

# Global Innovation Index 2023

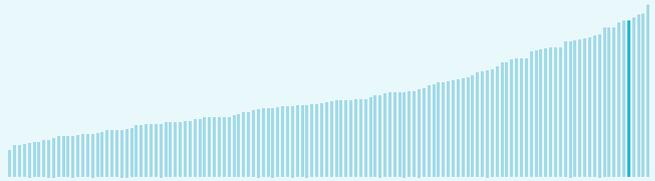


The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

Consisting of **roughly 80 indicators**, grouped into innovation inputs and outputs, the GII **aims to capture the multi-dimensional facets of innovation.**

## Singapore ranking in the Global Innovation Index 2023

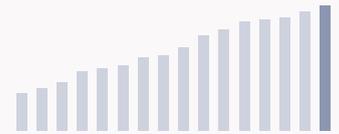
> Singapore ranks **5th** among the 132 economies featured in the GII 2023.



> Singapore ranks **5th** among the 50 high-income group economies.



> Singapore ranks **1st** among the 16 economies in South East Asia, East Asia, and Oceania.



### > Singapore GII Ranking (2020-2023)

The table shows the rankings of Singapore over the past four years. 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 2023 is between ranks 4 and 9.

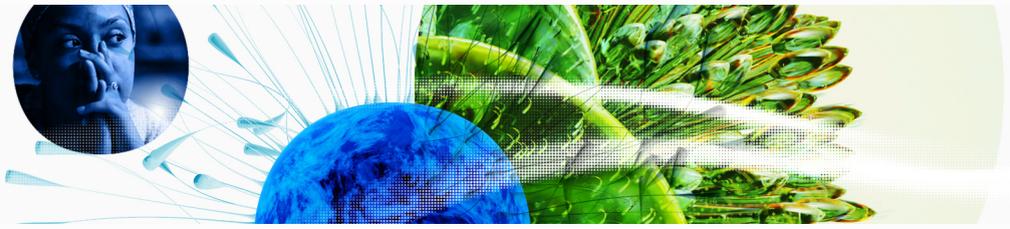
	GII Position	Innovation Inputs	Innovation Outputs
2020	8th	1st	15th
2021	8th	1st	13th
2022	7th	1st	14th
2023	5th	1st	12th

Singapore performs worse in innovation outputs than innovation inputs in 2023.

This year Singapore ranks 1st in innovation inputs. This position is the same as last year.

Singapore ranks 12th in innovation outputs. This position is higher than last year.

# Global Innovation Index 2023



## → Expected vs. observed innovation performance

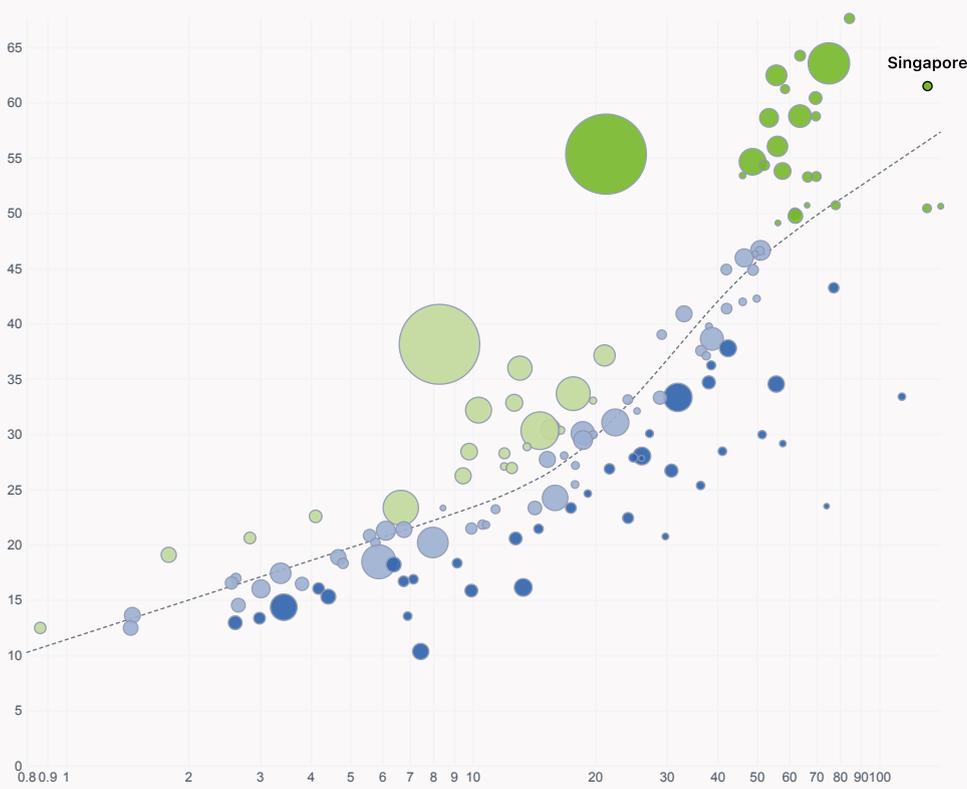
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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



> Singapore is an innovation leader, ranking in the top 25 of the GII.

## > Innovation overperformers relative to their economic development

↑ GII Score



- Innovation leader
- Performing above expectations for level of development
- Performing at expectations for level of development
- Performing below expectations for level of development

Size legend (Population)



→ GDP per capita, PPP logarithmic scale (thousands of \$)

