GLOBAL INNOVATION INDEX 2020

SINGAPORE

8th Singapore ranks 8th among the 131 economies featured in the GII 2020.

The Global Innovation Index (GII) ranks world economies according to their 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 changes to the GII model framework influence year-on-year comparisons of the GII rankings. The statistical confidence interval for the ranking of Singapore in the GII 2020 is between ranks 7 and 12.

Rankings of Singapore (2018–2020)

	GII	Innovation inputs	Innovation outputs
2020	8	1	15
2019	8	1	15
2018	5	1	15

- Singapore performs better in innovation inputs than innovation outputs in 2020.
- This year Singapore ranks 1st in innovation inputs, the same as both last year and 2018.
- As for innovation outputs, Singapore ranks 15th. This position is the same as both last year and 2018.

8th Singapore ranks 8th among the 49 high-income group economies.

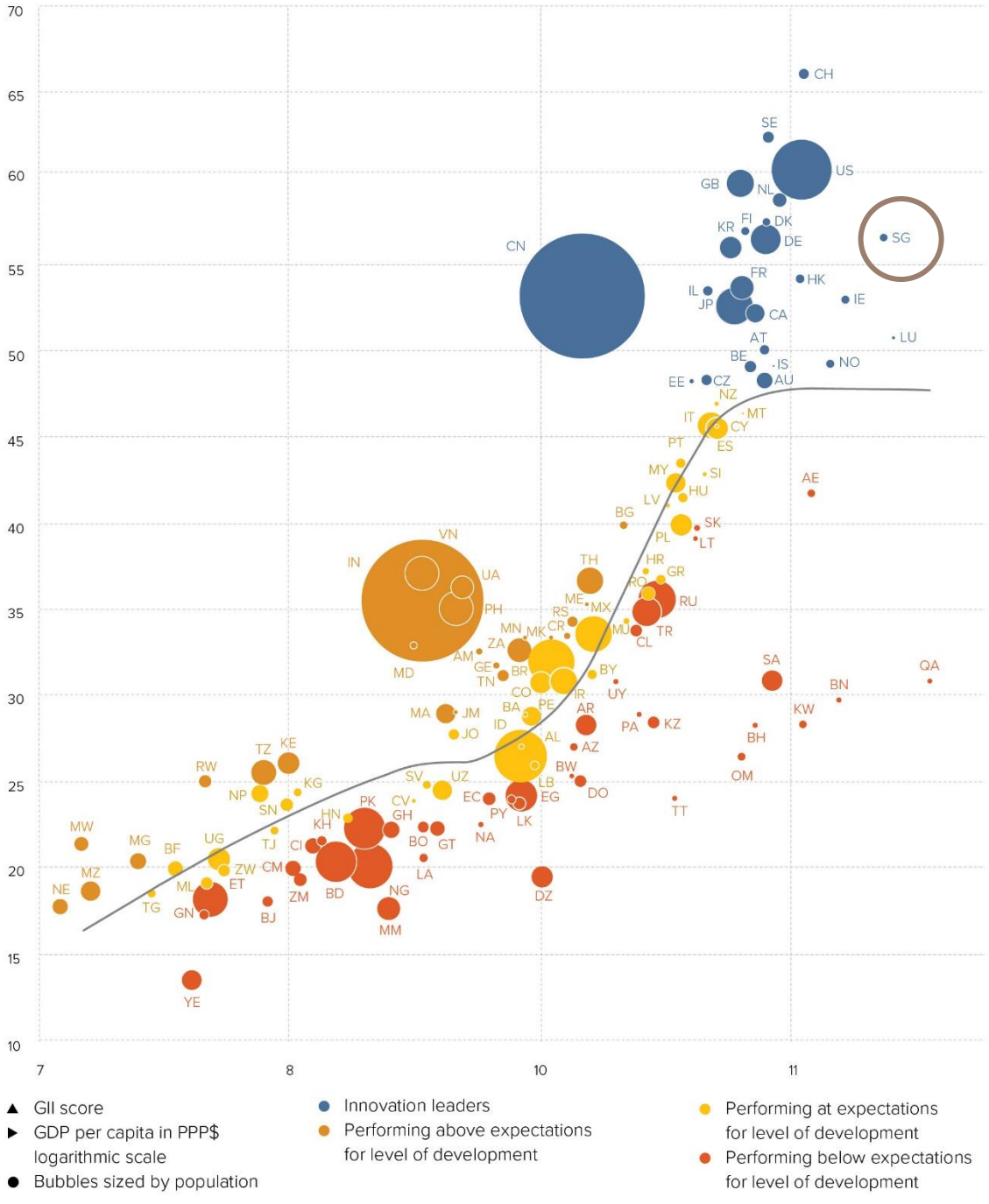
1st Singapore ranks 1st among the 17 economies in South East Asia, East Asia, and Oceania.

