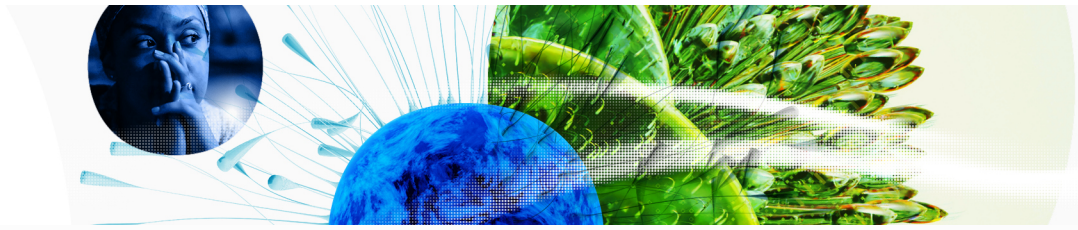
Global Innovation Index 2023



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

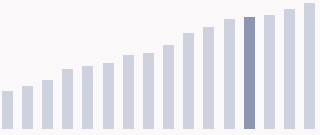
Consisting of **roughly 80 indicators**, grouped into innovation inputs and outputs, the GII **aims to capture the multi-dimensional facets of innovation**.

Japan ranking in the Global Innovation Index 2023

> Japan ranks 13th among the 132 economies featured in the GII 2023.

> Japan ranks 12th among the 50 high-income group economies.

> Japan ranks 4th among the 16 economies in South East Asia, East Asia, and Oceania.



> Japan GII Ranking (2020-2023)

The table shows the rankings of Japan 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 Japan in the GII 2023 is between ranks 13 and 15.

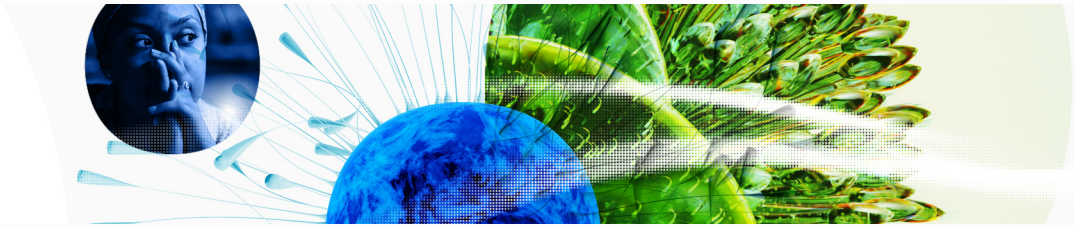
	GII Position	Innovation Inputs	Innovation Outputs
2020	16th	12th	18th
2021	13th	11th	14th
2022	13th	11th	12th
2023	13th	11th	14th

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

This year Japan ranks 11th in innovation inputs. This position is the same as last year.

Japan ranks 14th in innovation outputs. This position is lower than last year.

Global Innovation Index 2023

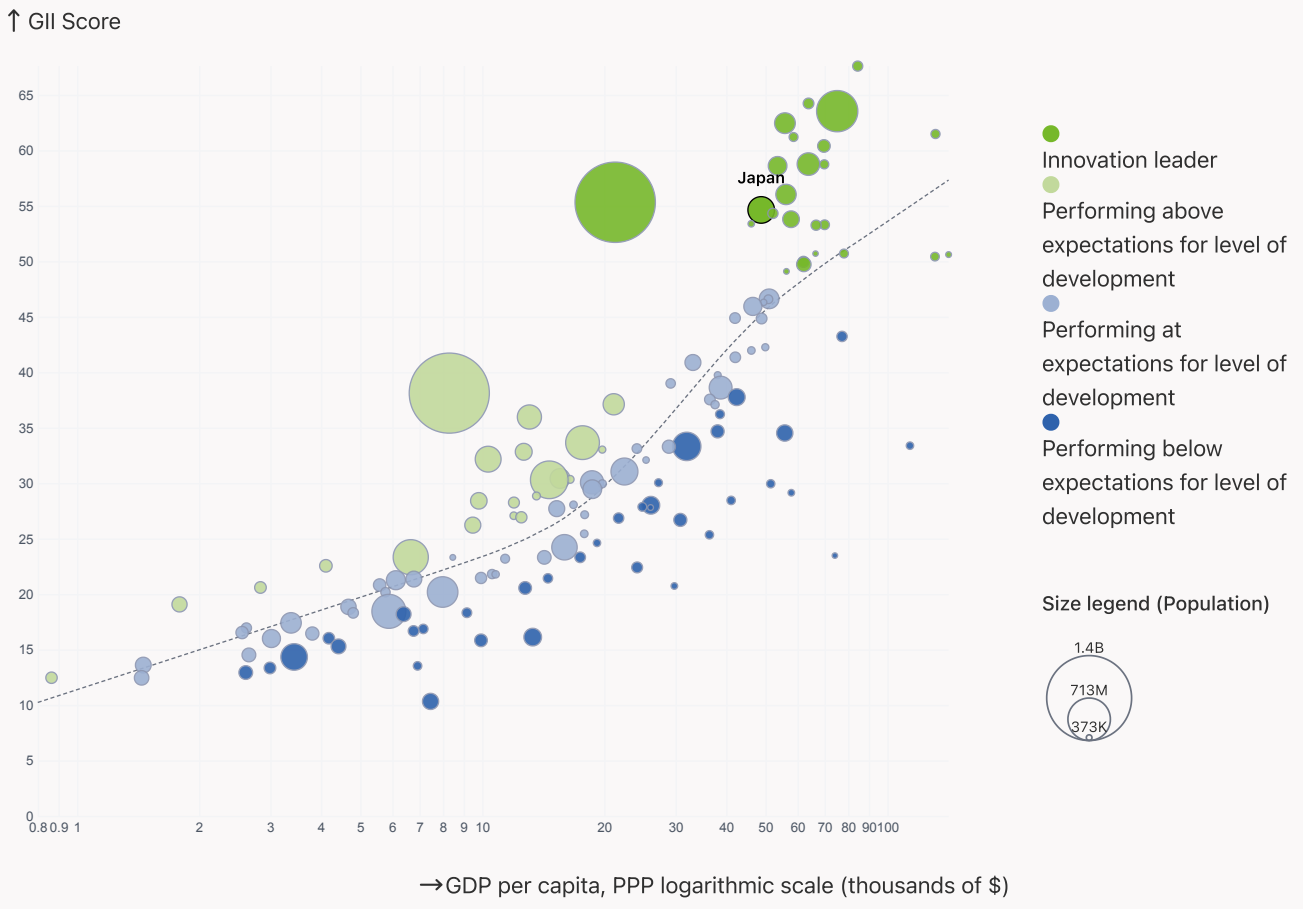


→ Expected vs. observed innovation performance

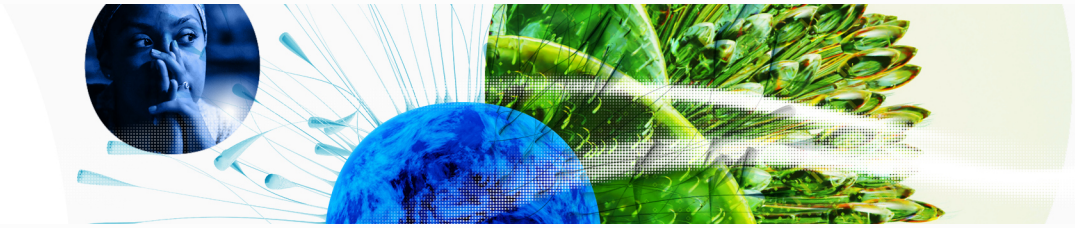
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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

