Global Innovation Index 2022

SINGAPORE

7th Singapore ranks 7th among the 132 economies featured in the GII 2022.

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 2022 is between ranks 5 and 11.

Rankings for Singapore (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	8	1	15
2021	8	1	13
2022	7	1	14

- Singapore performs better in innovation inputs than innovation outputs in 2022.
- This year Singapore ranks 1st in innovation inputs, the same as both 2021 and 2020.
- As for innovation outputs, Singapore ranks 14th. This position is lower than last year but higher than 2020.

7th Singapore ranks 7th among the 48 high-income group economies.

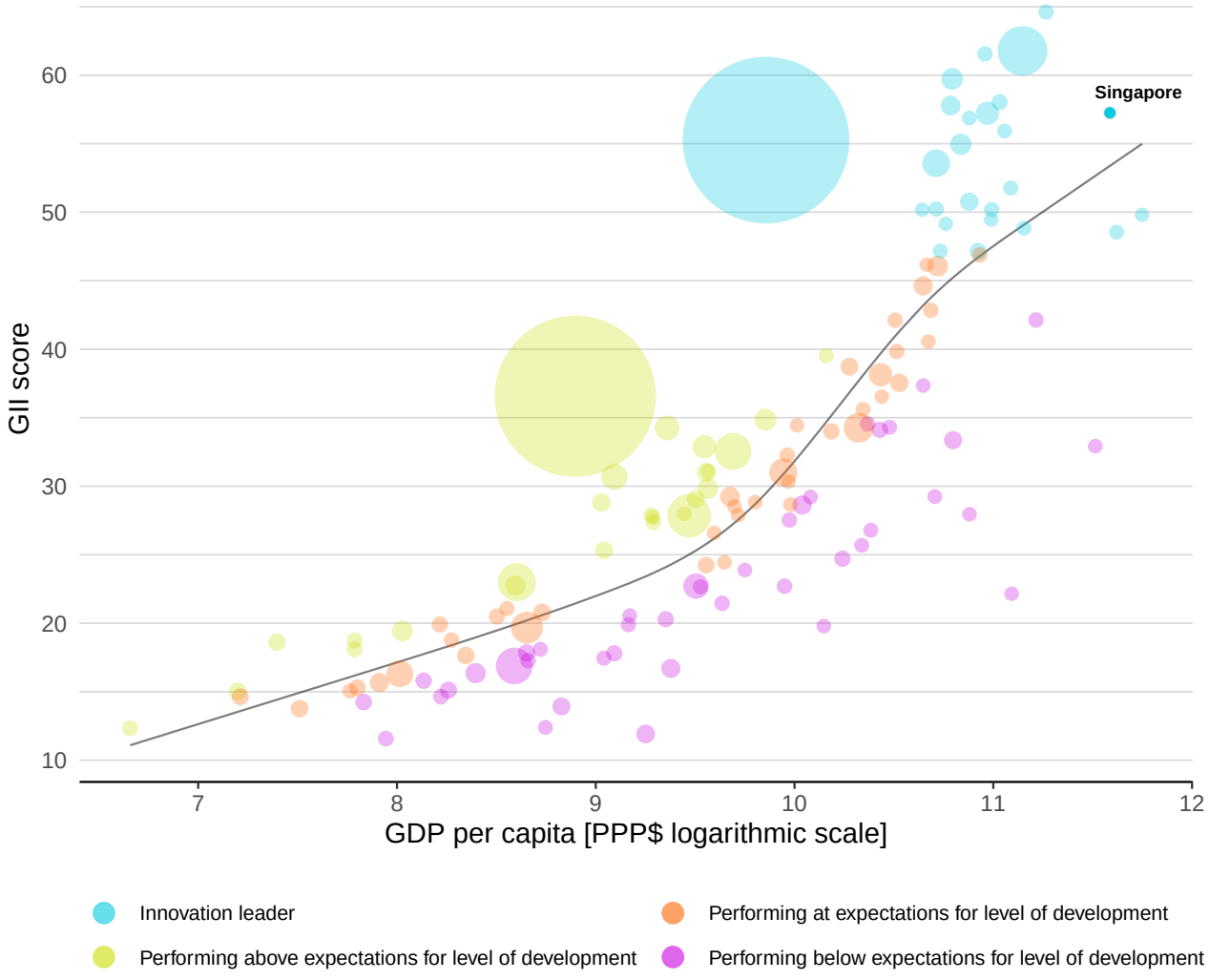
2nd Singapore ranks 2nd among the 17 economies in South East Asia, East Asia, and Oceania.