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 performing below expectations.

Relative to GDP, Singapore is performing above expectations for its level of development.

The positive relationship between innovation and development

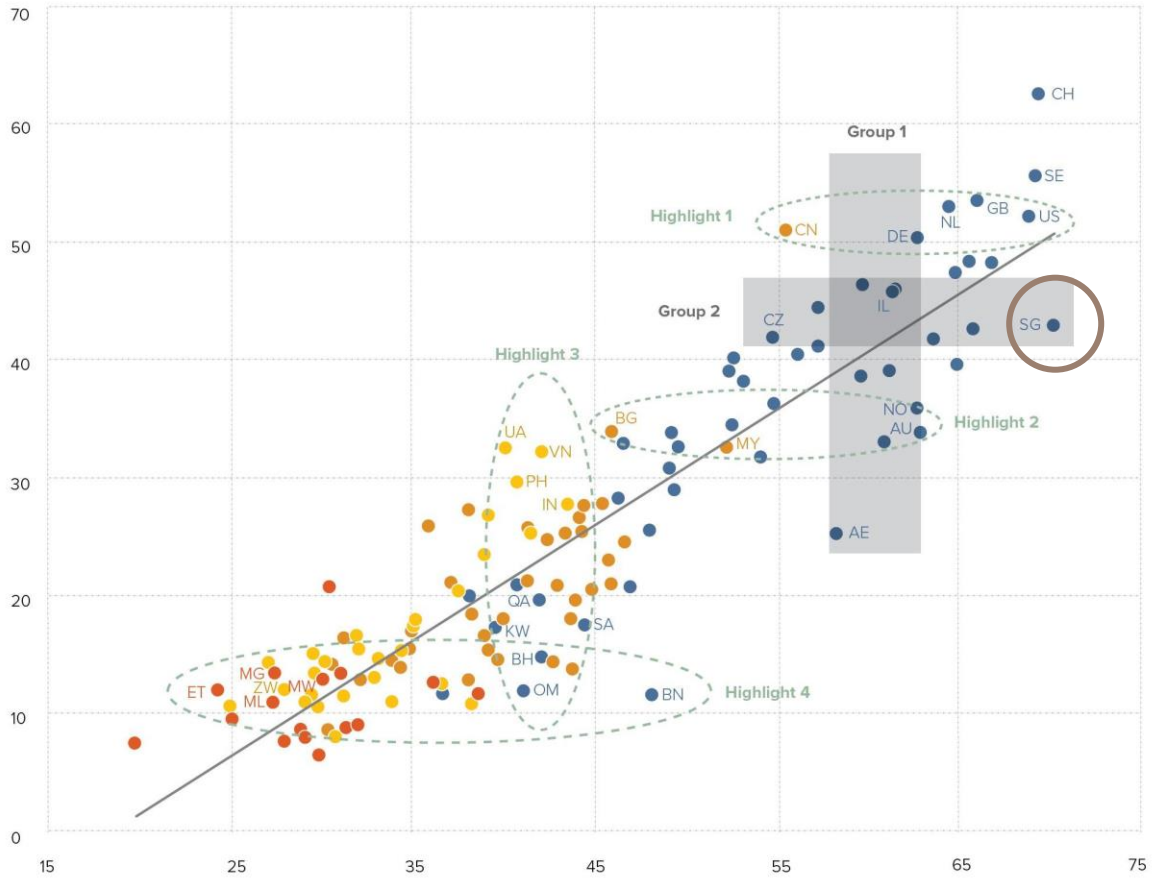


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

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

Innovation input to output performance, 2020



▲ Output score
► Input score

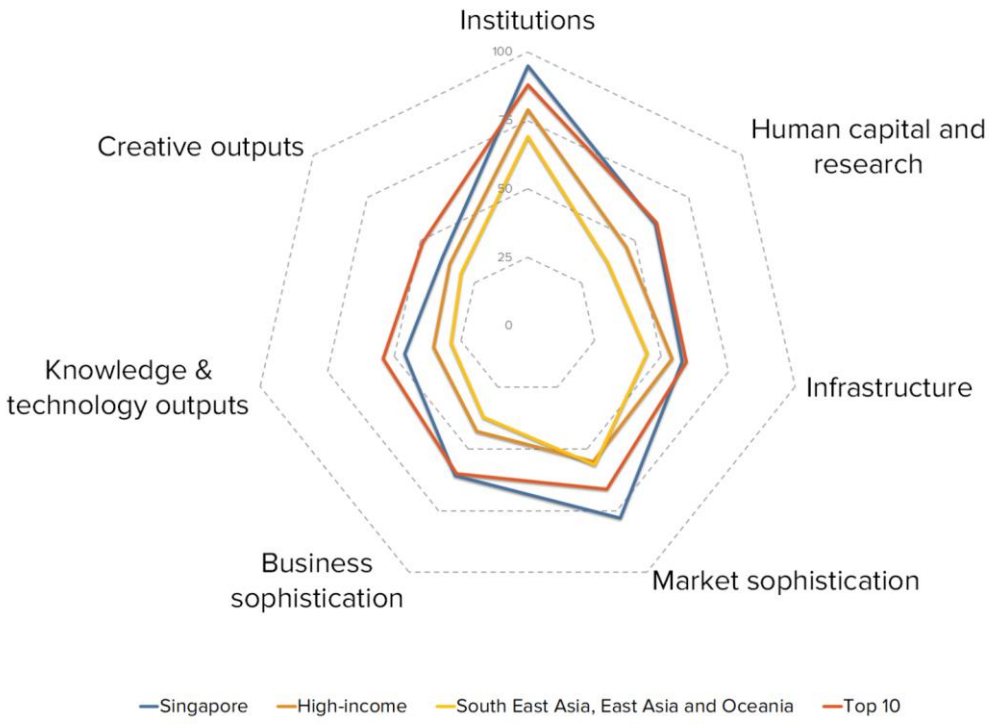
● High income group
● Upper middle-income group
● Lower middle-income group
● Low income group

— Fitted values

AU	Australia	IN	India	NL	Netherlands	CH	Switzerland
BH	Bahrain	IL	Israel	NO	Norway	UA	Ukraine
BN	Brunei Darussalam	KW	Kuwait	OM	Oman	AE	United Arab Emirates
BG	Bulgaria	MG	Madagascar	PH	Philippines	GB	United Kingdom
CN	China	MW	Malawi	QA	Qatar	US	United States of America
CZ	Czech Republic	ML	Mali	SA	Saudi Arabia	VN	Viet Nam
ET	Ethiopia	MY	Malaysia	SG	Singapore	ZW	Zimbabwe
DE	Germany			SE	Sweden		