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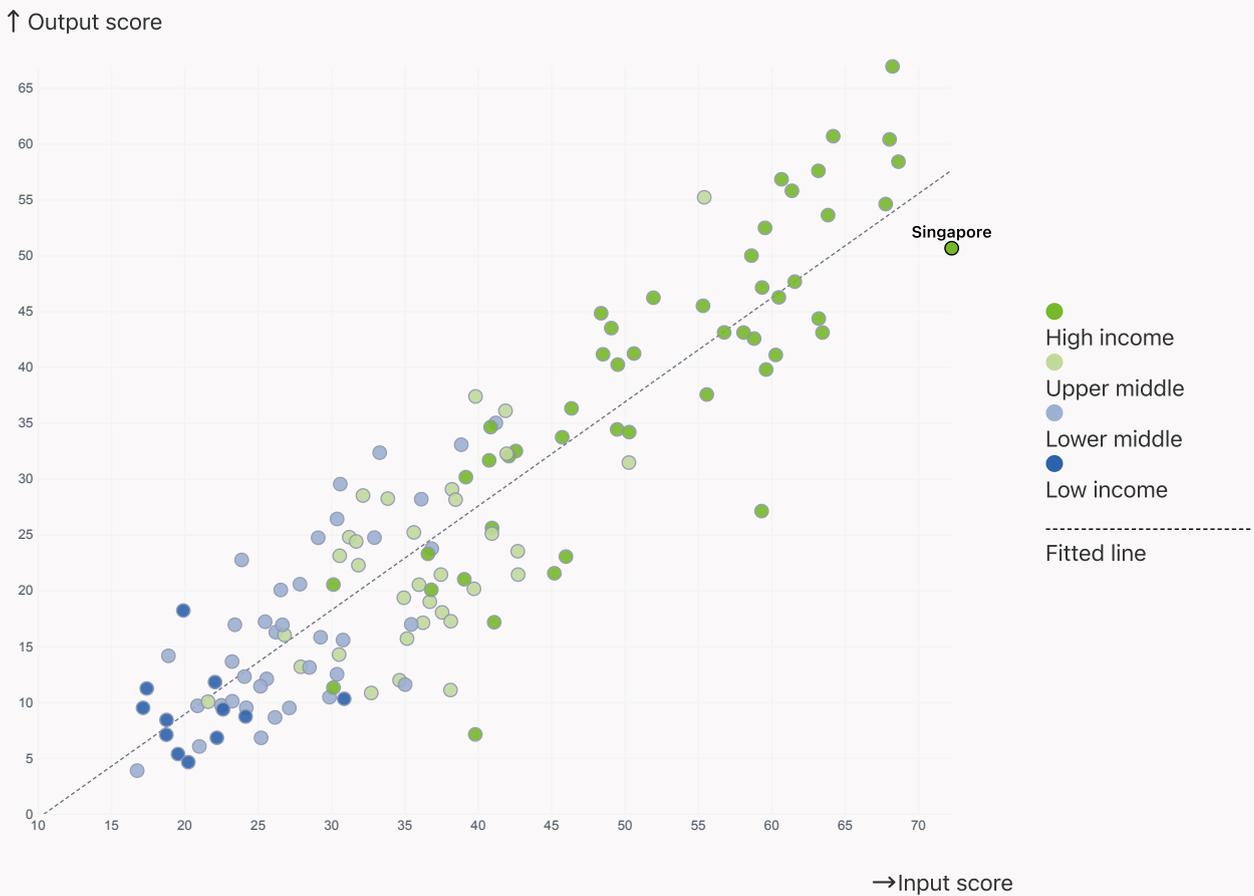
## → Effectively translating innovation investments into innovation outputs

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.

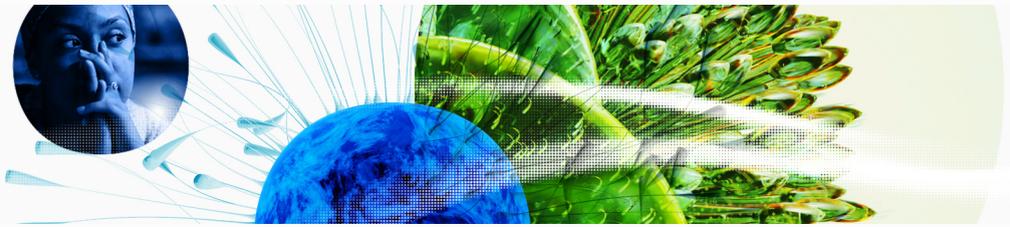


> Singapore produces less innovation outputs relative to its level of innovation investments.

### > Relationship between innovation inputs and outputs

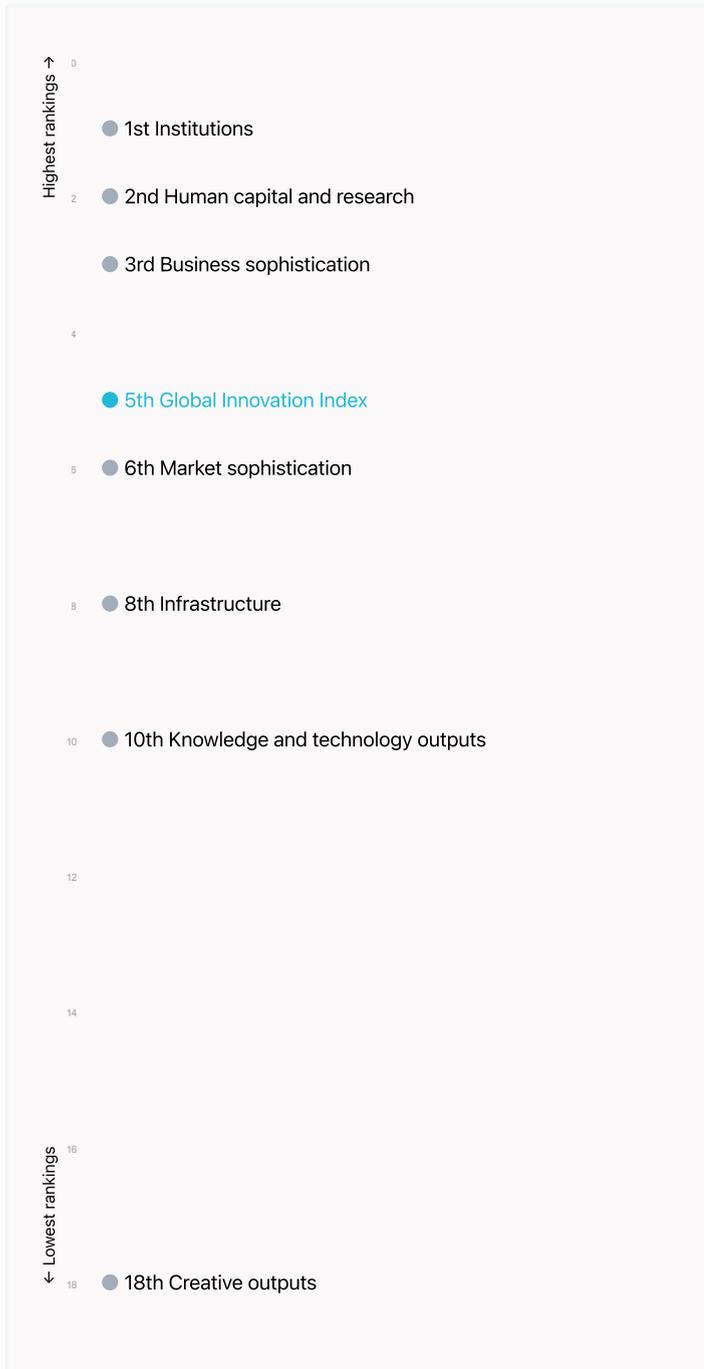


# Global Innovation Index 2023



## → Overview of Singapore's rankings in the seven areas of the GII in 2023

The chart shows the ranking for each of the seven areas that the GII comprises. The strongest areas for Singapore are those that rank above the GII (shown in blue) and the weakest are those that rank below.



