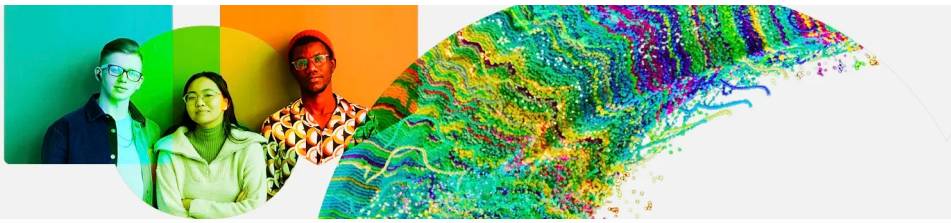
Global Innovation Index 2024



Japan ranking in the Global Innovation Index 2024

Japan ranks 13th among the 133 economies featured in the GII 2024.

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 ranks 12th among the 51 high-income group economies.

Japan ranks 4th among the 17 economies in South East Asia, East Asia, and Oceania.

Japan GII Ranking (2020-2024)

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 2024 is between ranks 12 and 13.

Year	GII Position	Innovation Inputs	Innovation Outputs
2020	16th	12th	18th
2021	13th	11th	14th
2022	13th	11th	12th
2023	13th	11th	14th
2024	13th	12th	14th

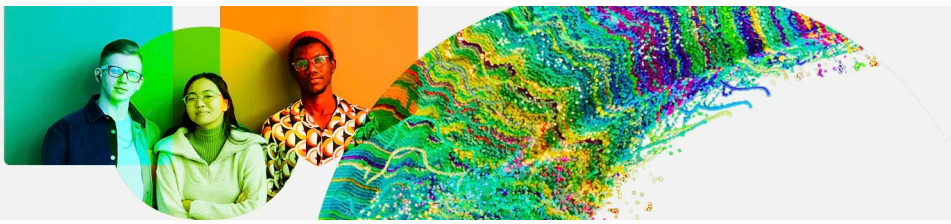
Japan performs worse in innovation outputs than innovation inputs in 2024.

This year **Japan ranks 12th in innovation inputs.** This position is lower than last year.

Japan ranks 14th in innovation outputs. This position is the same as last year.

Japan has 3 clusters in the top 100 S&T clusters of the Global Innovation Index.

Global Innovation Index 2024



> Global Innovation Tracker

The Global Innovation Tracker 2024 shows what is the current state of innovation in Japan, how rapidly is technology being embraced and what are the resulting societal impacts.

For Japan, 7 indicators have improved in the short-term and 6 indicators have worsened.

Science and innovation investment

Scientific publications	R&D investments	Venture capital		International patent filings
		Deal numbers	Deal values	
▼ -8.2% 2022 - 2023	▲ 4.7% 2021 - 2022	▼ -17.3% 2022 - 2023	▼ -23.8% 2022 - 2023	▼ -2.9% 2022 - 2023
▲ 0.3% 2013 - 2023	▲ 1.2% 2012 - 2022	▲ 22.1% 2013 - 2023	▲ 22% 2013 - 2023	▲ 1.1% 2013 - 2023

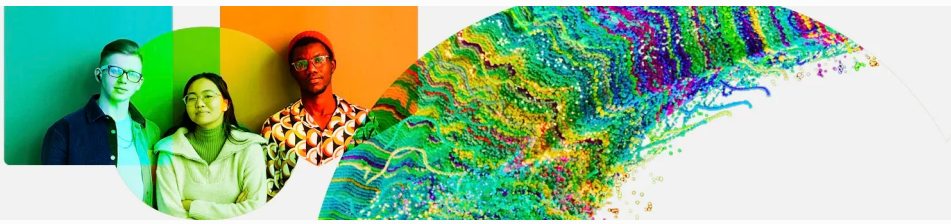
Technology adoption

Safe sanitation	Connectivity		Robots	Electric vehicles
	Fixed broadband	5G		
▲ 0.1% 2021 - 2022	▲ 2.5% 2021 - 2022	▲ 3.6% 2021 - 2022	▲ 5.3% 2021 - 2022	▲ 31.7% 2022 - 2023
▲ 0.1% 2012 - 2022	▲ 2.8% 2012 - 2022		▲ 2.9% 2012 - 2022	▲ 22.8% 2013 - 2023
99.1 per 100 inhabitants in 2022	37.2 per 100 inhabitants in 2022	96.6 per 100 inhabitants in 2022		0.8 per 100 inhabitants in 2023