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

> Innovation overperformers relative to their economic development



Global Innovation Index 2023

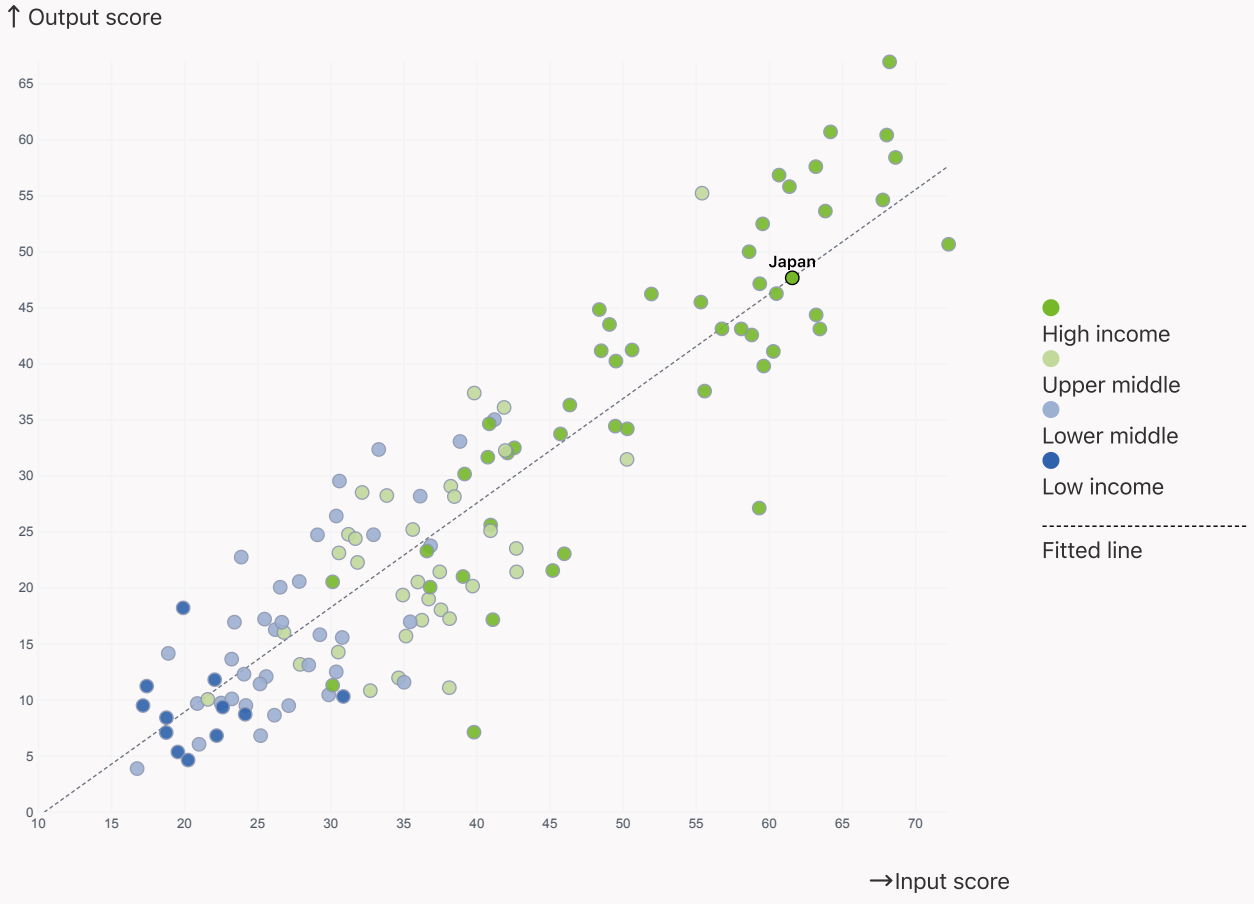


→ Effectively translating innovation investments into innovation outputs

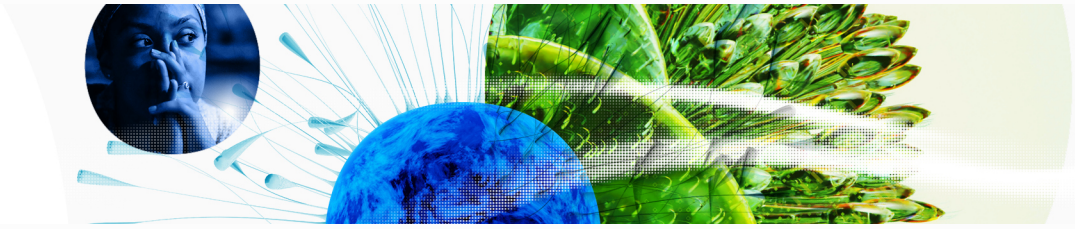
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

