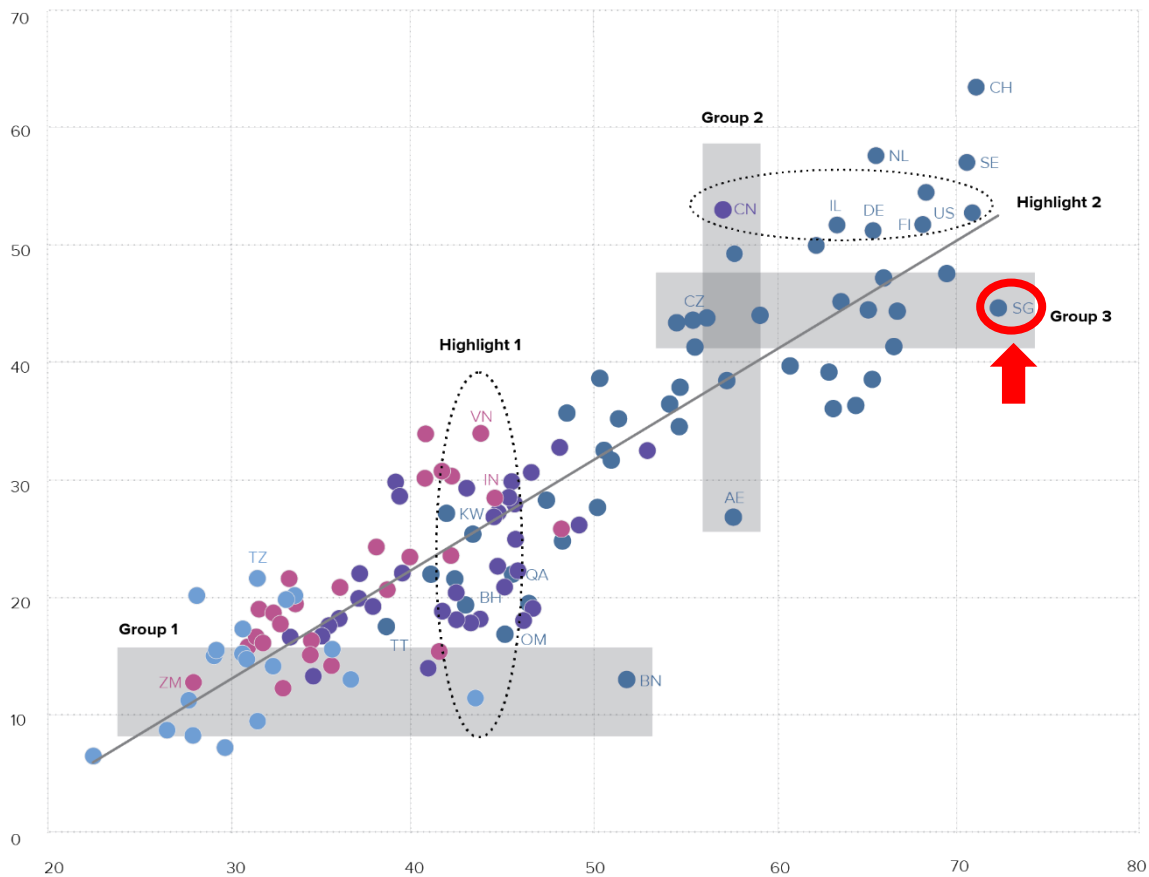
Singapore ranks 1st among the 15 economies in South East Asia, East Asia, and Oceania.

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.

Singapore produces less innovation outputs relative to its level of innovation investments.

Innovation input/output performance by income group, 2019

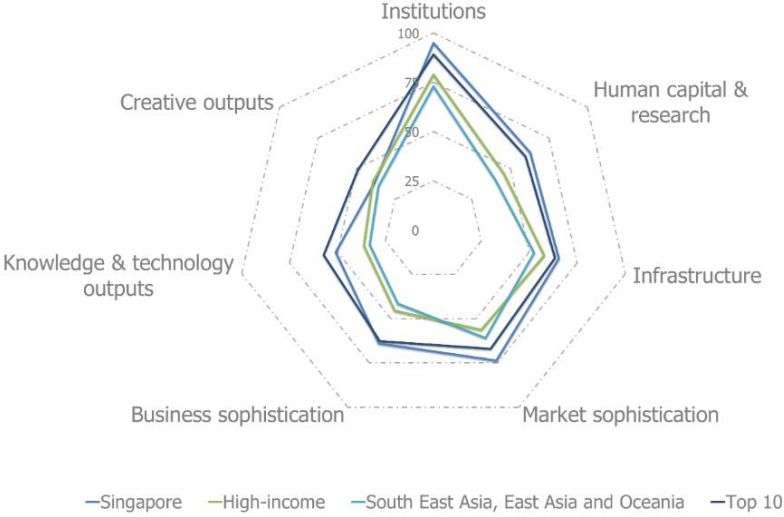


- ▲ Output score
- ▶ Input score
- High income
- Upper-middle income
- Lower-middle income
- Low income
- Fitted values