Socioeconomic impact

Labor productivity	Life expectancy	Temperature change
▲ 1.7% 2022 - 2023	▼ -0.5% 2021 - 2022	▲ 1.8°C 2023
▲ 0.7% 2013 - 2023	▲ 0.1% 2012 - 2022	n/a
94,877 USD in 2023	84 years in 2022	

Notes: Not all indicators of the Global Innovation Tracker are used to calculate the Global Innovation Index. Long-term annual growth refers to the compound annual growth rate (CAGR) over the indicated period. For each variable, a one-year growth rate is set for the short run, and ten-year CAGR is set for the long run; time windows might differ when gaps exist in data availability. The end period corresponds to the most recent available observation, which may differ among countries. Temperature change is an exception: it indicates the change in degrees Celsius with respect to the average temperature in the country from 1951–1980. Figures are rounded.



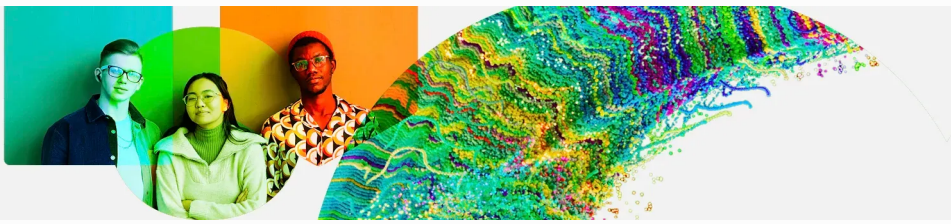
Expected vs. observed innovation performance

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 2024



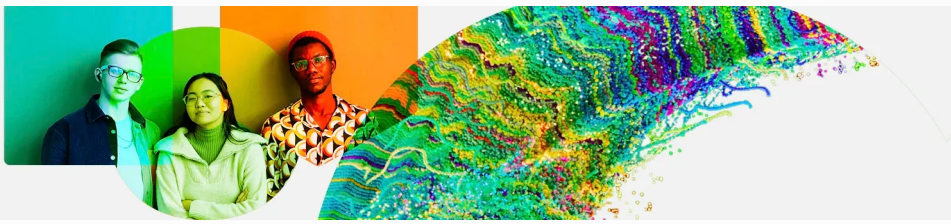
Effectively translating innovation investments into innovation outputs

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 more innovation outputs relative to its level of innovation investments.

