Global Innovation Index 2021

SINGAPORE

8th Singapore ranks 8th among the 132 economies featured in the GII 2021.

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 2021 is between ranks 6 and 10.

Rankings for Singapore (2019–2021)

	GII	Innovation inputs	Innovation outputs
2021	8	1	13
2020	8	1	15
2019	8	1	15

- Singapore performs better in innovation inputs than innovation outputs in 2021.
- This year Singapore ranks 1st in innovation inputs, the same as both 2020 and 2019.
- As for innovation outputs, Singapore ranks 13th. This position is higher than both 2020 and 2019.

8th Singapore ranks 8th among the 51 high-income group economies.

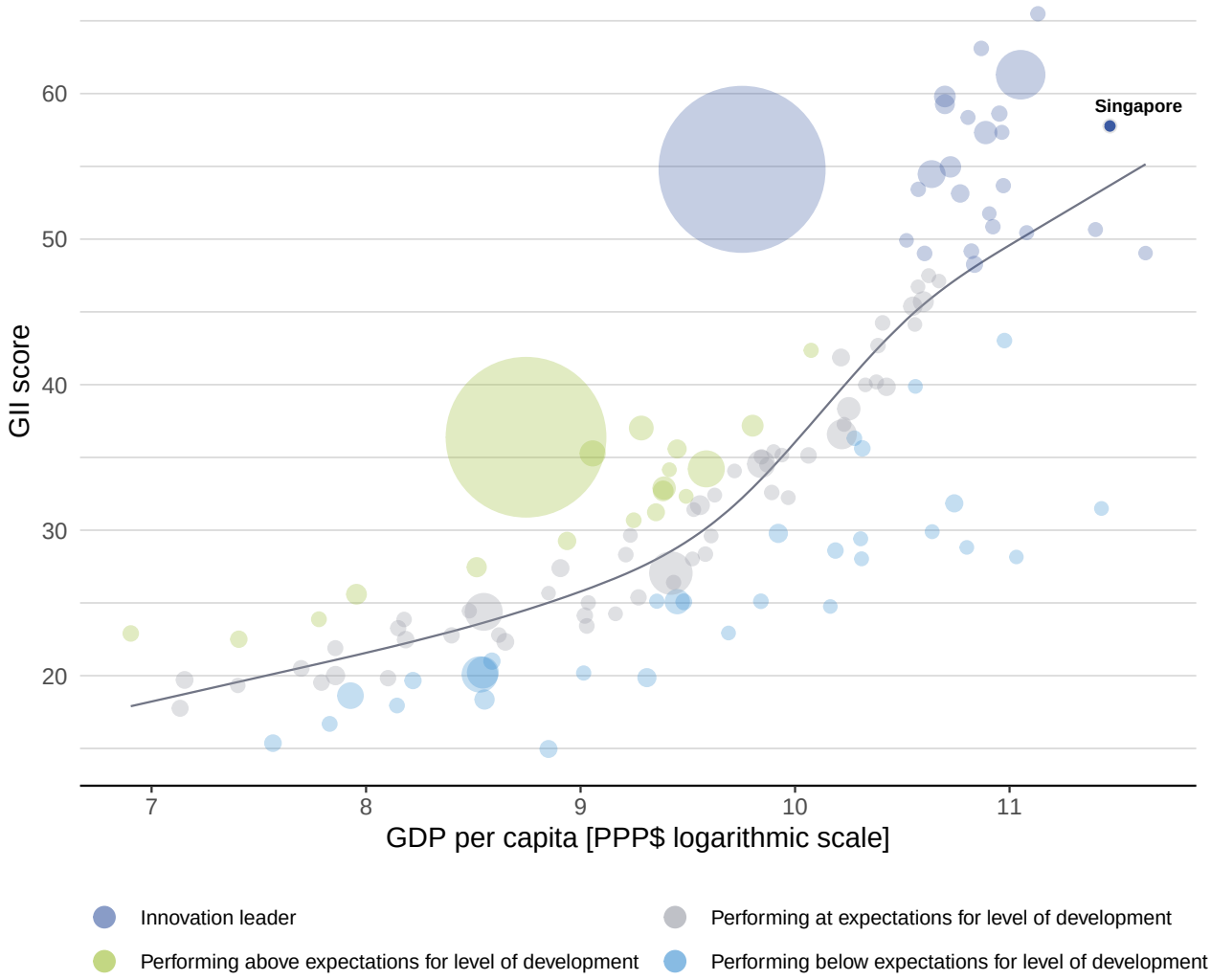
2nd Singapore ranks 2nd among the 17 economies in South East Asia, East Asia, and Oceania.