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 SINGAPORE TO OTHER HIGH-INCOME ECONOMIES AND THE SOUTH EAST ASIA, EAST ASIA, AND OCEANIA REGION

Singapore's scores in the seven GII pillars



High-income economies

Singapore has high scores in 6 of the 7 GII pillars: Institutions; Human capital & research; Infrastructure; Market sophistication; Business sophistication; and Knowledge & technology outputs; which are above the average of the high-income group.

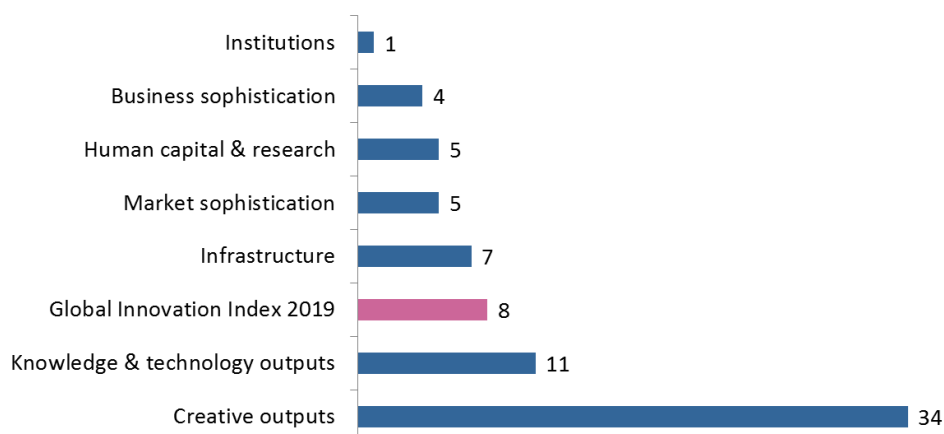
South East Asia, East Asia, and Oceania Region

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

Top ranks are found in areas such as Political environment, Regulatory environment, Tertiary education, and Knowledge absorption, where the country ranks in the top 3 worldwide.

OVERVIEW OF SINGAPORE'S RANKINGS IN THE 7 GII AREAS

Singapore performs the best in Institutions and its weakest performance is in Creative outputs.



*The highest possible ranking in each pillar is 1.

SINGAPORE'S INNOVATION STRENGTHS AND WEAKNESSES

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

Strengths			Weaknesses		
Code	Indicator name	Rank	Code	Indicator name	Rank
1	Institutions	1	2.1	Education	57
1.1	Political environment	1	2.1.1	Expenditure on education, % GDP	104
1.1.1	Political & operational stability*	1	2.1.2	Government funding/pupil, secondary, % GDP/cap	73
1.1.2	Government effectiveness*	1	2.1.5	Pupil-teacher ratio, secondary	47
1.2	Regulatory environment	2	3.3.2	Environmental performance*	45
1.2.1	Regulatory quality*	2	5.2.3	GERD financed by abroad, %	54
1.2.3	Cost of redundancy dismissal, salary weeks	1	6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP	46
1.3.1	Ease of starting a business*	3	7.1	Intangible assets	46
2.1.4	PISA scales in reading, maths & science	1	7.1.1	Trademarks by origin/bn PPP\$ GDP	88
2.2	Tertiary education	1	7.1.2	Industrial designs by origin/bn PPP\$ GDP	62
2.2.3	Tertiary inbound mobility, %	1	7.2.2	National feature films/mn pop. 15–69	57
3.1.3	Government's online service*	2	7.2.4	Printing & other media, % manufacturing	80
4.3.1	Applied tariff rate, weighted mean, %	3	7.3.3	Wikipedia edits/mn pop. 15–69	45
5	Business sophistication	4			
5.1.1	Knowledge-intensive employment, %	1			
5.2.4	JV–strategic alliance deals/bn PPP\$ GDP	1			
5.3	Knowledge absorption	1			
6.2.5	High- & medium-high-tech manufactures, %	1			
6.3.2	High-tech net exports, % total trade	1			