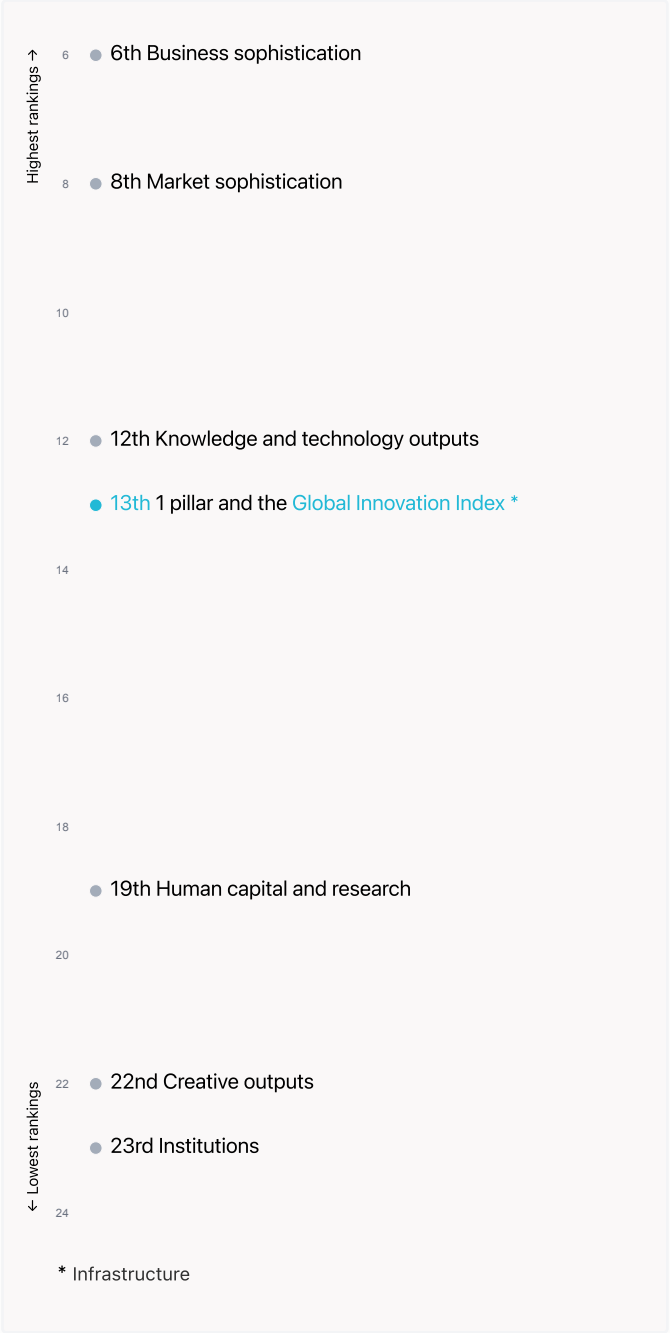
> Relationship between innovation inputs and outputs

Global Innovation Index 2024



Overview of Japan's rankings in the seven areas of the GII in 2024

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

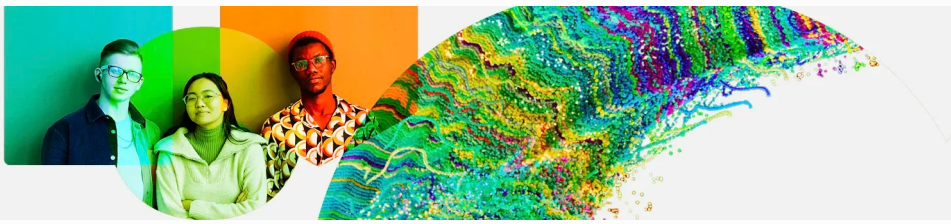
Japan ranks highest in Business sophistication (6th), Market sophistication (8th), Knowledge and technology outputs (12th) and Infrastructure (13th).

Lowest rankings

Japan ranks lowest in Institutions (23rd), Creative outputs (22nd) and Human capital and research (19th).

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

Global Innovation Index 2024



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

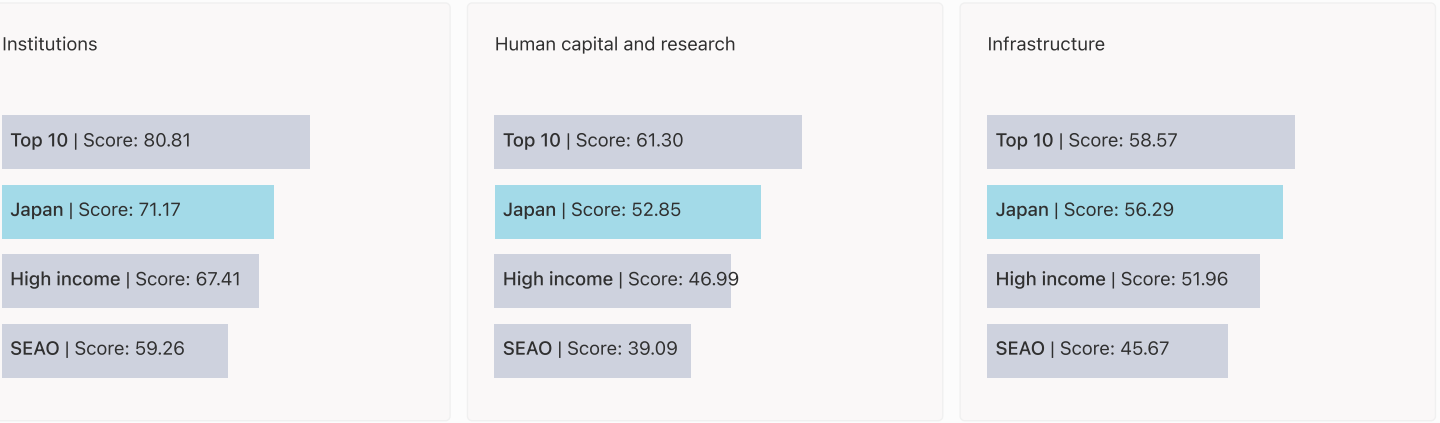
The charts shows the relative position of Japan (blue bar) against other economy groupings (grey bars), for each of the seven areas of the GII Index.