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

> Relationship between innovation inputs and outputs

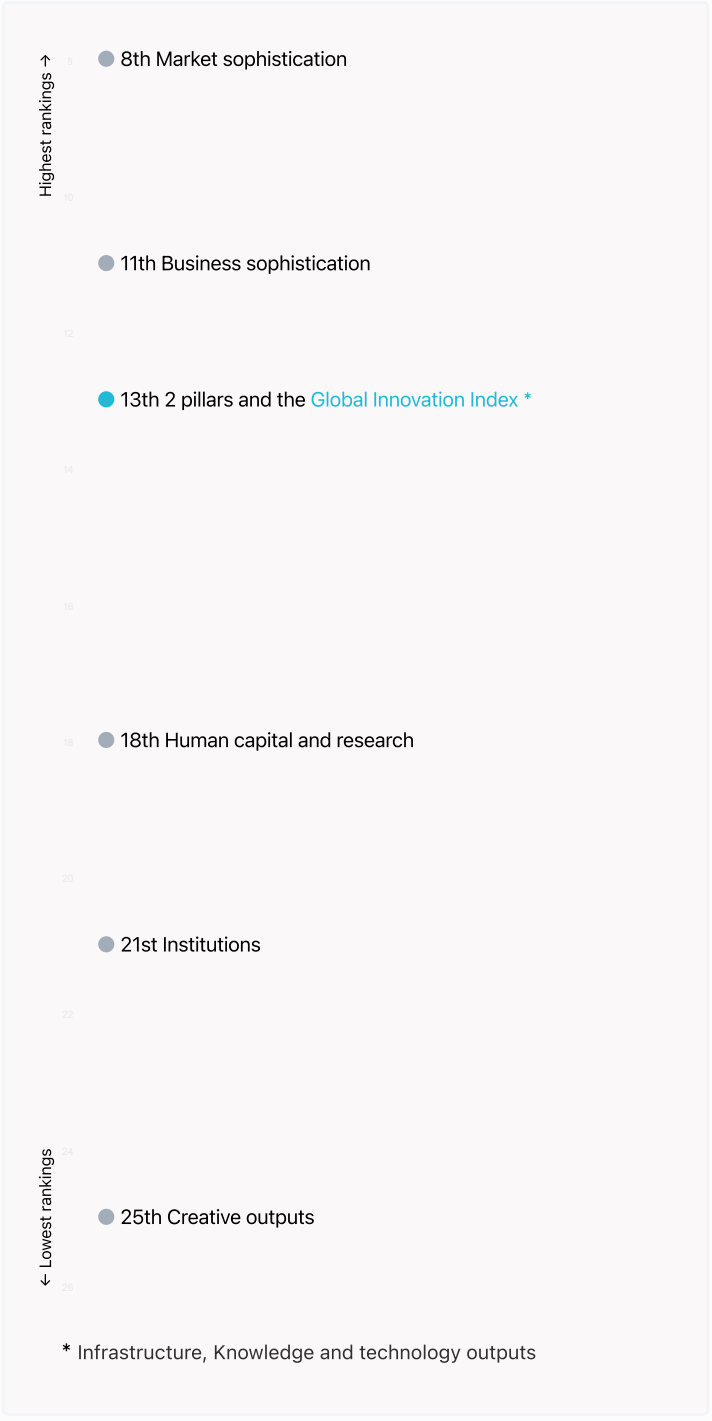


Global Innovation Index 2023



→ Overview of Japan'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 Japan are those that rank above the GII (shown in blue) and the weakest are those that rank below.



> Highest rankings

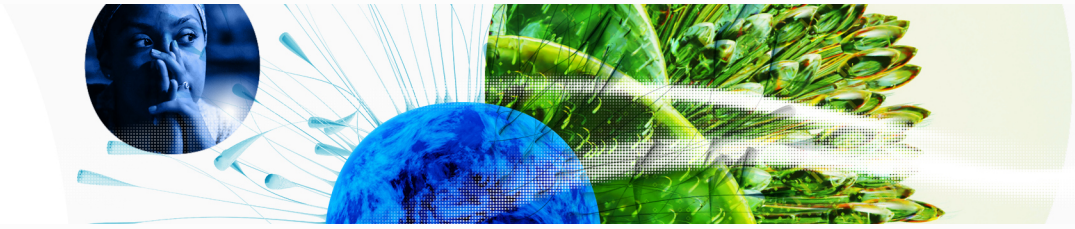
Japan ranks highest in Market sophistication (8th), Business sophistication (11th) and Infrastructure, Knowledge and technology outputs (13th).

> Lowest rankings

Japan ranks lowest in Creative outputs (25th), Institutions (21st) and Human capital and research (18th).

The full WIPO Intellectual Property Statistics profile for Japan can be found on this link.

Global Innovation Index 2023



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

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

> High-Income economies

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

> South East Asia, East Asia, And Oceania

Japan performs above the regional average in all the pillars.

Knowledge and technology outputs

- Top 10 | Score: 58.96
- Japan | Score: 51.13
- High income | Score: 38.62
- SEAO | Score: 32.16

* South East Asia, East Asia, and Oceania

Creative outputs

- Top 10 | 56.09
- Japan | 44.14
- High income | 40.27
- SEAO | 34.40

Business sophistication

- Top 10 | 64.39
- Japan | 59.88
- High income | 46.38
- SEAO | 40.54

Market sophistication

- Top 10 | 61.93
- Japan | 61.87
- SEAO | 47.18
- High income | 46.42

Human capital and research

- Top 10 | 60.28
- Japan | 53.75
- High income | 46.30
- SEAO | 40.81

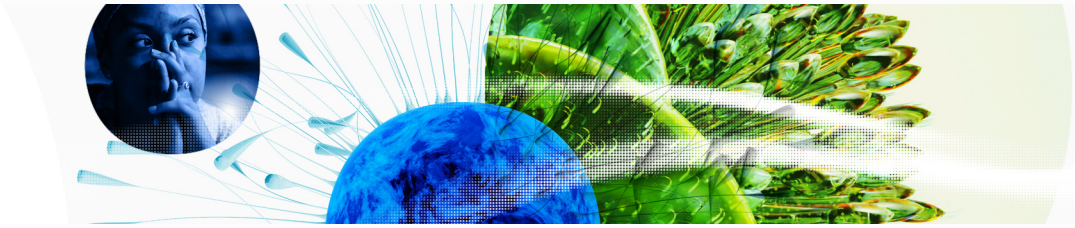
Infrastructure

- Top 10 | 62.83
- Japan | 60.28
- High income | 55.85
- SEAO | 47.13

Institutions

- Top 10 | 79.85
- Japan | 72.26
- High income | 68.16
- SEAO | 62.54

Global Innovation Index 2023



→ Innovation strengths and weaknesses in Japan

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

> Japan's main innovation strengths are **Cost of redundancy dismissal** (rank 1), **Domestic market scale, bn PPP$** (rank 1) and **Production and export complexity** (rank 1).

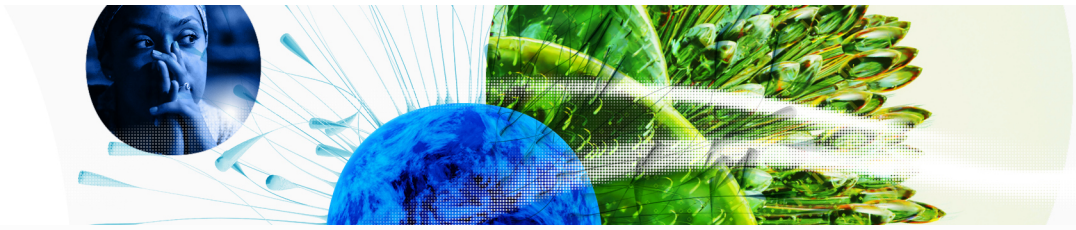
Strengths

Rank	Code	Indicator name
1	1.2.3	Cost of redundancy dismissal
1	4.3.3	Domestic market scale, bn PPP$
1	6.3.2	Production and export complexity
1	3.1.4	E-participation
1	6.3.1	Intellectual property receipts, % total trade
1	5.2.5	Patent families/bn PPP$ GDP
1	6.1.2	PCT patents by origin/bn PPP$ GDP
2	5.1.4	GERD financed by business, %
3	4.1.2	Domestic credit to private sector, % GDP
3	6.1.1	Patents by origin/bn PPP$ GDP
4	5.1.3	GERD performed by business, % GDP
5	2.3.2	Gross expenditure on R&D, % GDP
6	2.3.3	Global corporate R&D investors, top 3, mn US$

Weaknesses

Rank	Code	Indicator name
111	6.2.1	Labor productivity growth, %
104	2.1.1	Expenditure on education, % GDP
100	5.3.4	FDI net inflows, % GDP
83	6.3.4	ICT services exports, % total trade
77	2.2.2	Graduates in science and engineering, %
73	5.1.1	Knowledge-intensive employment, %
64	1.3.2	Entrepreneurship policies and culture
62	5.2.3	GERD financed by abroad, % GDP
58	7.2.1	Cultural and creative services exports, % total trade
51	4.2.4	VC received, value, % GDP