### > Highest rankings



Singapore ranks highest in Institutions (1st), Human capital and research (2nd) and Business sophistication (3rd).

### > Lowest rankings



Singapore ranks lowest in Creative outputs (18th), Knowledge and technology outputs (10th) and Infrastructure (8th).



The full WIPO Intellectual Property Statistics profile for Singapore can be found on [this link](#).

# Global Innovation Index 2023



## → Benchmark of Singapore against other country groupings for each of the seven areas of the GII Index

The charts show the relative position of Singapore (blue bar) against other country groupings (grey bars), for each of the seven areas of the GII Index.

### > High-Income economies

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



### > South East Asia, East Asia, And Oceania

Singapore performs above the regional average in all the pillars.



### Knowledge and technology outputs

Top 10 | Score: 58.96

Singapore | Score: 55.26

High income | Score: 38.62

SEAO | Score: 32.16

\* South East Asia, East Asia, and Oceania

### Creative outputs

Top 10 | 56.09

Singapore | 46.00

High income | 40.27

SEAO | 34.40

### Business sophistication

Singapore | 69.43

Top 10 | 64.39

High income | 46.38

SEAO | 40.54

### Market sophistication

Singapore | 67.38

Top 10 | 61.93

SEAO | 47.18

High income | 46.42

### Human capital and research

Singapore | 63.18

Top 10 | 60.28

High income | 46.30

SEAO | 40.81

### Infrastructure

Singapore | 63.13

Top 10 | 62.83

High income | 55.85

SEAO | 47.13

### Institutions

Singapore | 98.40

Top 10 | 79.85

High income | 68.16

SEAO | 62.54



## → Innovation strengths and weaknesses in Singapore

The table below gives an overview of the indicator strengths and weaknesses of Singapore in the GII 2023.



> Singapore's main innovation strengths are **Cost of redundancy dismissal (rank 1)**, **Cultural and creative services exports, % total trade (rank 1)** and **GitHub commits/mn pop. 15-69 (rank 1)**.

### Strengths

### Weaknesses

Rank	Code	Indicator name	Rank	Code	Indicator name
1	1.2.3	Cost of redundancy dismissal	113	2.1.1	Expenditure on education, % GDP
1	7.2.1	Cultural and creative services exports, % total trade	88	4.3.2	Domestic industry diversification
1	7.3.3	GitHub commits/mn pop. 15-69	87	7.1.2	Trademarks by origin/bn PPP\$ GDP
1	1.1.2	Government effectiveness	69	3.2.3	Gross capital formation, % GDP
1	6.2.4	High-tech manufacturing, %	66	7.1.4	Industrial designs by origin/bn PPP\$ GDP
1	3.1.1	ICT access	62	7.2.2	National feature films/mn pop. 15-69
1	3.2.2	Logistics performance	59	6.2.3	Software spending, % GDP
1	1.1.1	Operational stability for businesses	59	7.1.1	Intangible asset intensity, top 15, %
1	1.2.1	Regulatory quality	49	2.1.2	Government funding/pupil, secondary, % GDP/cap
1	4.2.4	VC received, value, % GDP	38	5.2.3	GERD financed by abroad, % GDP
1	4.2.3	VC recipients, deals/bn PPP\$ GDP			
2	5.1.1	Knowledge-intensive employment, %			
2	2.1.4	PISA scales in reading, maths and science			
2	1.3.1	Policies for doing business			
3	4.3.1	Applied tariff rate, weighted avg., %			
3	3.1.4	E-participation			
3	5.1.5	Females employed w/advanced degrees, %			
3	4.2.2	Venture capital (VC) investors, deals/bn PPP\$ GDP			

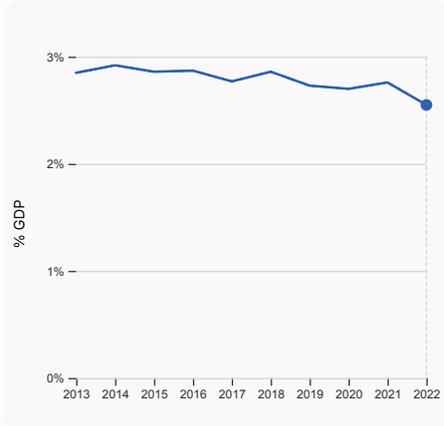
# Global Innovation Index 2023



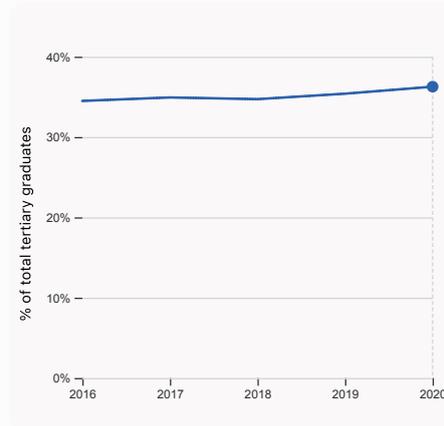
## → Singapore's innovation system

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

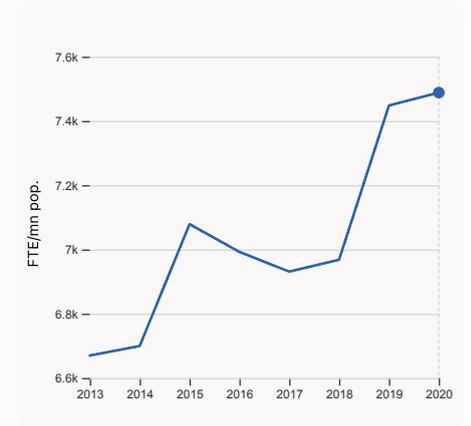
### > Innovation inputs in Singapore



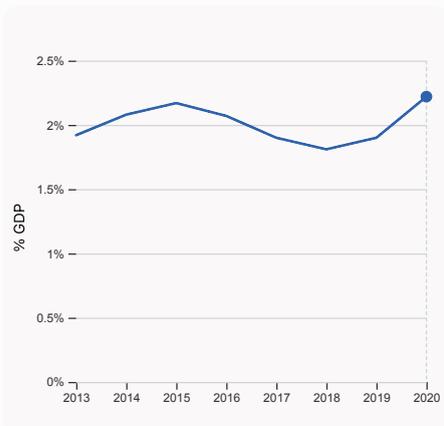
**2.1.1 Expenditure on education, % GDP** was equal to 2.55% GDP in 2022, down by 0.21 percentage points from the year prior – and equivalent to an indicator rank of 113.