BENCHMARKING SINGAPORE AGAINST OTHER HIGH-INCOME GROUP ECONOMIES AND SOUTH EAST ASIA, EAST ASIA, AND OCEANIA

Singapore's scores in the seven GII pillars



High-income group economies

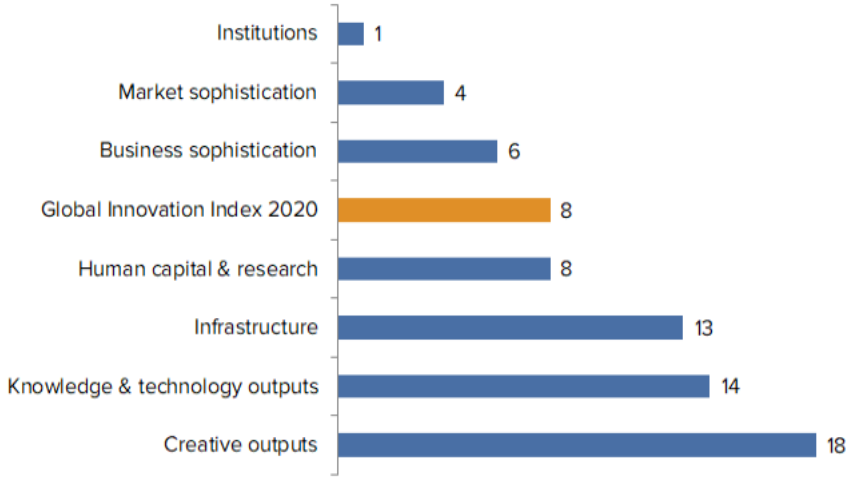
Singapore has high scores in all seven of the GII pillars, which are above average for the high-income group.

South East Asia, East Asia, and Oceania

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

OVERVIEW OF SINGAPORE RANKINGS IN THE SEVEN GII AREAS

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



*The highest possible ranking in each pillar is 1.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Singapore in the GII 2020.

Strengths

Code	Indicator name	Rank
1	Institutions	1
1.1	Political environment	1
1.1.1	Political & operational stability*	1
1.1.2	Government effectiveness*	1
1.2	Regulatory environment	2
1.2.1	Regulatory quality*	2
1.2.3	Cost of redundancy dismissal, salary weeks	1
1.3.1	Ease of starting a business*	4
2.1.4	PISA scales in reading, maths & science	2
2.2	Tertiary education	1
3.1.3	Government's online service*	2
4	Market sophistication	4
4.2	Investment	2
4.2.1	Ease of protecting minority investors*	3
4.2.3	Venture capital deals/bn PPP$ GDP	1
4.3.1	Applied tariff rate, weighted avg., %	3
5.1.1	Knowledge-intensive employment, %	2
5.1.5	Females employed w/advanced degrees, %	1
5.3	Knowledge absorption	2
5.3.4	FDI net inflows, % GDP	4
6.2.5	High- & medium-high-tech manufacturing, %	1
6.3.4	FDI net outflows, % GDP	4

Weaknesses

Code	Indicator name	Rank
2.1	Education	51
2.1.1	Expenditure on education, % GDP	103
2.1.2	Government funding/pupil, secondary, % GDP/cap	40
2.1.5	Pupil-teacher ratio, secondary	50
6.2.1	Growth rate of PPP$ GDP/worker, %	45
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	51
6.3.3	ICT services exports, % total trade	50
7.1.1	Trademarks by origin/bn PPP$ GDP	94
7.1.3	Industrial designs by origin/bn PPP$ GDP	81
7.2.2	National feature films/mn pop. 15–69	61
7.2.4	Printing & other media, % manufacturing	84

STRENGTHS

GII strengths for Singapore are found in six of the seven GII pillars.