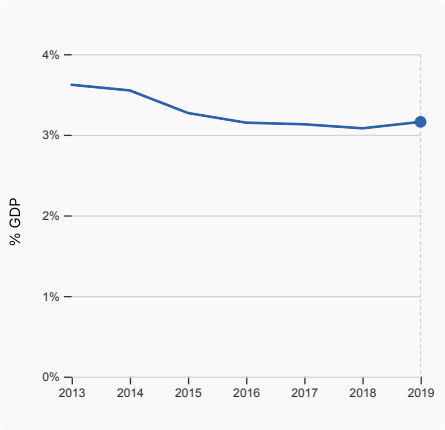
Global Innovation Index 2023



→ Japan's innovation system

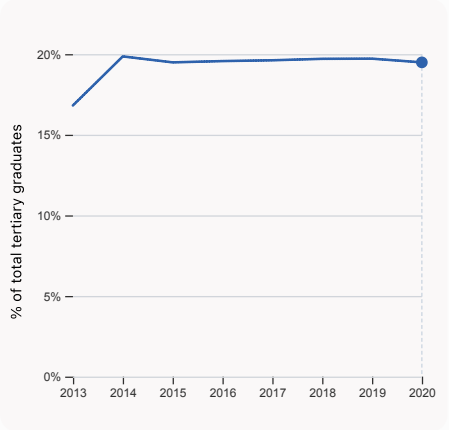
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Japan



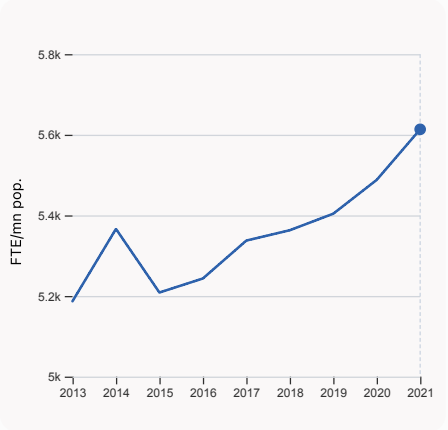
2.1.1 Expenditure on education, % GDP

was equal to 3.16% GDP in 2019, up by 0.08 percentage points from the year prior – and equivalent to an indicator rank of 104.



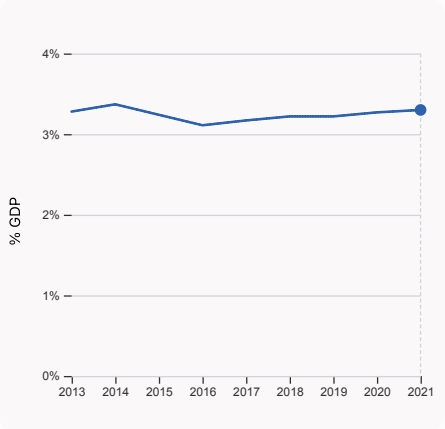
2.2.2 Graduates in science and engineering, %

was equal to 19.49% of total tertiary graduates in 2020, down by 0.23 percentage points from the year prior – and equivalent to an indicator rank of 77.



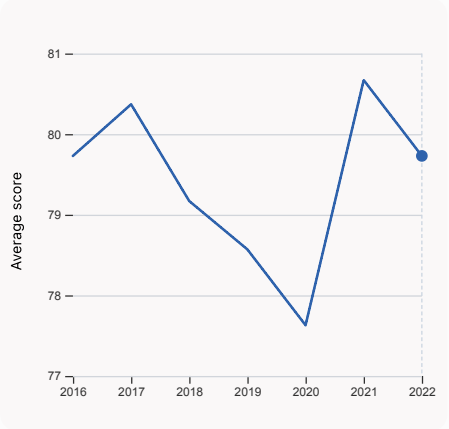
2.3.1 Researchers, FTE/mn pop.

was equal to 5,613.47 FTE/mn pop. in 2021, up by 2.29% from the year prior – and equivalent to an indicator rank of 11.



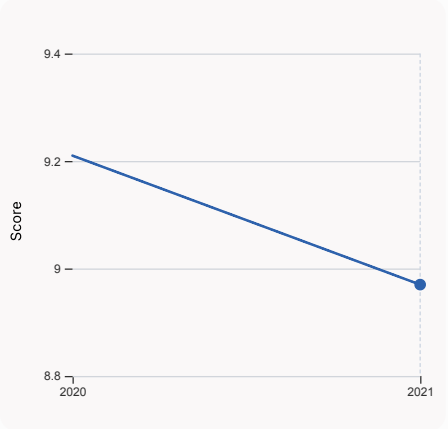
2.3.2 Gross expenditure on R&D, % GDP

was equal to 3.3% GDP in 2021, up by 0.03 percentage points from the year prior – and equivalent to an indicator rank of 5.



2.3.4 QS university ranking, top 3

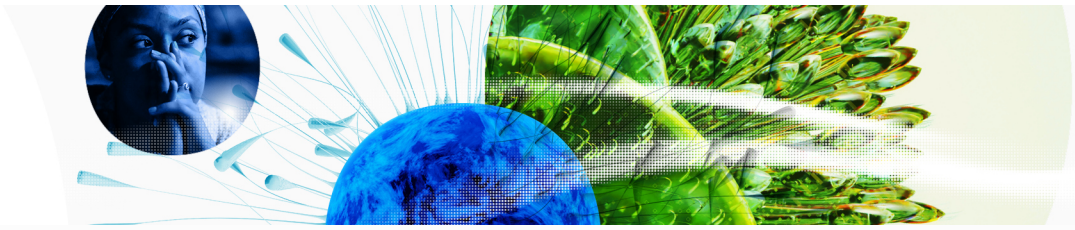
was equal to an average score of 79.73 for the top 3 universities in 2022, down by 1.17% from the year prior – and equivalent to an indicator rank of 8.

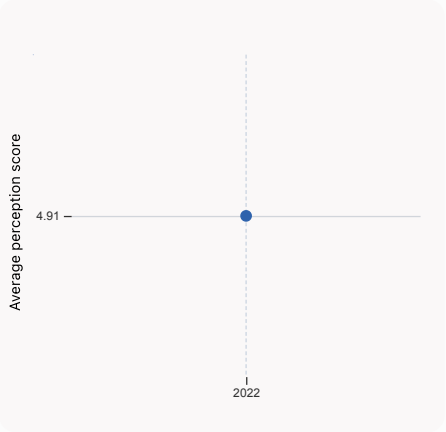


3.1.1 ICT access

was equal to a score of 8.97 in 2021, down by 2.61% from the year prior – and equivalent to an indicator rank of 54.

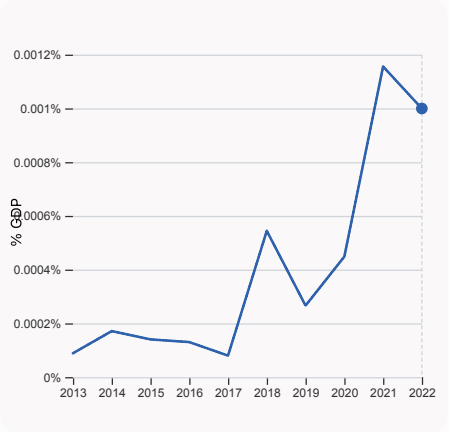
Global Innovation Index 2023





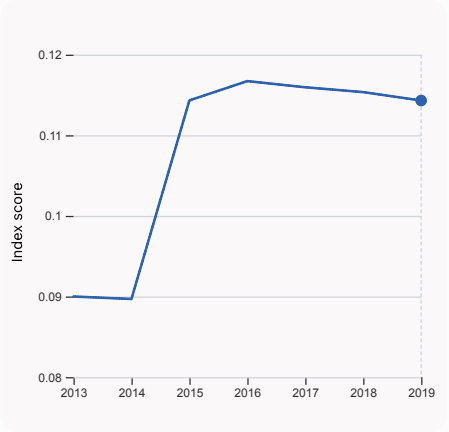
4.1.1 Finance for startups and scaleups

was equal to an average perception score of 4.91 in 2022, equivalent to an indicator rank of 36.