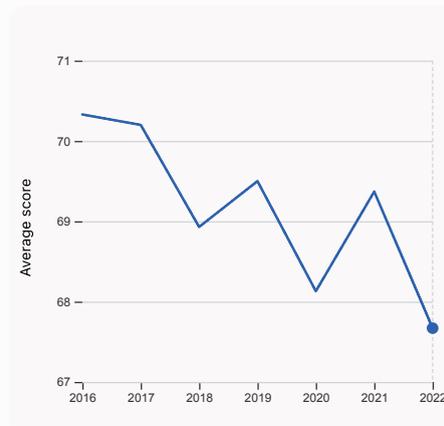
**2.2.2 Graduates in science and engineering, %** was equal to 36.27% of total tertiary graduates in 2020, up by 0.87 percentage points from the year prior – and equivalent to an indicator rank of 6.



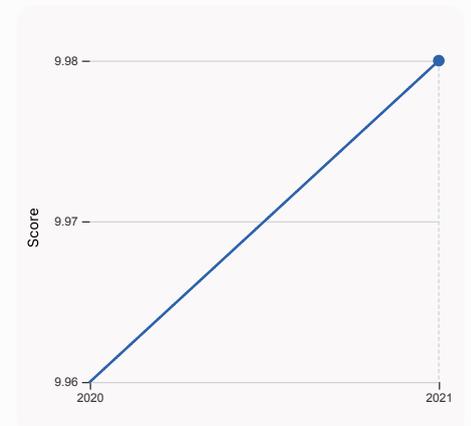
**2.3.1 Researchers, FTE/mn pop.** was equal to 7,488.43 FTE/mn pop. in 2020, up by 0.54% from the year prior – and equivalent to an indicator rank of 5.



**2.3.2 Gross expenditure on R&D, % GDP** was equal to 2.22% GDP in 2020, up by 0.32 percentage points from the year prior – and equivalent to an indicator rank of 16.

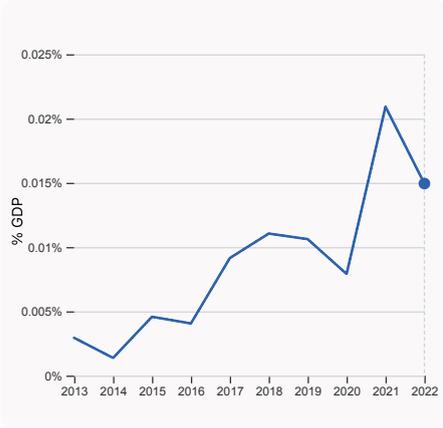
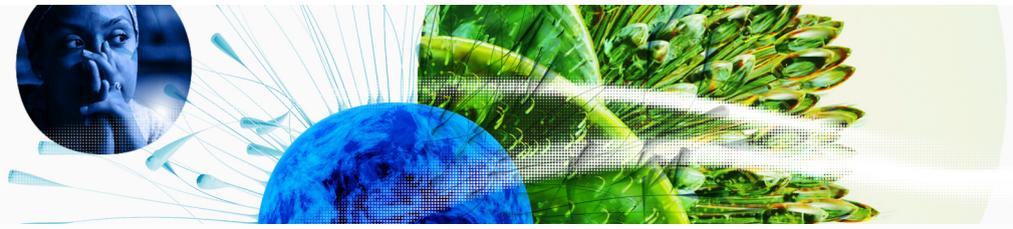


**2.3.4 QS university ranking, top 3** was equal to an average score of 67.67 for the top 3 universities in 2022, down by 2.45% from the year prior – and equivalent to an indicator rank of 12.



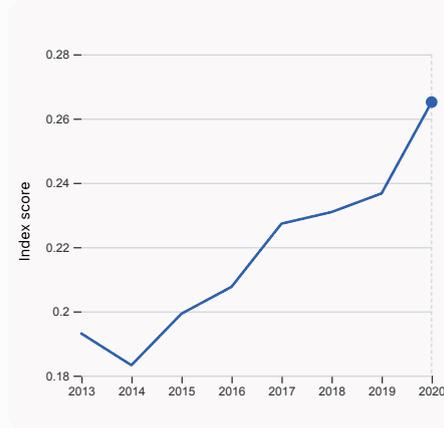
**3.1.1 ICT access** was equal to a score of 9.98 in 2021, up by 0.2% from the year prior – and equivalent to an indicator rank of 1.

# Global Innovation Index 2023



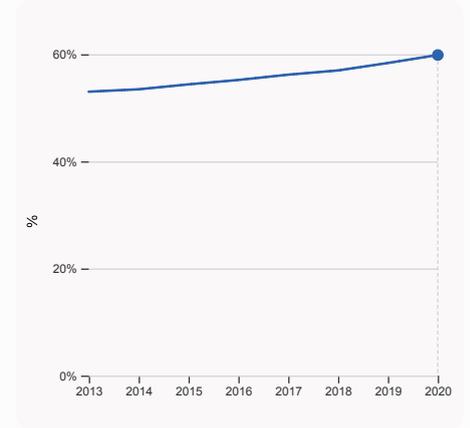
## 4.2.4 VC received, value, % GDP

was equal to 0.01494% GDP in 2022, down by 0.006 percentage points from the year prior – and equivalent to an indicator rank of 1.



## 4.3.2 Domestic industry diversification

was equal to an index score of 0.265 in 2020, up by 12.0027% from the year prior – and equivalent to an indicator rank of 88.



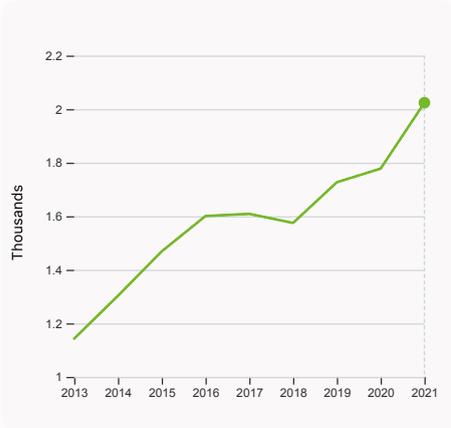
## 5.1.1 Knowledge-intensive employment, %

was equal to 59.87% in 2020, up by 1.49 percentage points from the year prior – and equivalent to an indicator rank of 2.