- Institutions (1): exhibits strengths in the sub-pillars Political environment (1) and Regulatory environment (2) and in the indicators Political & operational stability (1), Government effectiveness (1), Regulatory quality (2), Cost of redundancy dismissal (1) and Ease of starting a business (4).
- Human capital & research (8): shows strengths in the sub-pillar Tertiary education (1) and in the indicator PISA scales in reading, maths & science (2).
- Infrastructure (13): the indicator Government's online service (2) reveals a strength.
- Market sophistication (4): demonstrates strengths in the sub-pillar Investment (2) and in the indicators Ease of protecting minority investors (3), Venture capital deals (1) and Applied tariff rate (3).
- Business sophistication (6): displays strengths in the sub-pillar Knowledge absorption (2) and in the indicators Knowledge-intensive employment (2), Females employed w/advanced degrees (1) and FDI net inflows (4).
- Knowledge & technology outputs (14): reveals strengths in the indicators High- & medium-high-tech manufacturing (1) and FDI net outflows (4).

WEAKNESSES

GII weaknesses for Singapore are found in three of the seven GII pillars.

- Human capital & research (8): shows weaknesses in the sub-pillar Education (51) and in the indicators Expenditure on education (103), Government funding/pupil (40) and Pupil–teacher ratio (50).
- Knowledge & technology outputs (14): displays weaknesses in the indicators Growth rate of PPP (45), ISO 9001 quality certificates (51) and ICT services exports (50).
- Creative outputs (18): exhibits weaknesses in the indicators Trademarks by origin (94), Industrial designs by origin (81), National feature films (61) and Printing & other media (84).

SINGAPORE

GII 2020 rank

8

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
15	**1**	**High**	**SEAO**	**5.8**	**585.1**	**90,080.2**	**8**