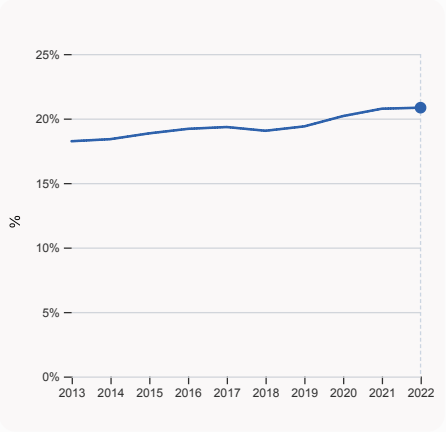
4.2.4 VC received, value, % GDP

was equal to 0.001% GDP in 2022, down by 0.00016 percentage points from the year prior – and equivalent to an indicator rank of 51.



4.3.2 Domestic industry diversification

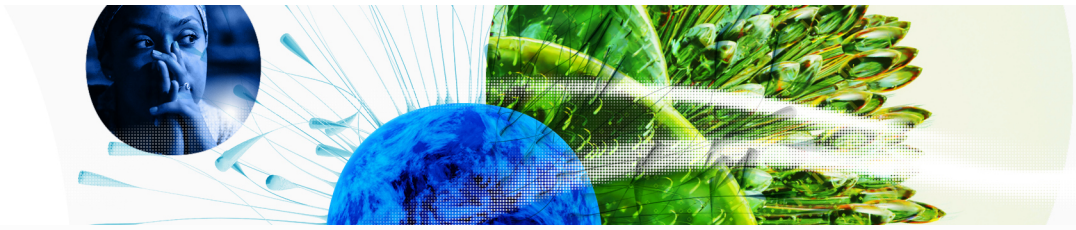
was equal to an index score of 0.114 in 2019, down by 0.91% from the year prior – and equivalent to an indicator rank of 28.



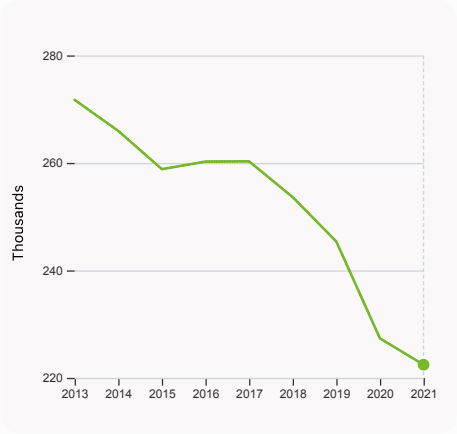
5.1.1 Knowledge-intensive employment, %

was equal to 20.84% in 2022, up by 0.08 percentage points from the year prior – and equivalent to an indicator rank of 73.

Global Innovation Index 2023

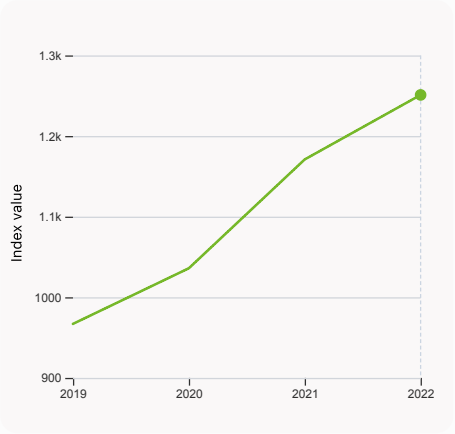


> Innovation outputs in Japan



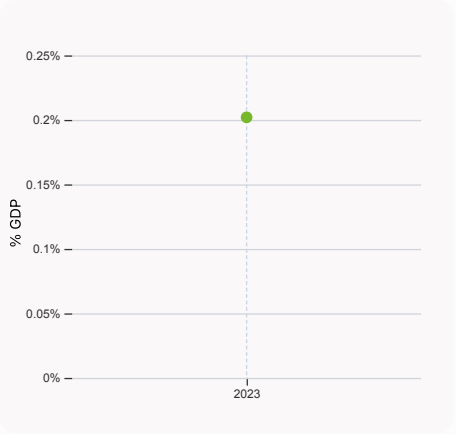
6.1.1 Patents by origin

was equal to 222.45 Thousands in 2021, down by 2.15% from the year prior – and equivalent to an indicator rank of 3.



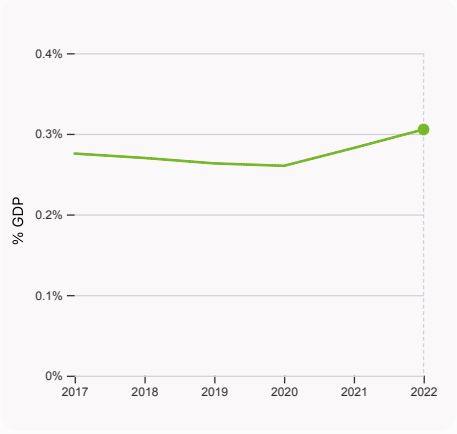
6.1.5 Citable documents H-index

was equal to an index value of 1,251 in 2022, up by 6.83% from the year prior – and equivalent to an indicator rank of 9.



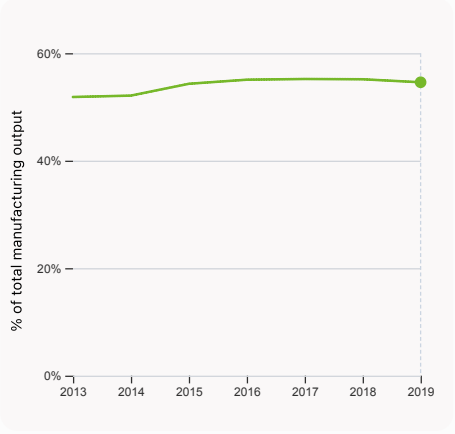
6.2.2 Unicorn valuation, % GDP

was equal to 0.202 % GDP in 2023 – and equivalent to an indicator rank of 46.



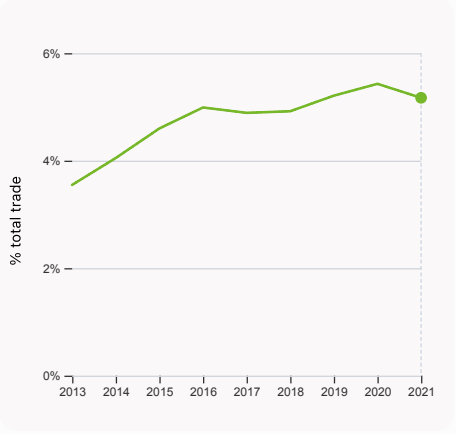
6.2.3 Software spending, % GDP

was equal to 0.305% GDP in 2022, up by 0.023 percentage points from the year prior – and equivalent to an indicator rank of 42.