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's performance is above expectations for its level of development.

The positive relationship between innovation and development

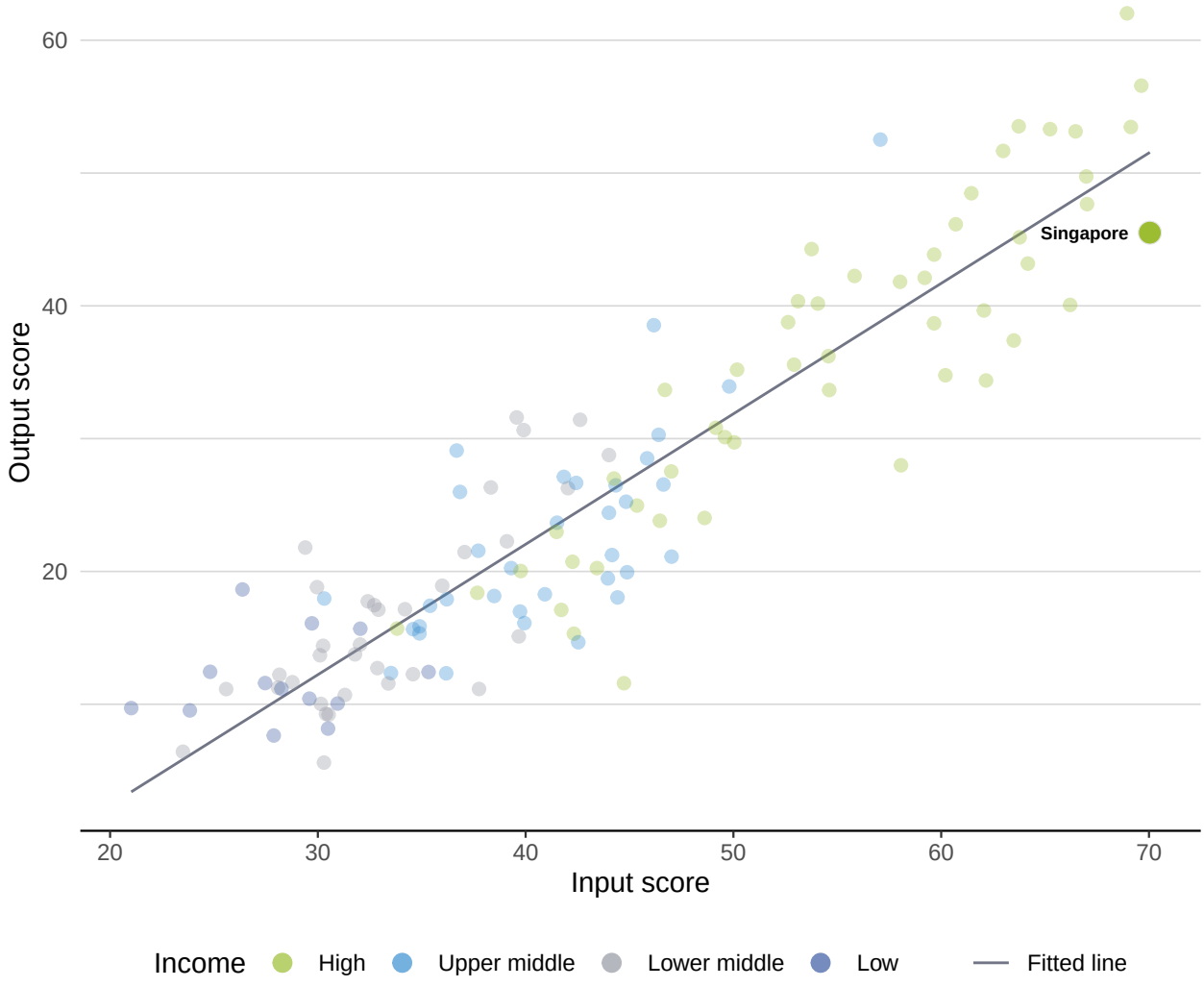


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

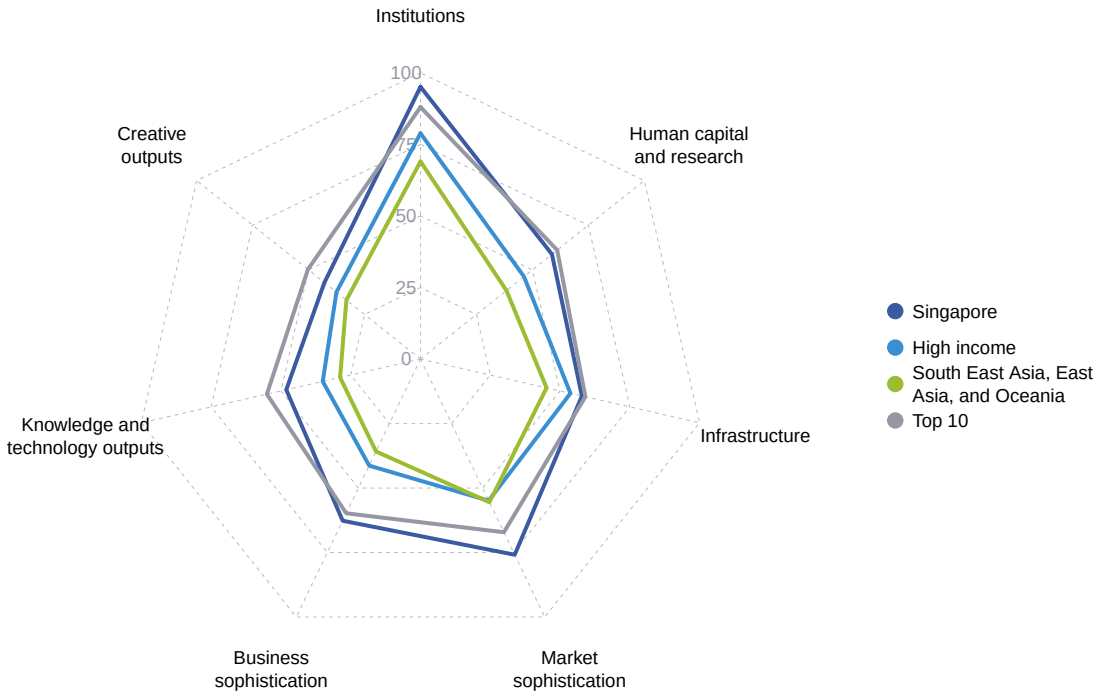
Singapore produces less innovation outputs relative to its level of innovation investments.

Innovation input to output performance



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

The seven GII pillar scores for Singapore



High-income group economies

Singapore performs above the high-income group average in all GII pillars.