		Score/Value	Rank	
INSTITUTIONS		**94.8**	**1**	● ◆
1.1	**Political environment**	**100.0**	**1**	● ◆
1.1.1	Political and operational stability*	100.0	1	● ◆
1.1.2	Government effectiveness*	100.0	1	● ◆
1.2	**Regulatory environment**	**98.2**	**2**	● ◆
1.2.1	Regulatory quality*	98.0	2	● ◆
1.2.2	Rule of law*	94.8	7	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**86.3**	**17**	
1.3.1	Ease of starting a business*	98.2	4	● ◆
1.3.2	Ease of resolving insolvency*	74.3	25	
HUMAN CAPITAL & RESEARCH		**59.5**	**8**	
2.1	**Education**	**49.8**	**51**	○ ◇
2.1.1	Expenditure on education, % GDP ⊙	2.9	103	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.6	40	○
2.1.3	School life expectancy, years	16.4	25	
2.1.4	PISA scales in reading, maths, & science	556.5	2	● ◆
2.1.5	Pupil-teacher ratio, secondary ⊙	11.5	50	○
2.2	**Tertiary education**	**69.1**	**1**	● ◆
2.2.1	Tertiary enrolment, % gross	84.8	13	
2.2.2	Graduates in science & engineering, %	34.9	8	◆
2.2.3	Tertiary inbound mobility, % ⊙	19.2	7	◆
2.3	**Research & development (R&D)**	**59.7**	**13**	
2.3.1	Researchers, FTE/mn pop ⊙	6,802.5	6	
2.3.2	Gross expenditure on R&D, % GDP ⊙	1.9	17	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	48.6	30	◇
2.3.4	QS university ranking, average score top 3*	69.5	12	
INFRASTRUCTURE		**57.9**	**13**	
3.1	**Information & communication technologies (ICTs)**	**90.6**	**7**	
3.1.1	ICT access*	88.9	6	
3.1.2	ICT use*	78.3	23	
3.1.3	Government's online service*	98.6	2	●
3.1.4	E-participation*	96.6	13	
3.2	**General infrastructure**	**45.0**	**11**	
3.2.1	Electricity output, kWh/mn pop	9,338.0	15	
3.2.2	Logistics performance*	90.4	7	
3.2.3	Gross capital formation, % GDP	27.2	36	
3.3	**Ecological sustainability**	**38.2**	**40**	
3.3.1	GDP/unit of energy use	12.8	26	
3.3.2	Environmental performance*	58.1	38	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.1	41	
MARKET SOPHISTICATION		**78.0**	**4**	● ◆
4.1	**Credit**	**64.7**	**13**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	121.9	17	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**93.4**	**2**	● ◆
4.2.1	Ease of protecting minority investors*	86.0	3	● ◆
4.2.2	Market capitalization, % GDP	207.6	4	◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.6	1	● ◆
4.3	**Trade, competition, and market scale**	**76.0**	**19**	
4.3.1	Applied tariff rate, weighted avg., %	0.2	3	● ◆
4.3.2	Intensity of local competition+	78.4	15	
4.3.3	Domestic market scale, bn PPP$	585.1	35	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**60.7**	**6**	
5.1	**Knowledge workers**	**68.5**	**7**	
5.1.1	Knowledge-intensive employment, %	56.9	2	● ◆
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP ⊙	1.2	19	
5.1.4	GERD financed by business, %	52.2	23	
5.1.5	Females employed w/advanced degrees, %	35.1	1	● ◆
5.2	**Innovation linkages**	**47.1**	**18**	
5.2.1	University/industry research collaboration+	71.3	6	
5.2.2	State of cluster development+	69.2	9	
5.2.3	GERD financed by abroad, % GDP	0.1	30	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	11	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.5	23	◇
5.3	**Knowledge absorption**	**66.5**	**2**	● ◆
5.3.1	Intellectual property payments, % total trade	2.9	6	
5.3.2	High-tech imports, % total trade	22.0	7	◆
5.3.3	ICT services imports, % total trade	2.6	14	
5.3.4	FDI net inflows, % GDP	24.6	4	● ◆
5.3.5	Research talent, % in business enterprise ⊙	49.9	23	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**46.1**	**14**	
6.1	**Knowledge creation**	**35.8**	**28**	◇
6.1.1	Patents by origin/bn PPP$ GDP	2.8	32	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.8	19	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	18.0	31	
6.1.5	Citable documents H-index	37.8	23	
6.2	**Knowledge impact**	**45.1**	**12**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.2	45	○
6.2.2	New businesses/th pop. 15-64	10.0	15	
6.2.3	Computer software spending, % GDP	0.0	42	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.4	51	○
6.2.5	High- and medium-high-tech manufacturing, %	77.7	1	● ◆
6.3	**Knowledge diffusion**	**57.5**	**7**	
6.3.1	Intellectual property receipts, % total trade	1.5	16	
6.3.2	High-tech net exports, % total trade	26.4	6	◆
6.3.3	ICT services exports, % total trade	2.2	50	○
6.3.4	FDI net outflows, % GDP	11.8	4	● ◆
CREATIVE OUTPUTS		**39.9**	**18**	
7.1	**Intangible assets**	**37.6**	**34**	
7.1.1	Trademarks by origin/bn PPP$ GDP	20.1	94	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	132.3	13	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.6	81	○
7.1.4	ICTs & organizational model creation+	74.6	14	
7.2	**Creative goods and services**	**37.6**	**16**	
7.2.1	Cultural & creative services exports, % total trade	2.6	5	◆
7.2.2	National feature films/mn pop. 15-69	2.8	61	○
7.2.3	Entertainment & Media market/th pop. 15-69	41.3	20	
7.2.4	Printing and other media, % manufacturing	0.6	84	○
7.2.5	Creative goods exports, % total trade	3.8	16	
7.3	**Online creativity**	**46.8**	**24**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	24.7	23	
7.3.2	Country-code TLDs/th pop. 15-69	11.8	38	◇
7.3.3	Wikipedia edits/mn pop. 15-69	78.8	29	
7.3.4	Mobile app creation/bn PPP$ GDP	73.0	7	◆

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

The following tables list data that are either missing or outdated for Singapore.