# Global Innovation Index 2023

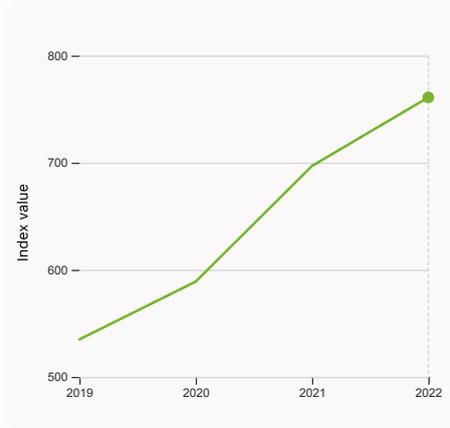


## > Innovation outputs in Singapore



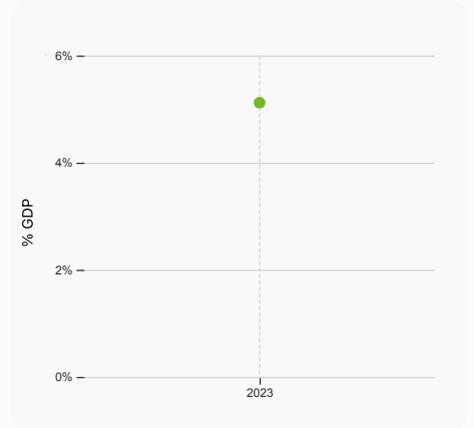
### 6.1.1 Patents by origin

was equal to 2.024 Thousands in 2021, up by 13.84% from the year prior – and equivalent to an indicator rank of 24.



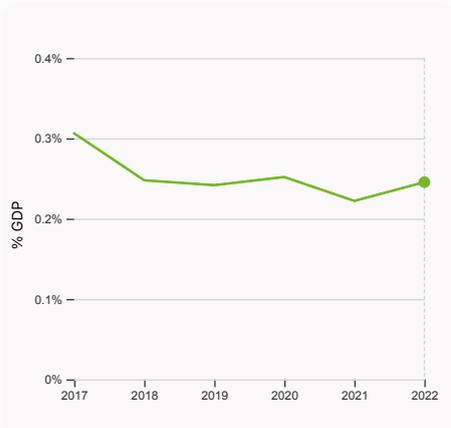
### 6.1.5 Citable documents H-index

was equal to an index value of 761 in 2022, up by 9.18% from the year prior – and equivalent to an indicator rank of 22.



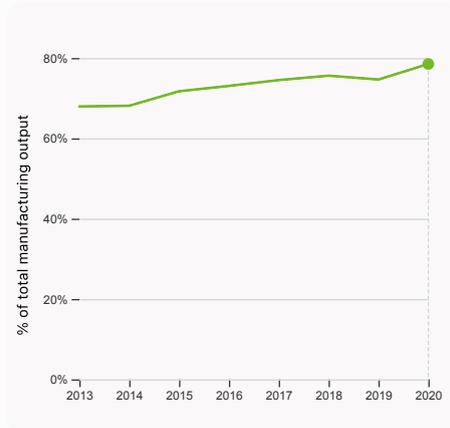
### 6.2.2 Unicorn valuation, % GDP

was equal to 5.12 % GDP in 2023 – and equivalent to an indicator rank of 8.



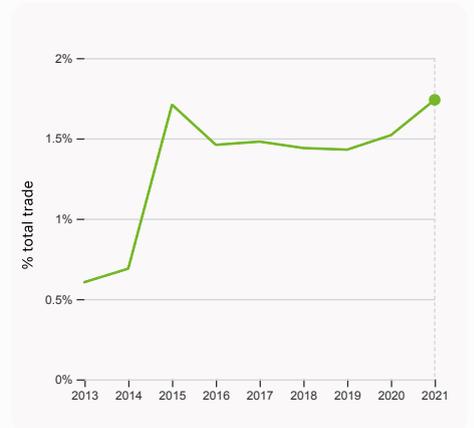
### 6.2.3 Software spending, % GDP

was equal to 0.246% GDP in 2022, up by 0.023 percentage points from the year prior – and equivalent to an indicator rank of 59.



### 6.2.4 High-tech manufacturing, %

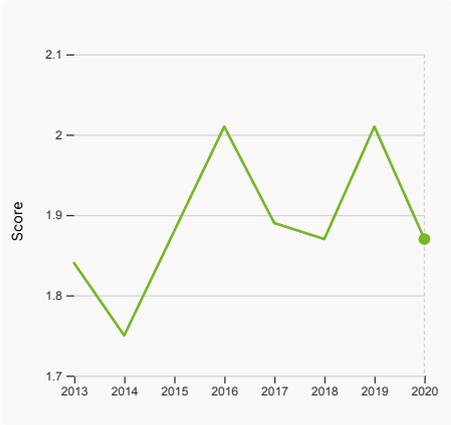
was equal to 78.53% of total manufacturing output in 2020, up by 3.87 percentage points from the year prior – and equivalent to an indicator rank of 1.



### 6.3.1 Intellectual property receipts, % total trade

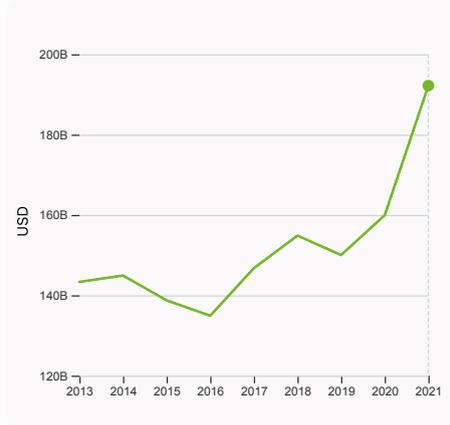
was equal to 1.74% total trade in 2021, up by 0.22 percentage points from the year prior – and equivalent to an indicator rank of 16.

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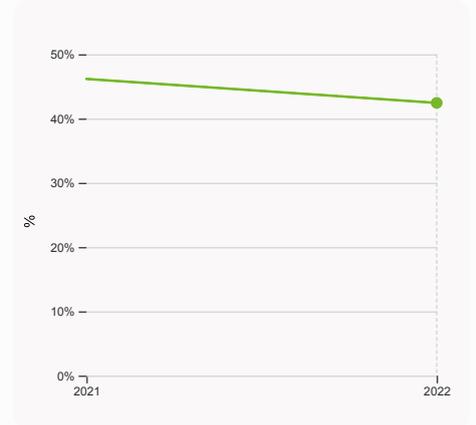
### 6.3.2 Production and export complexity

was equal to a score of 1.87 in 2020, down by 6.97% from the year prior – and equivalent to an indicator rank of 5.