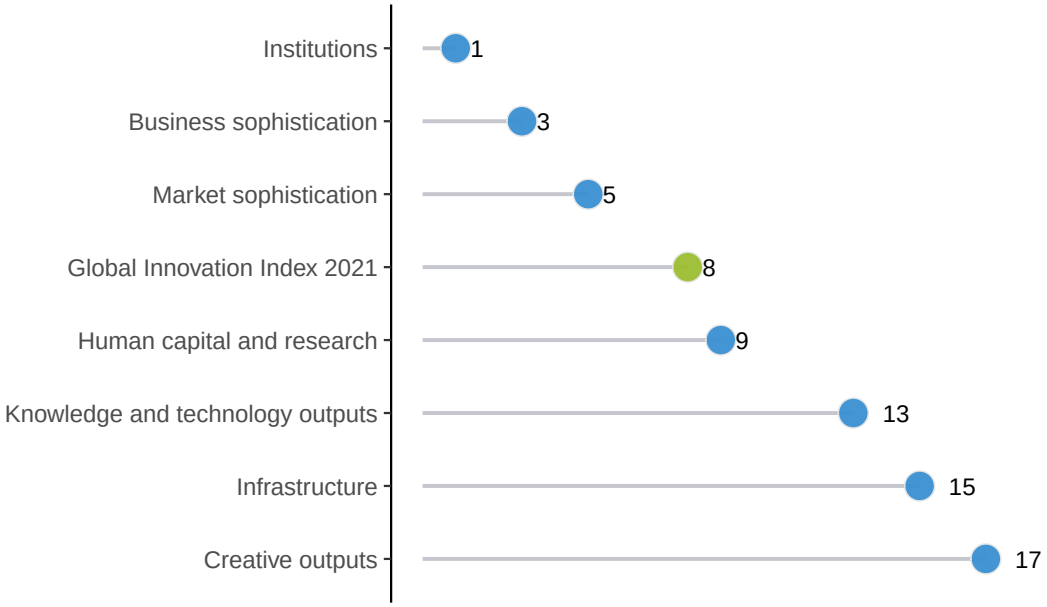
South East Asia, East Asia, and Oceania

Singapore performs above the regional average in all GII pillars.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2021 AREAS

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

The seven GII pillar ranks for Singapore



Note: The highest possible ranking in each pillar is one.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Singapore in the GII 2021.

Strengths and weaknesses for Singapore

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
1.1	Political environment	1	2.1	Education	54
1.1.1	Political and operational stability	1	2.1.1	Expenditure on education, % GDP	102
1.1.2	Government effectiveness	1	3.2.3	Gross capital formation, % GDP	49
1.2	Regulatory environment	1	4.3.2	Domestic industry diversification	79
1.2.1	Regulatory quality	1	6.2.1	Labor productivity growth, %	73
1.2.3	Cost of redudancy dismissal	1	6.2.3	Software spending, % GDP	52
1.3.1	Ease of starting a business	4	6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	55
2.1.4	PISA scales in reading, maths and science	2	7.1.1	Trademarks by origin/bn PPP$ GDP	92
2.2	Tertiary education	2	7.1.3	Industrial designs by origin/bn PPP$ GDP	79
4.2	Investment	1	7.2.2	National feature films/mn pop. 15–69	61
4.2.1	Ease of protecting minority investors	3	7.2.4	Printing and other media, % manufacturing	91
4.2.3	Venture capital investors, deals/bn PPP$ GDP	1			
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	1			
4.3.1	Applied tariff rate, weighted avg., %	3			
5.1.1	Knowledge-intensive employment, %	2			
5.3	Knowledge absorption	1			
5.3.4	FDI net inflows, % GDP	3			
6.2.5	High-tech manufacturing, %	1			
6.3	Knowledge diffusion	4			
6.3.3	High-tech exports, % total trade	1			

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
7.2.1	Cultural and creative services exports, % total trade	1			
7.3.4	Mobile app creation/bn PPP$ GDP	1			

Singapore

GII 2021 rank

8

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
13	**1**	**High**	**SEAO**	**5.9**	**551.6**	**95,603**	**8**