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

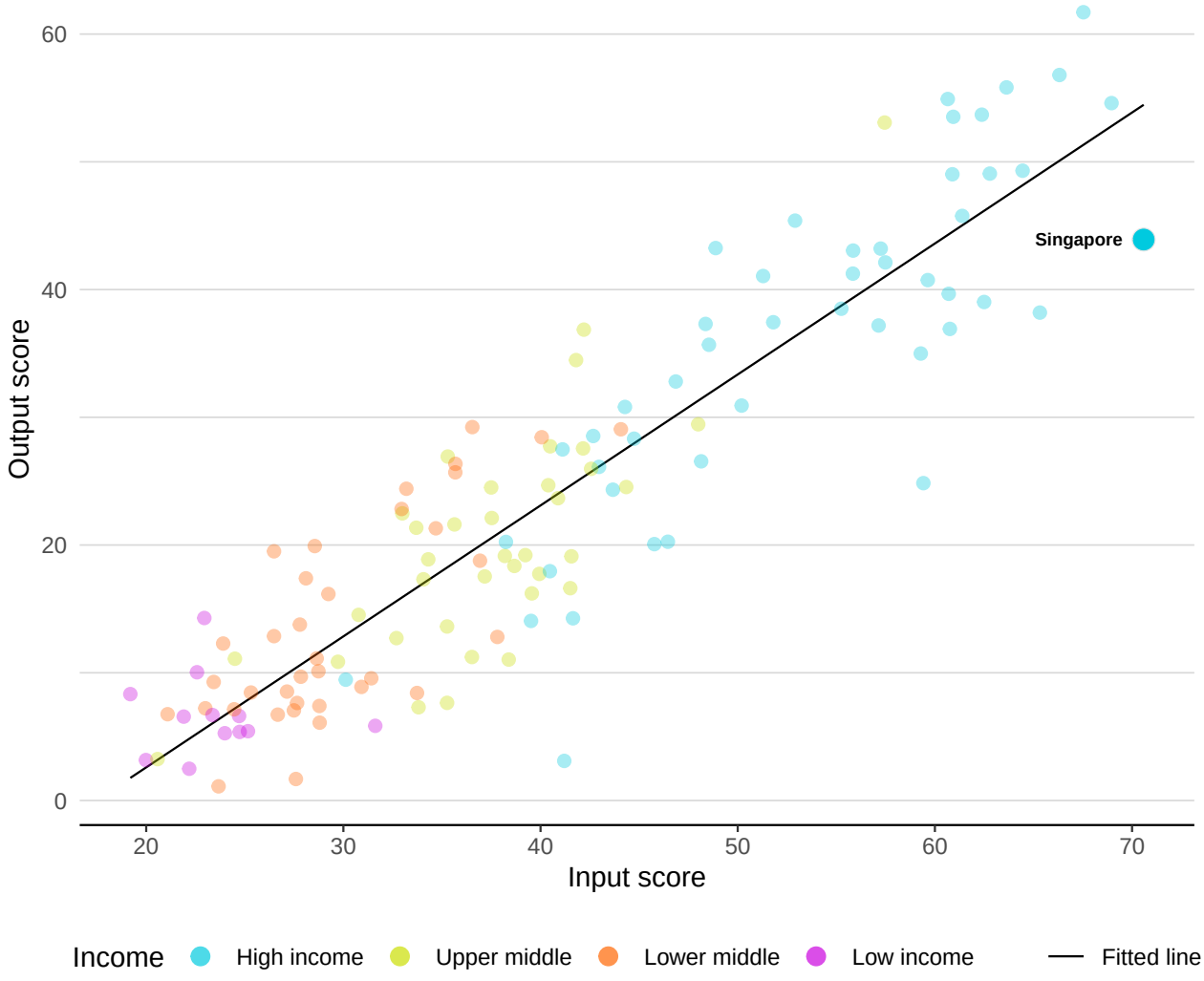


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

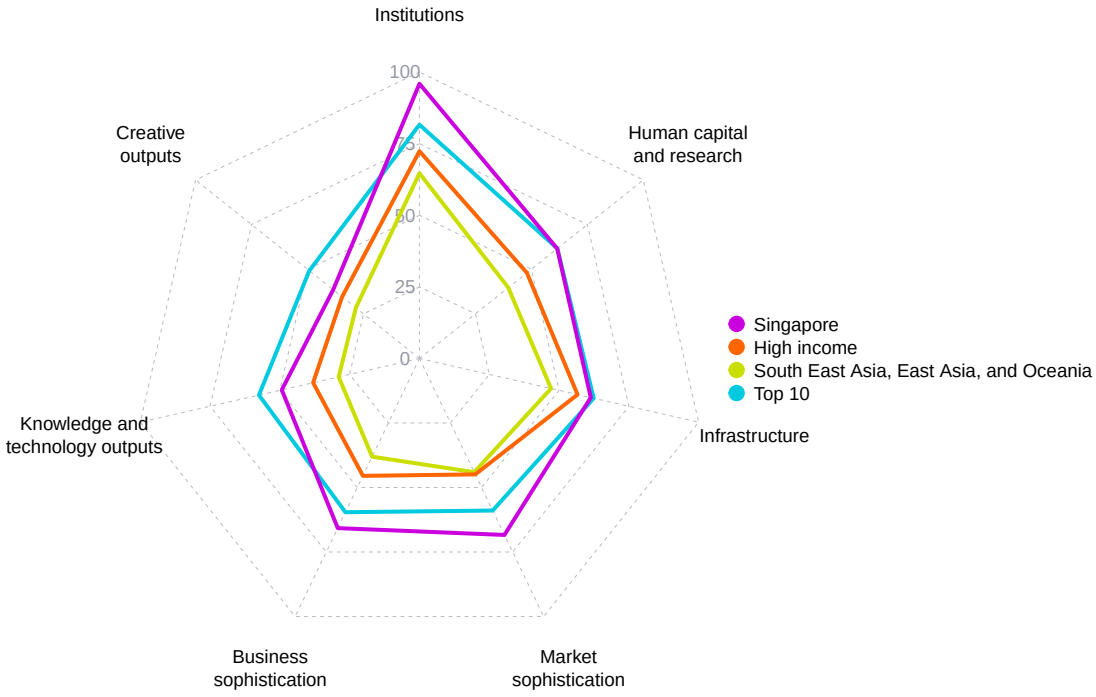
Singapore produces less innovation outputs relative to its level of innovation investments.