6.2.4 High-tech manufacturing, %

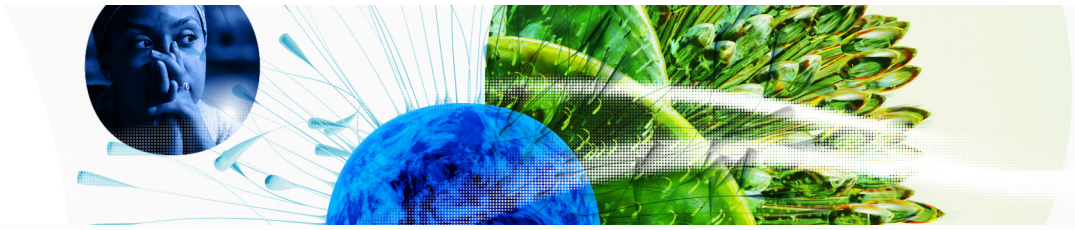
was equal to 54.59% of total manufacturing output in 2019, down by 0.56 percentage points from the year prior – and equivalent to an indicator rank of 8.

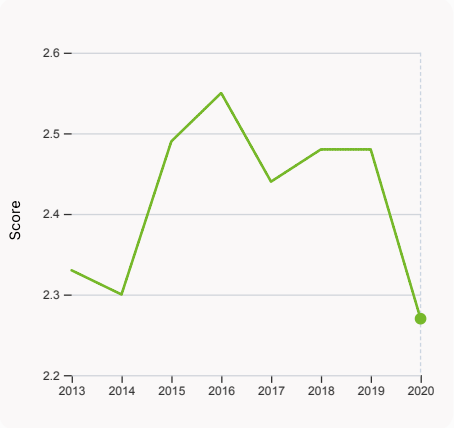


6.3.1 Intellectual property receipts, % total trade

was equal to 5.17% total trade in 2021, down by 0.26 percentage points from the year prior – and equivalent to an indicator rank of 1.

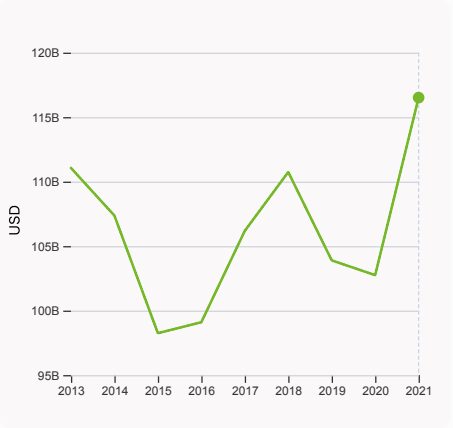
Global Innovation Index 2023





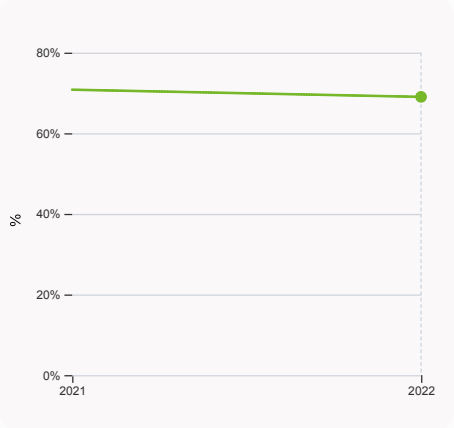
6.3.2 Production and export complexity

was equal to a score of 2.27 in 2020, down by 8.47% from the year prior – and equivalent to an indicator rank of 1.



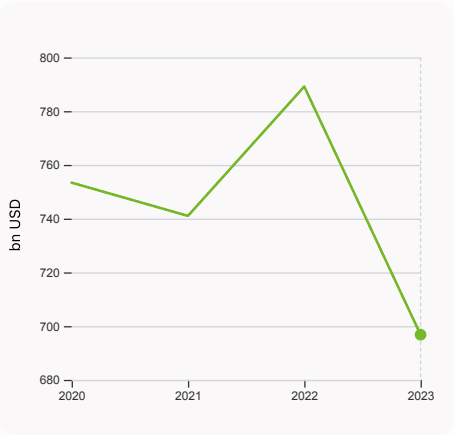
6.3.3 High-tech exports

was equal to 116,513,860,930 USD in 2021, up by 13.39% from the year prior – and equivalent to an indicator rank of 11.



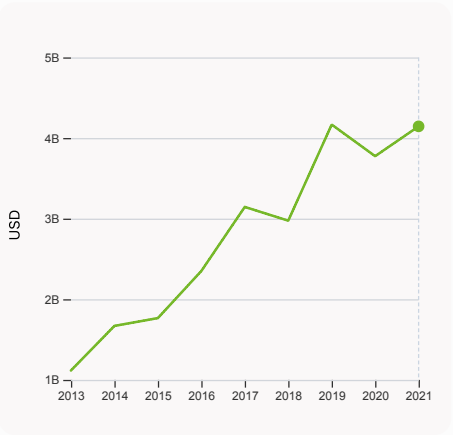
7.1.1 Intangible asset intensity, top 15, %

was equal to 69.03% in 2022, down by 1.78 percentage points from the year prior – and equivalent to an indicator rank of 20.



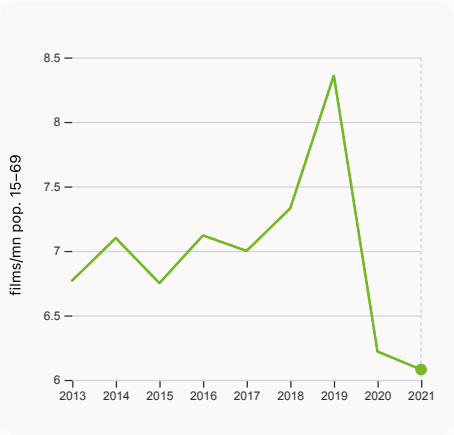
7.1.3 Global brand value, top 5,000

was equal to 696.814 bn USD in 2023, down by 11.7% from the year prior – and equivalent to an indicator rank of 7.



7.2.1 Cultural and creative services exports

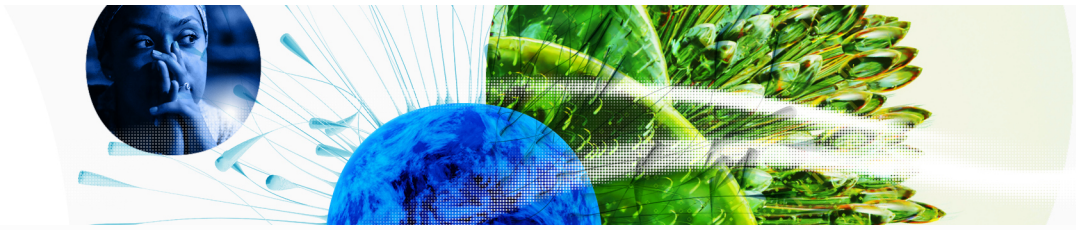
was equal to 4,144,976,000 USD in 2021, up by 9.8% from the year prior – and equivalent to an indicator rank of 58.