		Score/ Value	Rank
Institutions		**95.1**	**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**	**99.1**	**1** ● ◆
1.2.1	Regulatory quality*	100.0	1 ● ◆
1.2.2	Rule of law*	96.2	8
1.2.3	Cost of redundancy dismissal	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 and research		**58.7**	**9**
2.1	**Education**	**54.0**	**54** ○
2.1.1	Expenditure on education, % GDP ◴	2.9	102 ○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.4	39
2.1.3	School life expectancy, years	16.5	25
2.1.4	PISA scales in reading, maths and science	556.5	2 ● ◆
2.1.5	Pupil-teacher ratio, secondary ◴	11.3	42
2.2	**Tertiary education**	**63.1**	**2** ● ◆
2.2.1	Tertiary enrolment, % gross	88.9	10
2.2.2	Graduates in science and engineering, %	33.5	10 ◆
2.2.3	Tertiary inbound mobility, % ◴	19.2	7
2.3	**Research and development (R&D)**	**59.1**	**15**
2.3.1	Researchers, FTE/mn pop. ◴	6,821.1	5
2.3.2	Gross expenditure on R&D, % GDP ◴	1.8	19
2.3.3	Global corporate R&D investors, top 3, mn US$	50.0	30
2.3.4	QS university ranking, top 3*	68.1	12
Infrastructure		**57.8**	**15**
3.1	**Information and communication technologies (ICTs)**	**90.5**	**7**
3.1.1	ICT access*	90.5	7
3.1.2	ICT use*	77.4	28 ◇
3.1.3	Government's online service*	96.5	5
3.1.4	E-participation*	97.6	6
3.2	**General infrastructure**	**46.7**	**15**
3.2.1	Electricity output, GWh/mn pop.	9,556.1	15
3.2.2	Logistics performance*	90.5	7
3.2.3	Gross capital formation, % GDP	24.8	49 ○
3.3	**Ecological sustainability**	**36.3**	**42**
3.3.1	GDP/unit of energy use	14.4	27
3.3.2	Environmental performance*	58.1	38 ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.8	49
Market sophistication		**75.9**	**5** ◆
4.1	**Credit**	**62.5**	**13**
4.1.1	Ease of getting credit*	75.0	34
4.1.2	Domestic credit to private sector, % GDP	120.8	18
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**88.4**	**1** ● ◆
4.2.1	Ease of protecting minority investors*	86.0	3 ● ◆
4.2.2	Market capitalization, % GDP	200.6	4 ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.7	1 ● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.3	1 ● ◆
4.3	**Trade, diversification, and market scale**	**76.6**	**39**
4.3.1	Applied tariff rate, weighted avg., %	0.4	3 ●
4.3.2	Domestic industry diversification ◴	80.1	79 ○ ◇
4.3.3	Domestic market scale, bn PPP$	551.6	37

		Score/ Value	Rank
Business sophistication		**62.7**	**3** ● ◆
5.1	**Knowledge workers**	**65.3**	**10**
5.1.1	Knowledge-intensive employment, %	58.3	2 ● ◆
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP ◴	1.1	20
5.1.4	GERD financed by business, %	53.1	24
5.1.5	Females employed w/advanced degrees, %	27.1	6 ◆
5.2	**Innovation linkages**	**52.0**	**13**
5.2.1	University-industry R&D collaboration†	69.8	8
5.2.2	State of cluster development and depth†	69.4	6
5.2.3	GERD financed by abroad, % GDP	0.1	33
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	5 ◆
5.2.5	Patent families/bn PPP$ GDP	2.4	15
5.3	**Knowledge absorption**	**70.7**	**1** ● ◆
5.3.1	Intellectual property payments, % total trade	2.8	8
5.3.2	High-tech imports, % total trade	22.2	7 ◆
5.3.3	ICT services imports, % total trade	2.4	20
5.3.4	FDI net inflows, % GDP	27.1	3 ● ◆
5.3.5	Research talent, % in businesses ◴	51.5	21
Knowledge and technology outputs		**48.1**	**13**
6.1	**Knowledge creation**	**35.5**	**28** ◇
6.1.1	Patents by origin/bn PPP$ GDP	3.0	26
6.1.2	PCT patents by origin/bn PPP$ GDP	2.3	16
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	27.6	33
6.1.5	Citable documents H-index	38.4	22
6.2	**Knowledge impact**	**46.7**	**11**
6.2.1	Labor productivity growth, %	–0.3	73 ○
6.2.2	New businesses/th pop. 15–64	10.0	15
6.2.3	Software spending, % GDP	0.3	52 ○
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.5	55 ○
6.2.5	High-tech manufacturing, %	76.2	1 ● ◆
6.3	**Knowledge diffusion**	**62.1**	**4** ● ◆
6.3.1	Intellectual property receipts, % total trade	1.4	15
6.3.2	Production and export complexity	86.7	5
6.3.3	High-tech exports, % total trade	25.3	1 ● ◆
6.3.4	ICT services exports, % total trade	2.5	46
Creative outputs		**42.9**	**17**
7.1	**Intangible assets**	**40.2**	**40**
7.1.1	Trademarks by origin/bn PPP$ GDP	19.2	92 ○ ◇
7.1.2	Global brand value, top 5,000, % GDP	153.8	9
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.7	79 ○
7.1.4	ICTs and organizational model creation†	74.6	14
7.2	**Creative goods and services**	**39.0**	**13**
7.2.1	Cultural and creative services exports, % total trade	3.5	1 ● ◆
7.2.2	National feature films/mn pop. 15–69	2.8	61 ○
7.2.3	Entertainment and media market/th pop. 15–69	38.8	20
7.2.4	Printing and other media, % manufacturing	0.5	91 ○
7.2.5	Creative goods exports, % total trade	3.5	17
7.3	**Online creativity**	**52.1**	**19**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	24.5	23
7.3.2	Country-code TLDs/th pop. 15–69	11.8	38 ◇
7.3.3	Wikipedia edits/mn pop. 15–69	69.6	38 ◇
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1 ● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see Appendix IV 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 for Singapore