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.

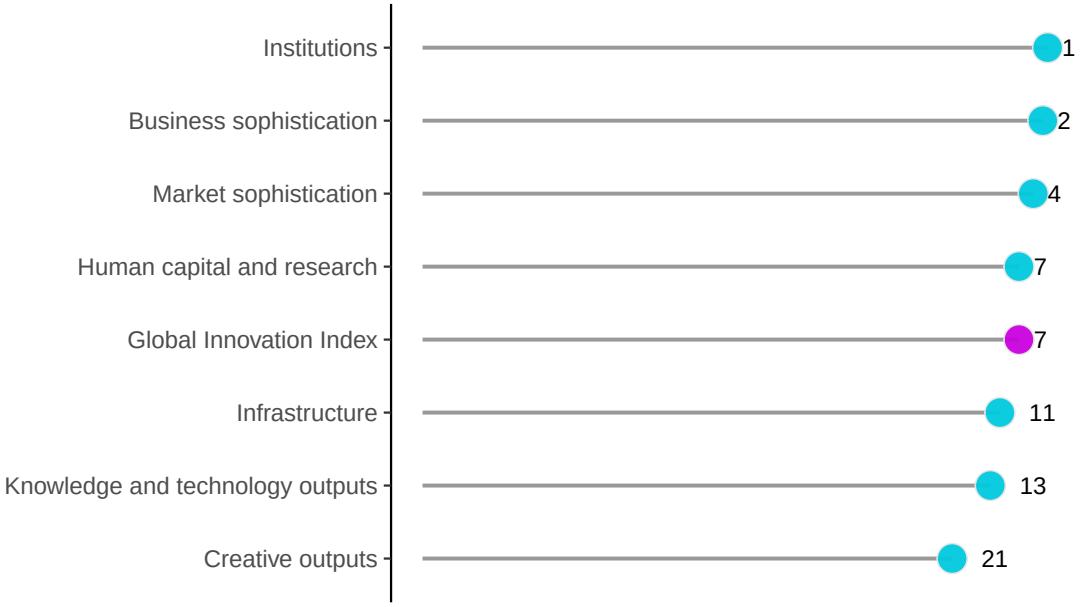
South East Asia, East Asia, and Oceania

Singapore performs above the regional average in all GII pillars.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 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 1.

The full WIPO Intellectual Property Statistics profile for Singapore can be found at:

https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=SG.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the indicator strengths and weaknesses of Singapore in the GII 2022.

Strengths and weaknesses for Singapore

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
1.1.1	Political and operational stability	1	2.1.1	Expenditure on education, % GDP	117
1.1.2	Government effectiveness	1	2.1.2	Government funding/pupil, secondary, % GDP/cap	53
1.2.1	Regulatory quality	1	3.2.3	Gross capital formation, % GDP	66
1.2.3	Cost of redundancy dismissal	1	4.3.2	Domestic industry diversification	80
1.3.1	Policies for doing business	3	6.2.3	Software spending, % GDP	50
2.1.4	PISA scales in reading, maths and science	2	7.1.1	Intangible asset intensity, top 15, %	55
3.1.1	ICT access	1	7.1.2	Trademarks by origin/bn PPP$ GDP	89
4.2.2	Venture capital investors, deals/bn PPP$ GDP	1	7.1.4	Industrial designs by origin/bn PPP$ GDP	76
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	1	7.2.2	National feature films/mn pop. 15–69	49
4.2.4	Venture capital received, value, % GDP	1	7.2.4	Printing and other media, % manufacturing	84
4.3.1	Applied tariff rate, weighted avg., %	3			
5.1.1	Knowledge-intensive employment, %	2			
6.2.5	High-tech manufacturing, %	1			
7.2.1	Cultural and creative services exports, % total trade	1			
7.3.3	GitHub commit pushes received/mn pop. 15–69	1			

GII 2022 rank

Singapore

7

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
14	1	High	SEAO	5.9	615.3	107,677