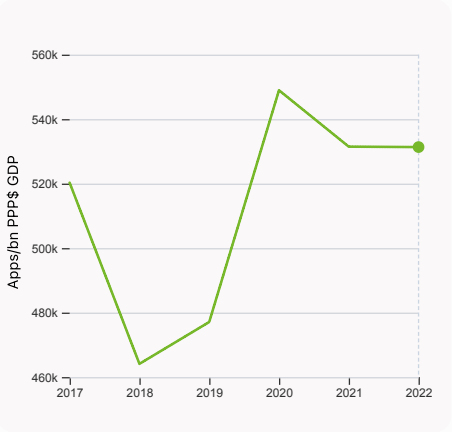


7.2.2 National feature films/mn pop. 15-69

was equal to 6.08 films/mn pop. 15–69 in 2021, down by 2.25% from the year prior – and equivalent to an indicator rank of 18.

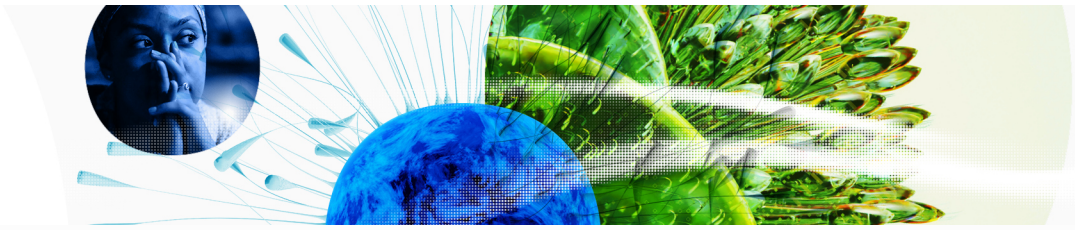
Global Innovation Index 2023





7.3.4 Mobile app creation/bn PPP$ GDP

was equal to 531,338.93 Apps/bn PPP$ GDP in 2022, down by 0.023% from the year prior – and equivalent to an indicator rank of 42.



→ Japan's innovation top performers

> 2.3.3 Global corporate R&D investors from Japan

Rank	Firm	Industry	R&D	R&D Growth	R&D Intensity
			[mn EUR]	[%]	[%]
15	TOYOTA MOTOR	Automobiles & Parts	8,691	3	4
24	HONDA MOTOR	Automobiles & Parts	6,373	4	6
31	NTT	Fixed Line Telecommunications	5,732	5	6
39	SONY	Leisure Goods	4,902	21	6

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 Japan's top universities

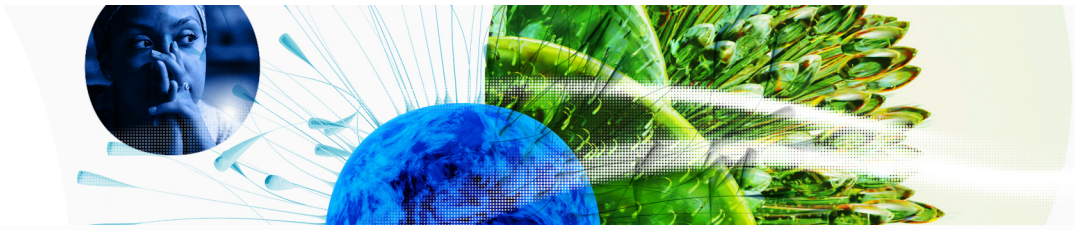
Rank	University	Score
23	THE UNIVERSITY OF TOKYO	85.30
36	KYOTO UNIVERSITY	81.40
55	TOKYO INSTITUTE OF TECHNOLOGY	72.50

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 Japan

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	PREFERRED NETWORKS	Artificial intelligence	Tokyo	2
1	SMARTNEWS	Mobile & telecommunications	Tokyo	2
3	SMARTHR	Fintech	Tokyo	2

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 Japan

Rank	Firm	Intensity, %
1	KEYENCE CORP	74.15
2	TAKEDA PHARMACEUTICAL CO LTD	97.51
3	SOFTBANK CORP	73.30

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

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

Rank	Brand	Industry	Brand Value, mn USD
1	TOYOTA	Automobiles	52,493.1
2	NTT GROUP	Telecoms	36,590.8
3	MITSUBISHI GROUP	Automobiles	34,962.1

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

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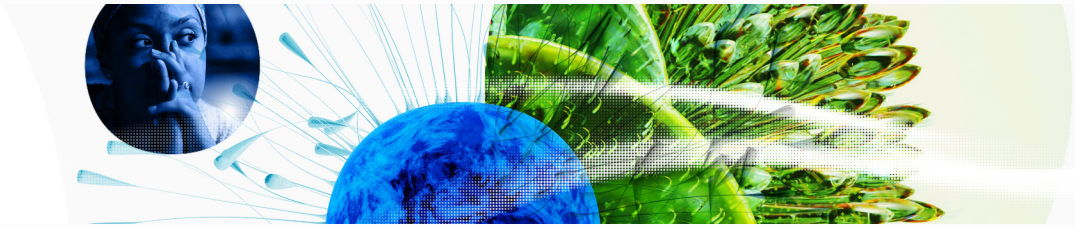

Japan

GII 2023 rank **13**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
14	11	High	SEAO	124.0	6,110.0	48,812.8

	Score / Value	Rank
Institutions	**72.3**	**21**
1.1 Institutional environment	**79.7**	**11**
1.1.1 Operational stability for businesses*	84.0	7
1.1.2 Government effectiveness*	75.5	17
1.2 Regulatory environment	**90.9**	**8**
1.2.1 Regulatory quality*	77.8	19
1.2.2 Rule of law*	86.0	15
1.2.3 Cost of redundancy dismissal	8.0	1 ●
1.3 Business environment	**46.1**	**64** ◇
1.3.1 Policies for doing business†	64.8	33
1.3.2 Entrepreneurship policies and culture†	27.4	64 ○ ◇
Human capital and research	**53.8**	**18**
2.1 Education	**60.7**	**33**
2.1.1 Expenditure on education, % GDP	3.2	104 ○ ◇
2.1.2 Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3 School life expectancy, years	15.1	48 ◇
2.1.4 PISA scales in reading, maths and science	520.0	5
2.1.5 Pupil-teacher ratio, secondary	10.7	38
2.2 Tertiary education	**29.0**	**71** ◇
2.2.1 Tertiary enrolment, % gross	65.3	48
2.2.2 Graduates in science and engineering, %	19.5	77 ○
2.2.3 Tertiary inbound mobility, %	5.7	44
2.3 Research and development (R&D)	**71.5**	**5**
2.3.1 Researchers, FTE/mn pop.	5,613.5	11
2.3.2 Gross expenditure on R&D, % GDP	3.3	5 ●
2.3.3 Global corporate R&D investors, top 3, mn US$	88.0	6 ●
2.3.4 QS university ranking, top 3*	80.8	8
Infrastructure	**60.3**	**13**
3.1 Information and communication technologies (ICTs)	**90.3**	**12**
3.1.1 ICT access*	84.6	54
3.1.2 ICT use*	86.5	31 ◇
3.1.3 Government's online service*	90.0	10
3.1.4 E-participation*	100.0	1 ●
3.2 General infrastructure	**48.3**	**19**
3.2.1 Electricity output, GWh/mn pop.	7,964.2	20
3.2.2 Logistics performance*	81.8	13
3.2.3 Gross capital formation, % GDP	25.7	47
3.3 Ecological sustainability	**42.3**	**28**
3.3.1 GDP/unit of energy use	12.9	37
3.3.2 Environmental performance*	64.9	25
3.3.3 ISO 14001 environment/bn PPP$ GDP	3.9	24
Market sophistication	**61.9**	**8**
4.1 Credit	**65.8**	**8**
4.1.1 Finance for startups and scaleups†	57.5	36 ◇
4.1.2 Domestic credit to private sector, % GDP	193.5	3 ●
4.1.3 Loans from microfinance institutions, % GDP	n/a	n/a
4.2 Investment	**26.2**	**26**
4.2.1 Market capitalization, % GDP	119.8	10
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	0.2	27
4.2.3 VC recipients, deals/bn PPP$ GDP	0.1	17
4.2.4 VC received, value, % GDP	0.0	51 ○ ◇
4.3 Trade, diversification, and market scale	**93.6**	**4**
4.3.1 Applied tariff rate, weighted avg., %	2.2	63
4.3.2 Domestic industry diversification	95.2	28
4.3.3 Domestic market scale, bn PPP$	6,110.0	1 ●