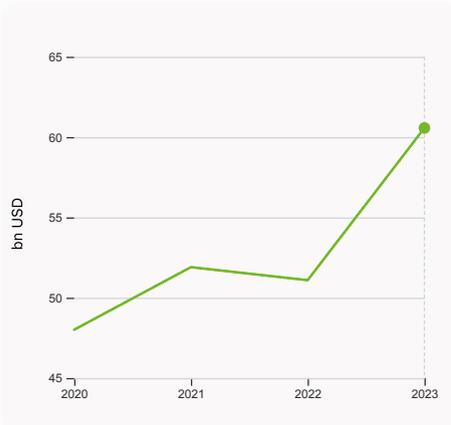
### 6.3.3 High-tech exports

was equal to 192,197,395,296 USD in 2021, up by 20.18% from the year prior – and equivalent to an indicator rank of 4.



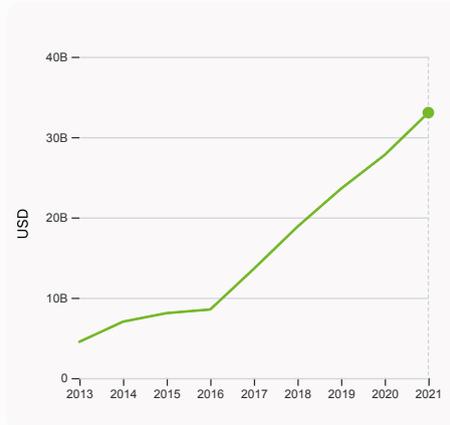
### 7.1.1 Intangible asset intensity, top 15, %

was equal to 42.44% in 2022, down by 3.73 percentage points from the year prior – and equivalent to an indicator rank of 59.



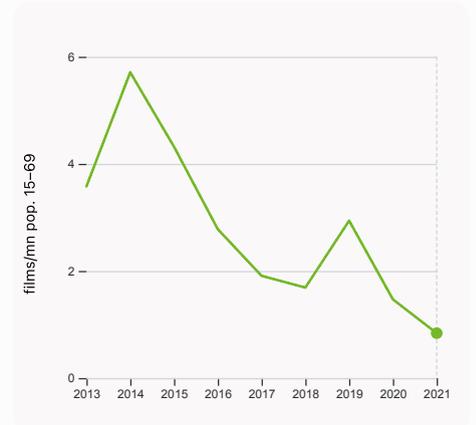
### 7.1.3 Global brand value, top 5,000

was equal to 60.568 bn USD in 2023, up by 18.54% from the year prior – and equivalent to an indicator rank of 11.



### 7.2.1 Cultural and creative services exports

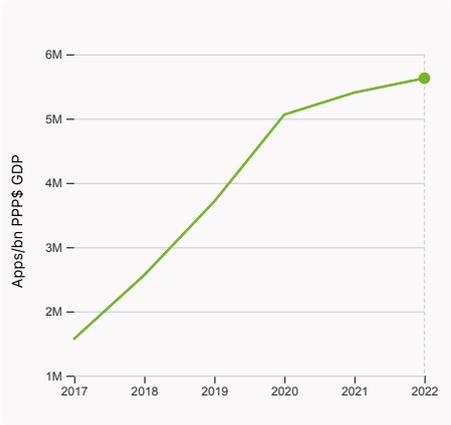
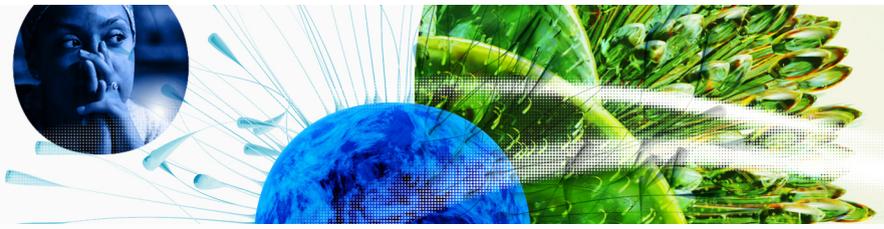
was equal to 33,042,241,000 USD in 2021, up by 18.92% from the year prior – and equivalent to an indicator rank of 1.



### 7.2.2 National feature films/mn pop. 15-69

was equal to 0.839 films/mn pop. 15-69 in 2021, down by 42.95% from the year prior – and equivalent to an indicator rank of 62.

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## 7.3.4 Mobile app creation/bn PPP\$ GDP

was equal to 5,628,118.89 Apps/bn PPP\$ GDP in 2022, up by 4.14% from the year prior – and equivalent to an indicator rank of 4.

# Global Innovation Index 2023



## → Singapore's innovation top performers

### > 2.3.3 Global corporate R&D investors from Singapore

Rank	Firm	Industry	R&D	R&D Growth	R&D Intensity
			[mn EUR]	[%]	[%]
264	SEA	Software & Computer Services	727	135	8
548	GRAB HOLDINGS	Software & Computer Services	322	36	54
995	CHINA YUCHAI	Industrial Engineering	155	-1	5
1068	IGG	Leisure Goods	142	81	21

Source: European Commission's Joint Research Centre (<https://iri.jrc.ec.europa.eu/scoreboard/2022-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 of Singapore's top universities

Rank	University	Score
11	NATIONAL UNIVERSITY OF SINGAPORE (NUS)	92.70
19	NANYANG TECHNOLOGICAL UNIVERSITY, SINGAPORE (NTU)	88.40
561-570	SINGAPORE MANAGEMENT UNIVERSITY	21.90

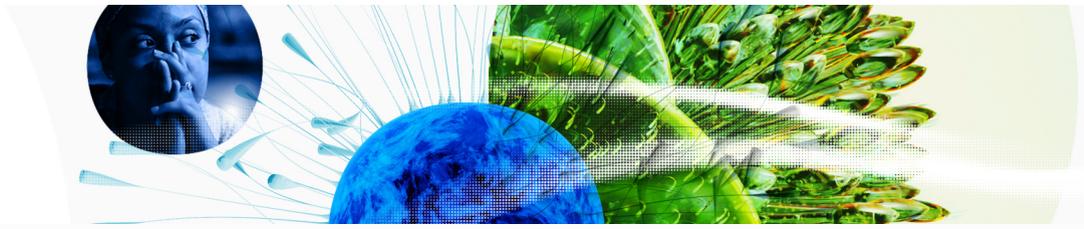
Source: QS Quacquarelli Symonds Ltd (<https://www.topuniversities.com/university-rankings/world-university-rankings/2023>).

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".

## > 6.2.2 Top Unicorn Companies in Singapore

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	HYALROUTE	Mobile & telecommunications		4
2	MOGLIX	E-commerce & direct-to-consumer		3
3	CODA PAYMENTS	Fintech		3

Source: CBInsights, Tracker – The Complete List of Unicorn Companies: <https://www.cbinsights.com/research-unicorn-companies>



## > 7.1.1 Top 15 intangible-asset intensive companies in Singapore

Rank	Firm	Intensity, %
1	DBS GROUP HOLDINGS LTD	29.92
2	SINGAPORE TELECOMMUNICATIONS LTD	53.68
3	SEA LTD	66.03

Source: Brand Finance (<https://brandirectory.com/reports/gif-2022>).  
Note: Brand Finance only provides within economy ranks.