		Score/ Value	Rank
Institutions		**95.9**	**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**	98.7	1 ● ◆
1.2.1	Regulatory quality*	100.0	1 ● ◆
1.2.2	Rule of law*	94.9	4
1.2.3	Cost of redundancy dismissal	8.0	1 ●
1.3	**Business environment**	89.0	[2]
1.3.1	Policies for doing business†	89.0	3 ● ◆
1.3.2	Entrepreneurship policies and culture*	n/a	n/a
Human capital and research		**61.5**	**7**
2.1	**Education**	59.0	43
2.1.1	Expenditure on education, % GDP	2.5	117 ○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.5	53 ○
2.1.3	School life expectancy, years	16.5	24
2.1.4	PISA scales in reading, maths and science	556.5	2 ● ◆
2.1.5	Pupil-teacher ratio, secondary	11.3	43
2.2	**Tertiary education**	66.3	2 ● ◆
2.2.1	Tertiary enrolment, % gross	91.1	10
2.2.2	Graduates in science and engineering, % 🕘	35.4	9 ◆
2.2.3	Tertiary inbound mobility, % 🕘	19.2	7
2.3	**Research and development (R&D)**	59.2	17
2.3.1	Researchers, FTE/mn pop. 🕘	7,287.3	5 ◆
2.3.2	Gross expenditure on R&D, % GDP 🕘	1.9	19
2.3.3	Global corporate R&D investors, top 3, mn USD	49.2	28
2.3.4	QS university ranking, top 3*	69.4	12
Infrastructure		**61.4**	**11**
3.1	**Information and communication technologies (ICTs)**	92.5	6
3.1.1	ICT access*	99.6	1 ● ◆
3.1.2	ICT use*	76.4	32 ◇
3.1.3	Government's online service*	96.5	5
3.1.4	E-participation*	97.6	6
3.2	**General infrastructure**	56.0	12
3.2.1	Electricity output, GWh/mn pop.	9,388.4	15
3.2.2	Logistics performance*	90.7	7
3.2.3	Gross capital formation, % GDP	23.2	66 ○
3.3	**Ecological sustainability**	35.5	41
3.3.1	GDP/unit of energy use	15.7	21
3.3.2	Environmental performance*	50.9	37
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	52
Market sophistication		**68.4**	**4 ◆**
4.1	**Credit**	50.3	[17]
4.1.1	Finance for startups and scaleups*	n/a	n/a
4.1.2	Domestic credit to private sector, % GDP	132.7	17
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	92.5	3 ● ◆
4.2.1	Market capitalization, % GDP	187.0	6 ◆
4.2.2	Venture capital investors, deals/bn PPP$ GDP	1.0	1 ● ◆
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	0.3	1 ● ◆
4.2.4	Venture capital received, value, % GDP	0.0	1 ● ◆
4.3	**Trade, diversification, and market scale**	62.4	43
4.3.1	Applied tariff rate, weighted avg., %	0.0	3 ● ◆
4.3.2	Domestic industry diversification	73.8	80 ○ ◇
4.3.3	Domestic market scale, bn PPP$	615.3	37

		Score/ Value	Rank
Business sophistication		**65.7**	**2 ● ◆**
5.1	**Knowledge workers**	69.6	6
5.1.1	Knowledge-intensive employment, % 🕘	59.9	2 ● ◆
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP 🕘	1.2	21
5.1.4	GERD financed by business, %	55.3	20
5.1.5	Females employed w/advanced degrees, % 🕘	28.1	6
5.2	**Innovation linkages**	54.3	10
5.2.1	University-industry R&D collaboration†	68.8	7
5.2.2	State of cluster development and depth†	67.6	10
5.2.3	GERD financed by abroad, % GDP	0.1	37
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	6
5.2.5	Patent families/bn PPP$ GDP	2.6	14
5.3	**Knowledge absorption**	73.3	1 ● ◆
5.3.1	Intellectual property payments, % total trade	2.9	9
5.3.2	High-tech imports, % total trade	24.9	6 ◆
5.3.3	ICT services imports, % total trade	3.2	13
5.3.4	FDI net inflows, % GDP	26.7	5 ◆
5.3.5	Research talent, % in businesses 🕘	52.2	21
Knowledge and technology outputs		**49.3**	**13**
6.1	**Knowledge creation**	38.8	24
6.1.1	Patents by origin/bn PPP$ GDP	3.2	25
6.1.2	PCT patents by origin/bn PPP$ GDP	2.6	12
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	27.8	32
6.1.5	Citable documents H-index	39.0	22
6.2	**Knowledge impact**	50.0	7 ◆
6.2.1	Labor productivity growth, %	2.9	18 ◆
6.2.2	New businesses/th pop. 15–64	10.0	14
6.2.3	Software spending, % GDP	0.3	50 ○
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.8	47
6.2.5	High-tech manufacturing, %	74.7	1 ● ◆
6.3	**Knowledge diffusion**	59.1	8
6.3.1	Intellectual property receipts, % total trade	1.4	17
6.3.2	Production and export complexity	88.5	5
6.3.3	High-tech exports, % total trade	29.4	5 ◆
6.3.4	ICT services exports, % total trade	2.8	47
Creative outputs		**38.5**	**21**
7.1	**Intangible assets**	34.1	53 ◇
7.1.1	Intangible asset intensity, top 15, %	46.2	55 ○ ◇
7.1.2	Trademarks by origin/bn PPP$ GDP	22.9	89 ○ ◇
7.1.3	Global brand value, top 5,000, % GDP	134.9	11
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.7	76 ○
7.2	**Creative goods and services**	40.4	8
7.2.1	Cultural and creative services exports, % total trade	4.6	1 ● ◆
7.2.2	National feature films/mn pop. 15–69	1.7	49 ○ ◇
7.2.3	Entertainment and media market/th pop. 15–69	40.2	20
7.2.4	Printing and other media, % manufacturing	0.5	84 ○ ◇
7.2.5	Creative goods exports, % total trade	3.8	16
7.3	**Online creativity**	45.6	9
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	28.3	23
7.3.2	Country-code TLDs/th pop. 15–69	12.0	37 ◇
7.3.3	GitHub commit pushes received/mn pop. 15–69	100.0	1 ● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	42.0	4 ◆