	Score / Value	Rank
Business sophistication	**59.9**	**11**
5.1 Knowledge workers	**62.9**	**18**
5.1.1 Knowledge-intensive employment, %	20.8	73 ○ ◇
5.1.2 Firms offering formal training, %	n/a	n/a
5.1.3 GERD performed by business, % GDP	2.6	4 ●
5.1.4 GERD financed by business, %	78.1	2 ●
5.1.5 Females employed w/advanced degrees, %	22.9	25
5.2 Innovation linkages	**50.2**	**20**
5.2.1 University-industry R&D collaboration†	64.0	28
5.2.2 State of cluster development†	72.3	20
5.2.3 GERD financed by abroad, % GDP	0.0	62 ○ ◇
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	42 ◇
5.2.5 Patent families/bn PPP$ GDP	13.0	1 ●
5.3 Knowledge absorption	**66.6**	**4**
5.3.1 Intellectual property payments, % total trade	3.2	7
5.3.2 High-tech imports, % total trade	15.0	16
5.3.3 ICT services imports, % total trade	2.7	23
5.3.4 FDI net inflows, % GDP	0.9	100 ○
5.3.5 Research talent, % in businesses	75.1	5
Knowledge and technology outputs	**51.1**	**13**
6.1 Knowledge creation	**59.1**	**12**
6.1.1 Patents by origin/bn PPP$ GDP	39.7	3 ●
6.1.2 PCT patents by origin/bn PPP$ GDP	8.2	1 ●
6.1.3 Utility models by origin/bn PPP$ GDP	0.7	28
6.1.4 Scientific and technical articles/bn PPP$ GDP	n/a	n/a
6.1.5 Citable documents H-index	67.2	9
6.2 Knowledge impact	**35.0**	**41** ◇
6.2.1 Labor productivity growth, %	-0.6	111 ○
6.2.2 Unicorn valuation, % GDP	0.2	46 ◇
6.2.3 Software spending, % GDP	0.3	42
6.2.4 High-tech manufacturing, %	54.6	8
6.3 Knowledge diffusion	**59.2**	**6**
6.3.1 Intellectual property receipts, % total trade	5.3	1 ●
6.3.2 Production and export complexity	100.0	1 ●
6.3.3 High-tech exports, % total trade	12.6	11
6.3.4 ICT services exports, % total trade	1.1	83 ○
6.3.5 ISO 9001 quality/bn PPP$ GDP	7.3	37
Creative outputs	**44.1**	**25**
7.1 Intangible assets	**55.7**	**14**
7.1.1 Intangible asset intensity, top 15, %	69.0	20
7.1.2 Trademarks by origin/bn PPP$ GDP	48.1	48
7.1.3 Global brand value, top 5,000	16.0	7
7.1.4 Industrial designs by origin/bn PPP$ GDP	3.9	25
7.2 Creative goods and services	**35.3**	**21**
7.2.1 Cultural and creative services exports, % total trade	0.4	58 ○
7.2.2 National feature films/mn pop. 15-69	6.1	18
7.2.3 Entertainment and media market/th pop. 15-69	72.4	5
7.2.4 Creative goods exports, % total trade	1.8	30
7.3 Online creativity	**30.0**	**41** ◇
7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	19.1	31 ◇
7.3.2 Country-code TLDs/th pop. 15-69	6.4	51 ◇
7.3.3 GitHub commits/mn pop. 15-69	21.9	41 ◇
7.3.4 Mobile app creation/bn PPP$ GDP	72.6	42

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.

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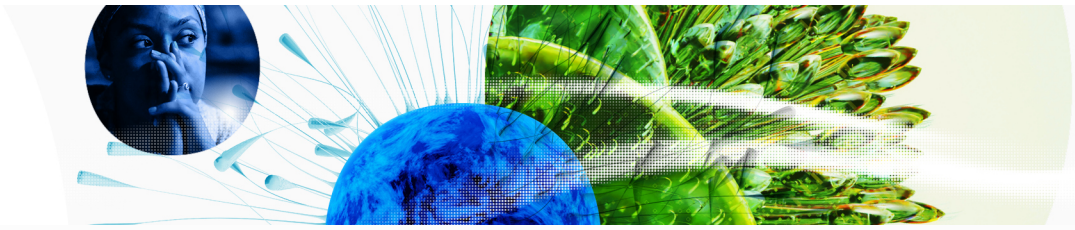

→ Data availability

The following tables list indicators that are either missing or outdated for Japan.

> Japan has missing data for three indicators and outdated data for four indicators.

> Missing data for Japan

Code	Indicator name	Economy Year	Model Year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2019	UNESCO Institute for Statistics
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

> Outdated data for Japan

Code	Indicator name	Economy Year	Model Year	Source
2.1.1	Expenditure on education, % GDP	2019	2021	UNESCO Institute for Statistics
4.3.2	Domestic industry diversification	2019	2020	United Nations Industrial Development Organization
5.1.5	Females employed w/advanced degrees, %	2020	2022	International Labour Organization
6.2.4	High-tech manufacturing, %	2019	2020	United Nations Industrial Development Organization

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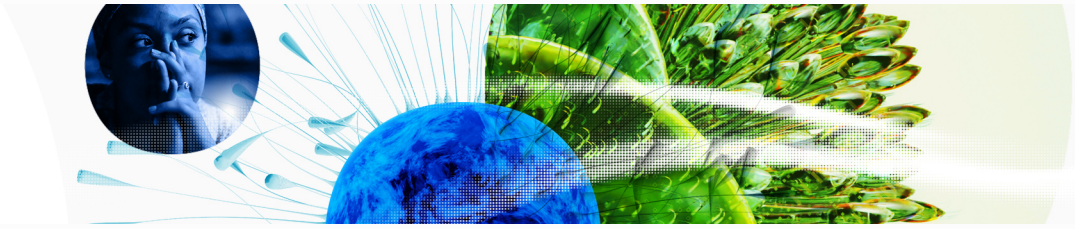

About the Global Innovation Index

- 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, 2023.

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.