## > 7.1.3 Top 5,000 companies in Singapore with highest global brand value

Rank	Brand	Industry	Brand Value, mn USD
1	DBS	Banking	10,509.2
2	UOB	Banking	5,540.2
3	OCBC BANK	Banking	5,411.9

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

# Global Innovation Index 2023



GII 2023 rank

5

## Singapore

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
12	1	High	SEAO	6.0	701.0	131,425.7
Score / Value Rank				Score / Value Rank		
<b>Institutions</b> 98.4 1 ●●				<b>Business sophistication</b> 69.4 3 ●◆		
<b>1.1 Institutional environment</b> 100.0 1 ●◆				<b>5.1 Knowledge workers</b> 72.3 5		
1.1.1 Operational stability for businesses* 100.0 1 ●◆				5.1.1 Knowledge-intensive employment, % ● 59.9 2 ●◆		
1.1.2 Government effectiveness* 100.0 1 ●◆				5.1.2 Firms offering formal training, % n/a n/a		
<b>1.2 Regulatory environment</b> 98.5 1 ●◆				5.1.3 GERD performed by business, % GDP ● 1.4 18		
1.2.1 Regulatory quality* 100.0 1 ●◆				5.1.4 GERD financed by business, % 58.3 16		
1.2.2 Rule of law* 94.1 4				5.1.5 Females employed w/advanced degrees, % ● 29.6 3 ●◆		
1.2.3 Cost of redundancy dismissal 8.0 1 ●◆				<b>5.2 Innovation linkages</b> 61.6 12		
<b>1.3 Business environment</b> 96.7 [1]				5.2.1 University-industry R&D collaboration+ 85.5 8		
1.3.1 Policies for doing business+ 96.7 2 ●◆				5.2.2 State of cluster development+ 80.8 11		
1.3.2 Entrepreneurship policies and culture+ n/a n/a				5.2.3 GERD financed by abroad, % GDP 0.1 38 ○		
<b>Human capital and research</b> 63.2 2 ●◆				5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP 0.2 6		
<b>2.1 Education</b> 58.2 46				5.2.5 Patent families/bn PPP\$ GDP 2.6 14		
2.1.1 Expenditure on education, % GDP 2.5 113 ○◇				<b>5.3 Knowledge absorption</b> 74.4 1 ●◆		
2.1.2 Government funding/pupil, secondary, % GDP/cap 20.6 49 ○				5.3.1 Intellectual property payments, % total trade 2.6 9		
2.1.3 School life expectancy, years 16.6 25				5.3.2 High-tech imports, % total trade 24.3 5 ◆		
2.1.4 PISA scales in reading, maths and science 556.5 2 ●◆				5.3.3 ICT services imports, % total trade 4.0 9		
2.1.5 Pupil-teacher ratio, secondary 11.5 45				5.3.4 FDI net inflows, % GDP 26.0 6 ◆		
<b>2.2 Tertiary education</b> 69.8 2 ●◆				5.3.5 Research talent, % in businesses ● 54.2 19		
2.2.1 Tertiary enrolment, % gross 93.1 9				<b>Knowledge and technology outputs</b> 55.3 10		
2.2.2 Graduates in science and engineering, % 36.3 6 ◆				<b>6.1 Knowledge creation</b> 44.1 20		
2.2.3 Tertiary inbound mobility, % n/a n/a				6.1.1 Patents by origin/bn PPP\$ GDP 3.2 24		
<b>2.3 Research and development (R&amp;D)</b> 61.5 14				6.1.2 PCT patents by origin/bn PPP\$ GDP 2.5 11		
2.3.1 Researchers, FTE/mn pop. ● 7,488.4 5				6.1.3 Utility models by origin/bn PPP\$ GDP n/a n/a		
2.3.2 Gross expenditure on R&D, % GDP ● 2.2 16				6.1.4 Scientific and technical articles/bn PPP\$ GDP n/a n/a		
2.3.3 Global corporate R&D investors, top 3, mn US\$ 60.2 23				6.1.5 Citable documents H-index 40.0 22		
2.3.4 QS university ranking, top 3* 68.6 12				<b>6.2 Knowledge impact</b> 69.2 2 ●◆		
<b>Infrastructure</b> 63.1 8				6.2.1 Labor productivity growth, % 2.1 31 ◆		
<b>3.1 Information and communication technologies (ICTs)</b> 94.5 5 ◆				6.2.2 Unicorn valuation, % GDP 5.1 8 ◆		
3.1.1 ICT access* 100.0 1 ●◆				6.2.3 Software spending, % GDP 0.2 59 ○◇		
3.1.2 ICT use* 84.7 40 ◇				6.2.4 High-tech manufacturing, % 78.5 1 ●◆		
3.1.3 Government's online service* 95.8 5 ◆				<b>6.3 Knowledge diffusion</b> 52.6 13		
3.1.4 E-participation* 97.7 3 ●◆				6.3.1 Intellectual property receipts, % total trade 1.6 16		
<b>3.2 General infrastructure</b> 57.2 9				6.3.2 Production and export complexity 91.8 5		
3.2.1 Electricity output, GWh/mn pop. 10,295.2 15				6.3.3 High-tech exports, % total trade 28.6 4 ◆		
3.2.2 Logistics performance* 100.0 1 ●◆				6.3.4 ICT services exports, % total trade 2.8 46		
3.2.3 Gross capital formation, % GDP 23.6 69 ○				6.3.5 ISO 9001 quality/bn PPP\$ GDP 6.9 42		
<b>3.3 Ecological sustainability</b> 37.6 37				<b>Creative outputs</b> 46.0 18		
3.3.1 GDP/unit of energy use 16.3 20				<b>7.1 Intangible assets</b> 39.9 41 ◇		
3.3.2 Environmental performance* 54.2 37				7.1.1 Intangible asset intensity, top 15, % 42.4 59 ○◇		
3.3.3 ISO 14001 environment/bn PPP\$ GDP 2.2 40				7.1.2 Trademarks by origin/bn PPP\$ GDP 23.7 87 ○◇		
<b>Market sophistication</b> 67.4 6				7.1.3 Global brand value, top 5,000 13.5 11		
<b>4.1 Credit</b> 49.4 [29]				7.1.4 Industrial designs by origin/bn PPP\$ GDP 1.1 66 ○◇		
4.1.1 Finance for startups and scaleups+ n/a n/a				<b>7.2 Creative goods and services</b> 47.2 6 ◆		
4.1.2 Domestic credit to private sector, % GDP 130.6 17				7.2.1 Cultural and creative services exports, % total trade 4.9 1 ●◆		
4.1.3 Loans from microfinance institutions, % GDP n/a n/a				7.2.2 National feature films/mn pop. 15-69 0.8 62 ○◇		
<b>4.2 Investment</b> 89.8 1 ●◆				7.2.3 Entertainment and media market/th pop. 15-69 42.1 20 ○◇		
4.2.1 Market capitalization, % GDP 185.7 6 ◆				7.2.4 Creative goods exports, % total trade 3.6 15		
4.2.2 Venture capital (VC) investors, deals/bn PPP\$ GDP 1.9 3 ●◆				<b>7.3 Online creativity</b> 56.9 16		
4.2.3 VC recipients, deals/bn PPP\$ GDP 0.9 1 ●◆				7.3.1 Generic top-level domains (TLDs)/th pop. 15-69 29.8 23		
4.2.4 VC received, value, % GDP 0.0 1 ●◆				7.3.2 Country-code TLDs/th pop. 15-69 12.3 39 ◇		
<b>4.3 Trade, diversification, and market scale</b> 63.0 45				7.3.3 GitHub commits/mn pop. 15-69 100.0 1 ●◆		
4.3.1 Applied tariff rate, weighted avg., % 0.1 3 ●◆				7.3.4 Mobile app creation/bn PPP\$ GDP 85.5 4 ◆		
4.3.2 Domestic industry diversification 74.2 88 ○◇						
4.3.3 Domestic market scale, bn PPP\$ 701.0 37						