STRENGTHS

- Singapore's strengths are in 6 of the seven GII pillars, with most of them in Institutions (1).
- Institutions (1) is itself a relative strength for Singapore. The country exhibits strengths also in sub-pillars Political environment (1) and Regulatory environment (2). At the indicator level, five of the seven variables in this pillar are strengths. These are Political & operational stability (1), Government effectiveness (1), Regulatory quality (2), Cost of redundancy dismissal (1), and Ease of starting a business (3).
- Business sophistication (4) is also a relative strength for Singapore. The country performs particularly well in sub-pillar Knowledge absorption, which itself is a strength, and in indicators Knowledge-intensive employment and JV–strategic alliance deals – both ranking 1st in the world.
- In Human capital & research (5), Singapore has relative strengths in sub-pillar Tertiary education as well as in indicators PISA results and Tertiary inbound mobility. In all of them, the country ranks 1st in the world.
- Other relative strengths include:
 - Indicator Government's online service (2) is a relative strength in Infrastructure (7).
 - Indicator Applied tariff rate (3) is a strength in Market sophistication (5).
 - In Knowledge & technology outputs (11), Singapore has relative strengths in two indicators: High- & medium-high-tech manufactures and High-tech exports – where it ranks 1st economy globally.

WEAKNESSES

- Singapore's relative weaknesses in the GII are in five of the seven GII pillars, and mostly in Creative outputs (34) and Human capital & research (5).
- In Creative outputs (34), the sub-pillar Intangible assets (46) as well indicators Trademarks by origin (88), Industrial designs by origin (62), National feature films (57), Printing & other media (80), and Wikipedia edits (45) – are relative weaknesses for Singapore.
- In Human capital & research (5), Singapore exhibits weaknesses in sub-pillar Education (57) and three of its five indicators - Expenditure on education (104), Government funding per pupil (73), and Pupil-teacher ratio (47).
- Other weaknesses include indicators Environmental performance (45), GERD financed by abroad (54), and ISO 9001 quality certificates (46).