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 appendices for details, including the year of the data, at https://www.wipo.int/global_innovation_index/en/2022. 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 indicators that are either missing or outdated for Singapore.

Missing data for Singapore

Code	Indicator name	Economy year	Model year	Source
1.3.2	Entrepreneurship policies and culture	n/a	2021	Global Entrepreneurship Monitor
4.1.1	Finance for startups and scaleups	n/a	2021	Global Entrepreneurship Monitor
4.1.3	Loans from microfinance institutions, % GDP	n/a	2020	International Monetary Fund, Financial Access Survey (FAS)
5.1.2	Firms offering formal training, %	n/a	2019	World Bank Enterprise Surveys
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2020	World Intellectual Property Organization

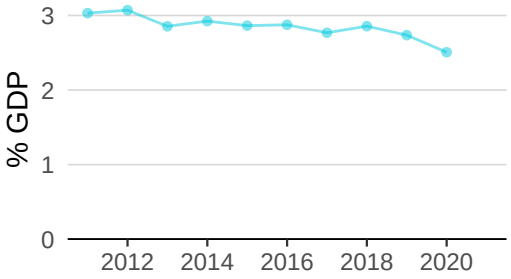
Outdated data for Singapore

Code	Indicator name	Economy year	Model year	Source
2.2.2	Graduates in science and engineering, %	2019	2020	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	2012	2019	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2019	2020	UNESCO Institute for Statistics
2.3.2	Gross expenditure on R&D, % GDP	2019	2020	UNESCO Institute for Statistics
5.1.1	Knowledge-intensive employment, %	2020	2021	International Labour Organization
5.1.3	GERD performed by business, % GDP	2019	2020	UNESCO Institute for Statistics
5.1.5	Females employed w/advanced degrees, %	2020	2021	International Labour Organization
5.3.5	Research talent, % in businesses	2019	2020	UNESCO Institute for Statistics

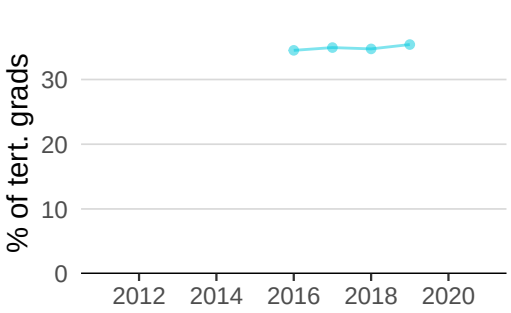
SINGAPORE'S INNOVATION SYSTEM

As far as practicable, the plots below present unscaled indicator data.

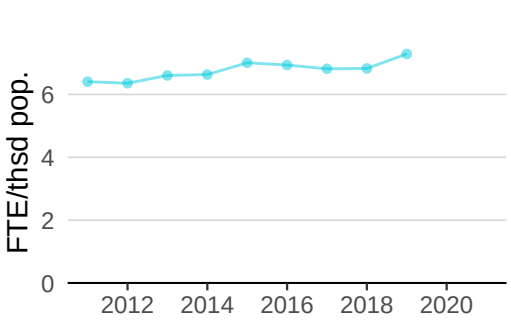
Innovation inputs



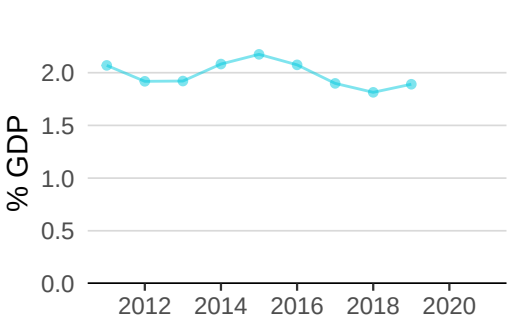
2.1.1 Expenditure on education was equal to 2.5% GDP in 2020–down by 8 percentage points from the year prior–and equivalent to an indicator rank of 117.