Code	Indicator name	Economy 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	2019	World Bank
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2019	World Intellectual Property Organization

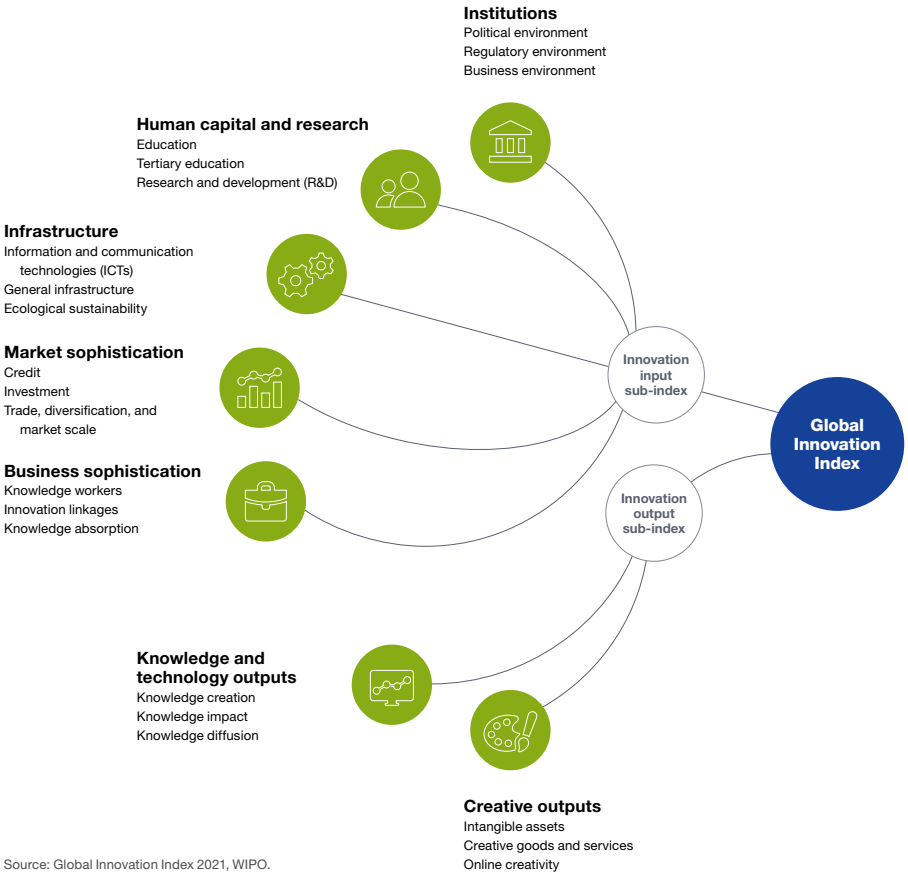
Outdated data for Singapore

Code	Indicator name	Economy year	Model year	Source
2.1.1	Expenditure on education, % GDP	2013	2017	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2018	2019	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	2012	2018	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2018	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2018	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
4.3.2	Domestic industry diversification	2017	2018	United Nations Industrial Development Organization
5.1.3	GERD performed by business, % GDP	2018	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.3.5	Research talent, % in businesses	2018	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is published by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations.

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.



Source: Global Innovation Index 2021, WIPO.

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.