Missing data

Code	Indicator name	Country year	Model year	Source
4.1.3	Microfinance gross loans, % GDP	n/a	2018	Microfinance Information Exchange
5.1.2	Firms offering formal training, %	n/a	2018	World Bank
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2018	World Intellectual Property Organization

Outdated data

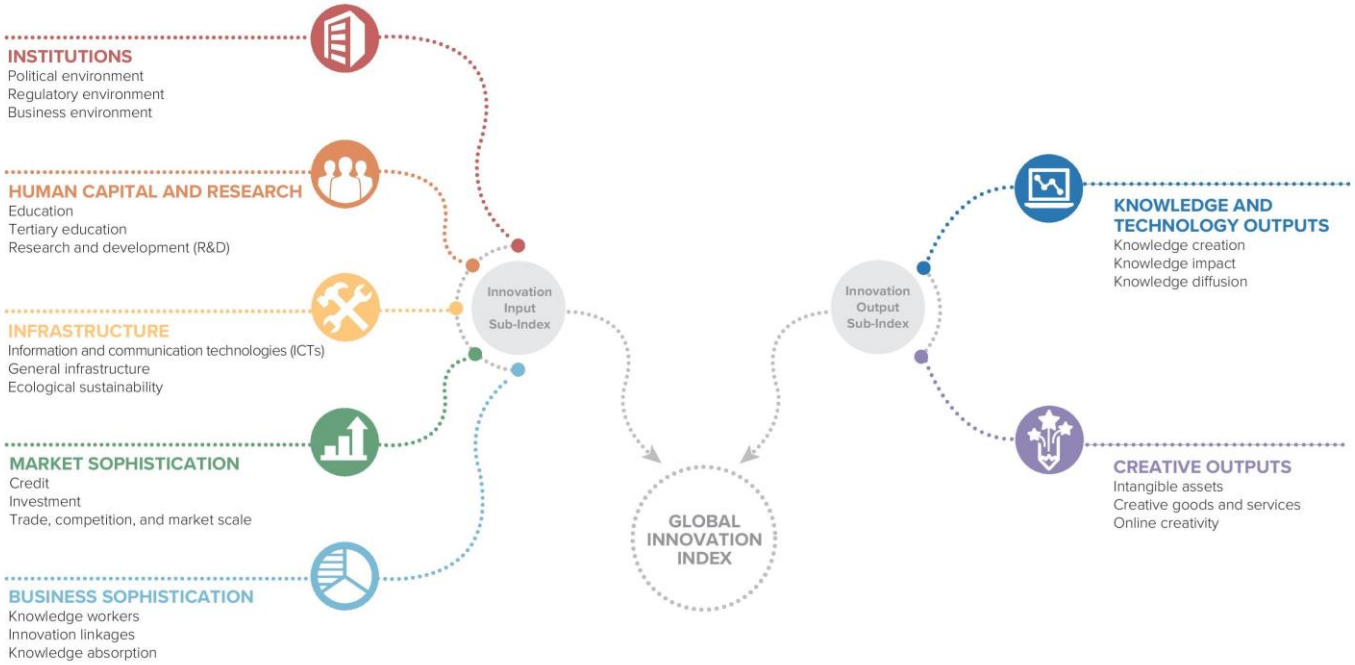
Code	Indicator name	Country year	Model year	Source
2.1.1	Expenditure on education, % GDP	2013	2018	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2017	2018	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	2012	2017	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2017	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2017	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
5.1.3	GERD performed by business, % GDP	2017	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
5.3.5	Research talent, % in business enterprise	2017	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators

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 2020, the GII presents its 13th edition devoted to the theme *Who Will Finance Innovation?*

Recognizing that innovation is a key driver of economic development, the GII aims to provide an innovation ranking and rich 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 economies that incorporate the GII into their innovation agendas.

Framework of the Global Innovation Index 2020



The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that include 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 consisting of three sub-pillars.