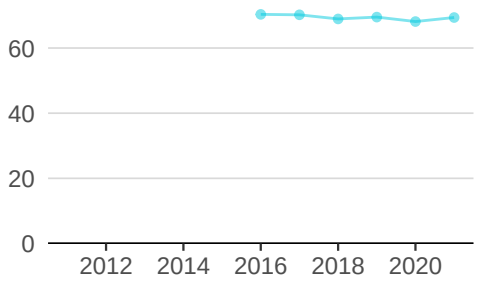
2.2.2 Graduates in science and engineering was equal to 35.4% of tert. grads in 2019–up by 2 percentage points from the year prior–and equivalent to an indicator rank of 9.



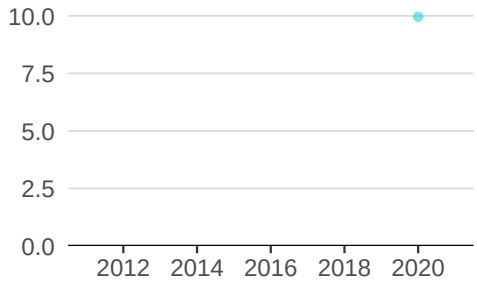
2.3.1 Researchers was equal to 7.3 FTE/thsd pop. in 2019–up by 7 percentage points from the year prior–and equivalent to an indicator rank of 5.



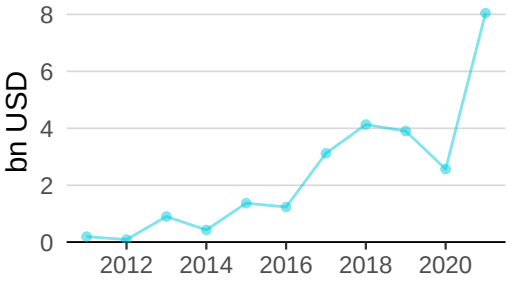
2.3.2 Gross expenditure on R&D was equal to 1.9% GDP in 2019–up by 4 percentage points from the year prior–and equivalent to an indicator rank of 19.



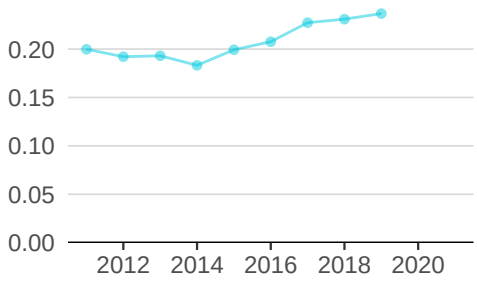
2.3.4 QS university ranking was equal to 69.4 in 2021–up by 2 percentage points from the year prior–and equivalent to an indicator rank of 12.



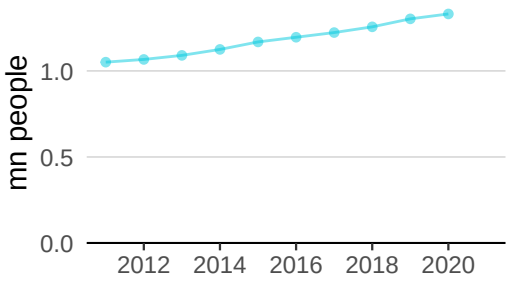
3.1.1 ICT access was equal to 10.0 in 2020 and equivalent to an indicator rank of 1.



4.2.4 Venture capital received was equal to 8.0 bn USD in 2021–up by 213 percentage points from the year prior–and equivalent to an indicator rank of 1.

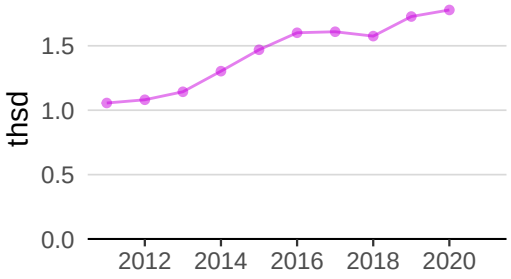


4.3.2 Domestic industry diversification was equal to 0.2 in 2019–up by 3 percentage points from the year prior–and equivalent to an indicator rank of 80.

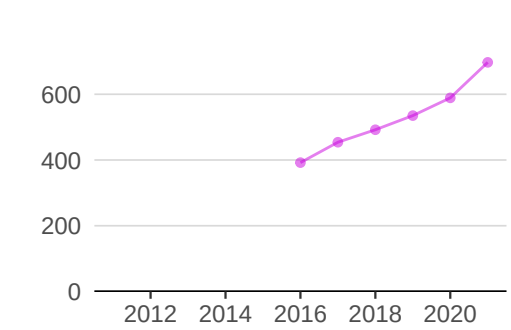


5.1.1 Knowledge-intensive employment was equal to 1.3 mn people in 2020–up by 2 percentage points from the year prior–and equivalent to an indicator rank of 2.