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$	GDP per capita, PPP\$	GII 2018 rank	
15	1	High	SEAO	5.8	556.2	100,344.7	5	
				Score/Value	Rank			
INSTITUTIONS				94.9	1	◆◆		
1.1	Political environment	100.0	1	◆◆	5.1	Knowledge workers	71.0	9
1.1.1	Political and operational stability*.....	100.0	1	◆◆	5.1.1	Knowledge-intensive employment, %.....	56.1	1
1.1.2	Government effectiveness*.....	100.0	1	◆◆	5.1.2	Firms offering formal training, % firms.....	n/a	n/a
1.2	Regulatory environment	98.3	2	●	5.1.3	GERD performed by business, % GDP.....	1.3	16
1.2.1	Regulatory quality*.....	98.7	2	◆◆	5.1.4	GERD financed by business, %.....	54.1	19
1.2.2	Rule of law*.....	94.6	8		5.1.5	Females employed w/advanced degrees, %.....	17.1	36
1.2.3	Cost of redundancy dismissal, salary weeks.....	8.0	1	●	5.2	Innovation linkages	49.3	14
1.3	Business environment	86.3	17		5.2.1	University/industry research collaboration*.....	70.0	10
1.3.1	Ease of starting a business*.....	98.2	3	◆◆	5.2.2	State of cluster development*.....	68.6	11
1.3.2	Ease of resolving insolvency*.....	74.3	25		5.2.3	GERD financed by abroad, %.....	6.8	54
				Score/Value	Rank			
HUMAN CAPITAL & RESEARCH				63.0	5	◆		
2.1	Education	50.3	57	○◆	5.3	Knowledge absorption	71.3	1
2.1.1	Expenditure on education, % GDP.....	2.9	104	○◆	5.3.1	Intellectual property payments, % total trade.....	3.3	5
2.1.2	Government funding/pupil, secondary, % GDP/cap.....	16.7	73	○◆	5.3.2	High-tech imports, % total trade.....	21.2	7
2.1.3	School life expectancy, years.....	16.3	26		5.3.3	ICT services imports, % total trade.....	2.7	11
2.1.4	PISA scales in reading, maths, & science.....	551.6	1	◆◆	5.3.4	FDI net inflows, % GDP.....	22.3	8
2.1.5	Pupil-teacher ratio, secondary.....	11.7	47	○	5.3.5	Research talent, % in business enterprise.....	50.5	24
2.2	Tertiary education	77.1	1	◆◆	5.3	Knowledge absorption	71.3	1
2.2.1	Tertiary enrolment, % gross.....	83.9	13		5.3.1	Intellectual property payments, % total trade.....	3.3	5
2.2.2	Graduates in science & engineering, %.....	34.5	5	◆	5.3.2	High-tech imports, % total trade.....	21.2	7
2.2.3	Tertiary inbound mobility, %.....	27.2	1	◆◆	5.3.3	ICT services imports, % total trade.....	2.7	11
2.3	Research & development (R&D)	61.6	13		5.3.4	FDI net inflows, % GDP.....	22.3	8
2.3.1	Researchers, FTE/mn pop.....	6,729.7	5		5.3.5	Research talent, % in business enterprise.....	50.5	24
2.3.2	Gross expenditure on R&D, % GDP.....	2.2	13		KNOWLEDGE & TECHNOLOGY OUTPUTS ...50.9 11			
2.3.3	Global R&D companies, avg. exp. top 3, mn US\$.....	48.8	30		6.1	Knowledge creation	33.4	27
2.3.4	QS university ranking, average score top 3*.....	68.9	12		6.1.1	Patents by origin/bn PPP\$ GDP.....	3.0	33
				Score/Value	Rank			
INFRASTRUCTURE				65.4	7	◆		
3.1	Information & communication technologies (ICTs)	89.6	11		6.1.2	PCT patents by origin/bn PPP\$ GDP.....	1.7	20
3.1.1	ICT access*.....	87.2	9		6.1.3	Utility models by origin/bn PPP\$ GDP.....	n/a	n/a
3.1.2	ICT use*.....	75.8	26		6.1.4	Scientific & technical articles/bn PPP\$ GDP.....	17.5	28
3.1.3	Government's online service*.....	98.6	2	●	6.1.5	Citable documents H-index.....	36.5	23
3.1.4	E-participation*.....	96.6	13		6.2	Knowledge impact	53.9	11
3.2	General infrastructure	54.7	11		6.2.1	Growth rate of PPP\$ GDP/worker, %.....	2.5	33
3.2.1	Electricity output, kWh/mn pop.....	9,209.8	17		6.2.2	New businesses/th pop. 15-64.....	8.6	16
3.2.2	Logistics performance*.....	90.4	7		6.2.3	Computer software spending, % GDP.....	0.3	41
3.2.3	Gross capital formation, % GDP.....	27.8	30		6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP.....	7.0	46
3.3	Ecological sustainability	52.1	22		6.2.5	High- & medium-high-tech manufactures, %.....	0.8	1
3.3.1	GDP/unit of energy use.....	16.4	9		6.3	Knowledge diffusion	65.2	5
3.3.2	Environmental performance*.....	64.2	45	○◆	6.3.1	Intellectual property receipts, % total trade.....	1.6	15
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP.....	2.4	43		6.3.2	High-tech net exports, % total trade.....	27.4	1
				Score/Value	Rank			
MARKET SOPHISTICATION				73.6	5	◆		
4.1	Credit	68.4	13		6.3.3	ICT services exports, % total trade.....	2.4	44
4.1.1	Ease of getting credit*.....	75.0	29		6.3.4	FDI net outflows, % GDP.....	9.0	8
4.1.2	Domestic credit to private sector, % GDP.....	128.2	17		CREATIVE OUTPUTS38.3 34			
4.1.3	Microfinance gross loans, % GDP.....	n/a	n/a		7.1	Intangible assets	47.3	46
4.2	Investment	76.7	5	◆	7.1.1	Trademarks by origin/bn PPP\$ GDP.....	20.1	88
4.2.1	Ease of protecting minority investors*.....	80.0	6	◆	7.1.2	Industrial designs by origin/bn PPP\$ GDP.....	1.1	62
4.2.2	Market capitalization, % GDP.....	220.1	4	◆	7.1.3	ICTs & business model creation*.....	80.4	7
4.2.3	Venture capital deals/bn PPP\$ GDP.....	0.2	7		7.1.4	ICTs & organizational model creation*.....	74.6	14
4.3	Trade, competition, & market scale	75.6	19		7.2	Creative goods & services	32.2	20
4.3.1	Applied tariff rate, weighted avg., %.....	0.1	3	◆◆	7.2.1	Cultural & creative services exports, % total trade.....	1.9	8
4.3.2	Intensity of local competition*.....	78.4	15		7.2.2	National feature films/mn pop. 15-69.....	2.9	57
4.3.3	Domestic market scale, bn PPP\$.....	556.2	35		7.2.3	Entertainment & Media market/th pop. 15-69.....	42.3	20
					7.2.4	Printing & other media, % manufacturing.....	0.7	80
					7.2.5	Creative goods exports, % total trade.....	4.4	11
					7.3	Online creativity	26.4	28
					7.3.1	Generic top-level domains (TLDs)/th pop. 15-69.....	25.6	23
					7.3.2	Country-code TLDs/th pop. 15-69.....	11.2	38
					7.3.3	Wikipedia edits/mn pop. 15-69.....	23.8	45
					7.3.4	Mobile app creation/bn PPP\$ GDP.....	52.9	10

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 Singapore.