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/gii-ranking>. 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.



> Singapore has missing data for six indicators and outdated data for six indicators.

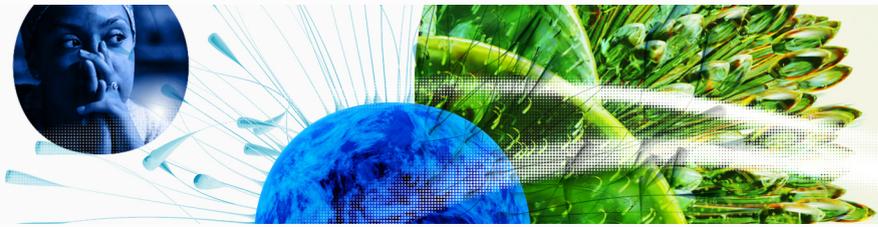
## > Missing data for Singapore

Code	Indicator name	Economy Year	Model Year	Source
1.3.2	Entrepreneurship policies and culture	n/a	2022	Global Entrepreneurship Monitor
2.2.3	Tertiary inbound mobility, %	n/a	2020	UNESCO Institute for Statistics
4.1.1	Finance for startups and scaleups	n/a	2022	Global Entrepreneurship Monitor
4.1.3	Loans from microfinance institutions, % GDP	n/a	2021	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	2021	World Intellectual Property Organization; International Monetary Fund

## > Outdated data for Singapore

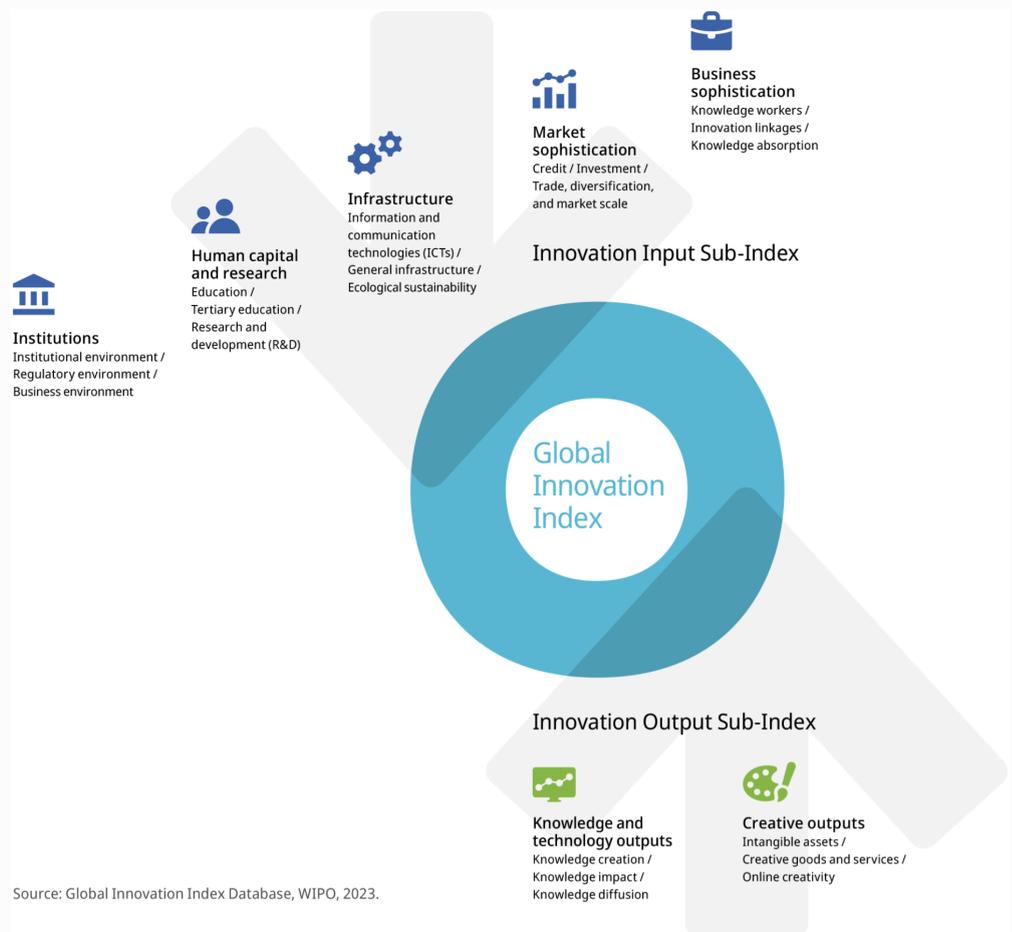
Code	Indicator name	Economy Year	Model Year	Source
2.3.1	Researchers, FTE/mn pop.	2020	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
2.3.2	Gross expenditure on R&D, % GDP	2020	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.1.1	Knowledge-intensive employment, %	2020	2022	International Labour Organization
5.1.3	GERD performed by business, % GDP	2020	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.1.5	Females employed w/advanced degrees, %	2021	2022	International Labour Organization
5.3.5	Research talent, % in businesses	2020	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT

# Global Innovation Index 2023



## → 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.



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.