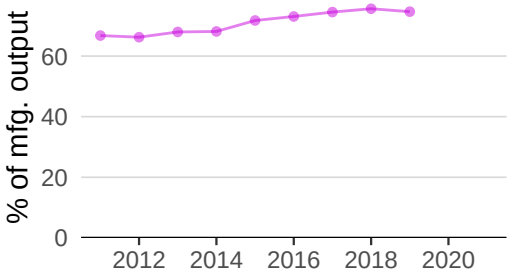
Innovation outputs



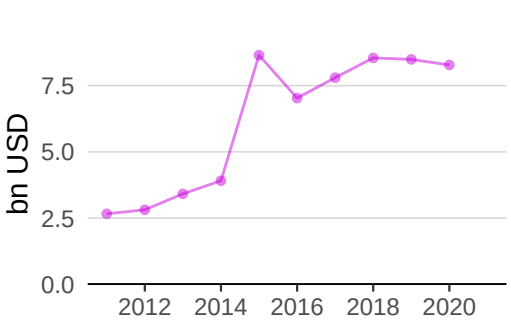
6.1.1 Patents by origin was equal to 1.8 thsd in 2020–up by 3 percentage points from the year prior–and equivalent to an indicator rank of 25.



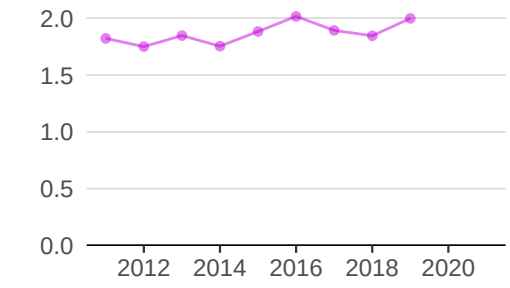
6.1.5 Citable documents H-index was equal to 697.0 in 2021–up by 18 percentage points from the year prior–and equivalent to an indicator rank of 22.



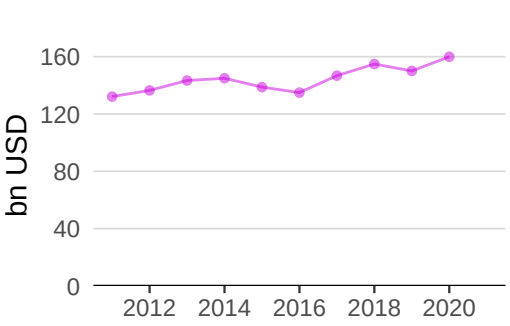
6.2.5 High-tech manufacturing was equal to 74.7% of mfg. output in 2019–down by 1 percentage point from the year prior–and equivalent to an indicator rank of 1.



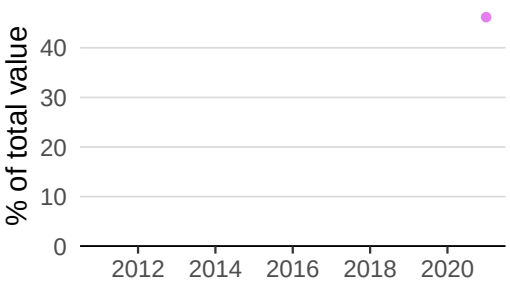
6.3.1 Intellectual property receipts was equal to 8.3 bn USD in 2020–down by 2 percentage points from the year prior–and equivalent to an indicator rank of 17.



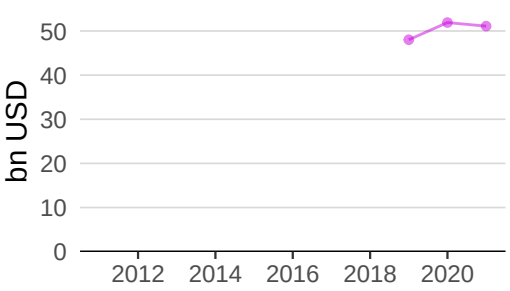
6.3.2 Production and export complexity was equal to 2.0 in 2019–up by 8 percentage points from the year prior–and equivalent to an indicator rank of 5.



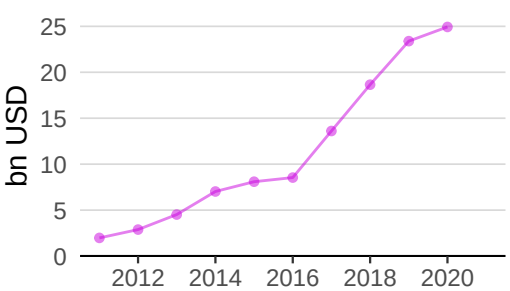
6.3.3 High-tech exports was equal to 159.9 bn USD in 2020–up by 7 percentage points from the year prior–and equivalent to an indicator rank of 5.



7.1.1 Intangible asset intensity was equal to 46.2% of total value in 2021 and equivalent to an indicator rank of 55.



7.1.3 Global brand value was equal to 51.1 bn USD in 2021–down by 2 percentage points from the year prior–and equivalent to an indicator rank of 11.



7.2.1 Cultural and creative services exports was equal to 24.9 bn USD in 2020–up by 7 percentage points from the year prior–and equivalent to an indicator rank of 1.