Some indicators that were unavailable for Singapore in the GII 2018 become available in the GII 2019. These are: Government funding per pupil, School life expectancy, Tertiary enrolment, Graduates in science & engineering, and Cultural & creative services exports.

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
6.1.3	Utility models by origin/bn PPP\$ GDP	n/a	2017	World Intellectual Property Organization

Outdated data

Code	Indicator name	Country year	Model year	Source
2.1.1	Expenditure on education, % GDP	2013	2015	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	2010	2015	UNESCO Institute for Statistics
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
2.3.1	Researchers, FTE/mn pop.	2014	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2014	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.3	GERD performed by business, % GDP	2014	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.4	GERD financed by business, %	2014	2016	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.2.3	GERD financed by abroad, %	2014	2016	UNESCO Institute for Statistics
5.3.5	Research talent, % in business enterprise	2014	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators

Model changes

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

Changes to the GII 2019 framework

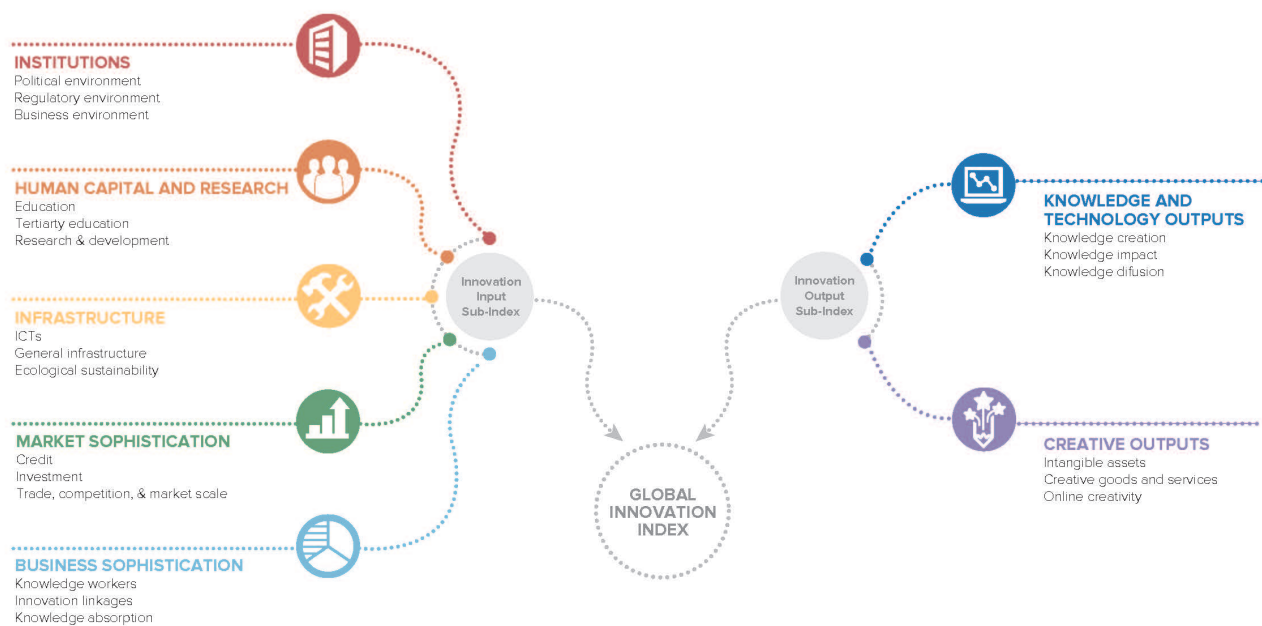
GII 2018		Adjustment	GII 2019	
1.1.1	Political stability & safety	Replaced	1.1.1	Political & operational stability
3.3.2	Environmental performance	Indicator changed at source	3.3.2	Environmental performance
5.3.1	Intellectual property payments, % total trade	Methodology change	5.3.1	Intellectual property 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.