SINGAPORE'S INNOVATION TOP PERFORMERS

2.3.3 Global corporate R&D investors

Firm	Industry	R&D	R&D Growth	R&D Intensity	Rank
		[mn EUR]	[%]	[%]	
CHINA YUCHAI	Industrial Engineering	141	34.2	5.5	902
SINGAPORE TECHNOLOGIES ENGINEERING	Construction & Materials	115	-3.5	2.6	1,050
WAVE LIFE SCIENCES	Pharmaceuticals & Biotechnology	90	-30.5	552.2	1,283

Source: European Commission's Joint Research Centre (https://iri.jrc.ec.europa.eu/scoreboard/2021-eu-industrial-rd-investment-scoreboard).
Note: European Commission's Joint Research Centre ranks the top 2,500 firms by R&D investment annually.

2.3.4 QS university ranking

University	Score	Rank
NATIONAL UNIVERSITY OF SINGAPORE	93.8	11
NANYANG TECHNOLOGICAL UNIVERSITY	90.8	12
SINGAPORE MANAGEMENT UNIVERSITY	23.5	511-520

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2022).
Note: QS Quacquarelli Symonds Ltd annually assesses over 1,200 universities across the globe and scores them between [0,100].
Ranks can represent a single value "x", a tie "x=" or a range "x-y".

7.1.1 Intangible asset intensity, top 15

Firm	Rank
SEA	1
SINGAPORE TELECOMMUNICATIONS	2
DBS GROUP	3

Source: Brand Finance (https://brandirectory.com/reports/gift-2021).
Note: Brand Finance only provides within economy ranks.

7.1.3 Global brand value, top 5,000

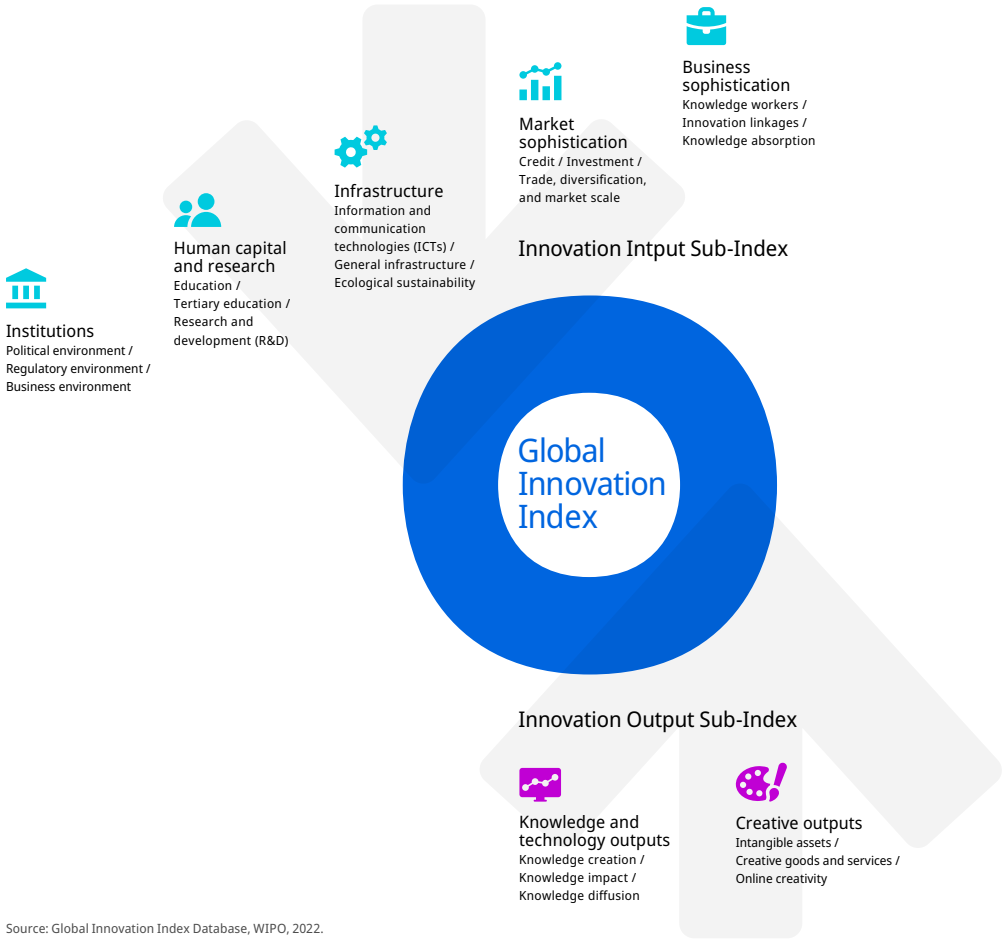
Brand	Industry	Rank
DBS	Banking	1
UOB	Banking	2
OCBC BANK	Banking	3

Source: Brand Finance (https://brandirectory.com).
Note: Rank corresponds to within economy ranks.

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 Database, WIPO, 2022.

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.