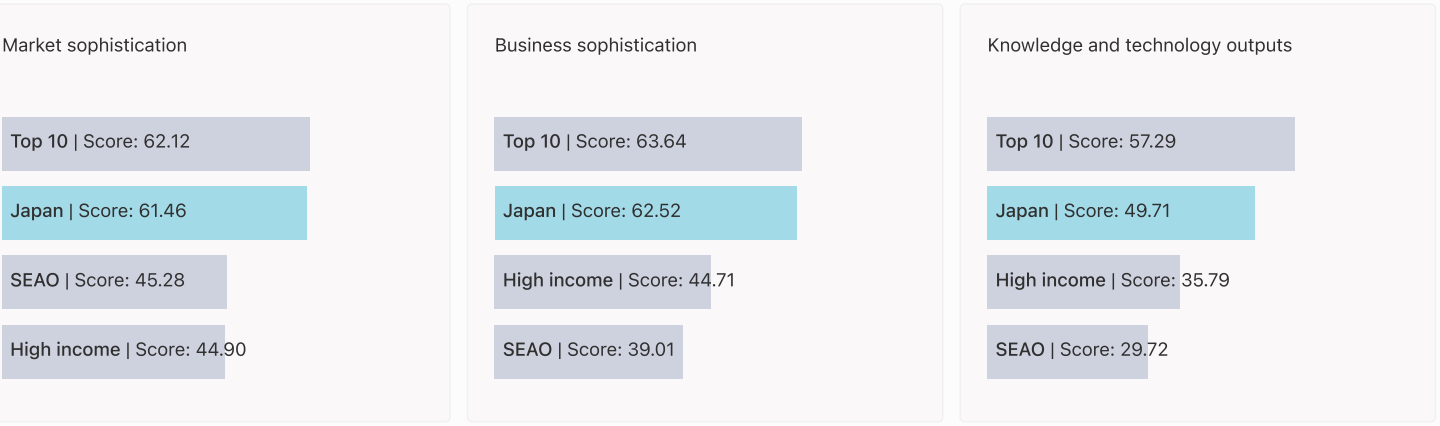
High-Income economies

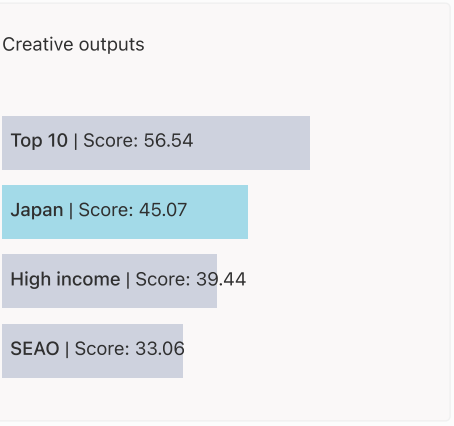
Japan performs above the high-income group average in all pillars.

South East Asia, East Asia, And Oceania

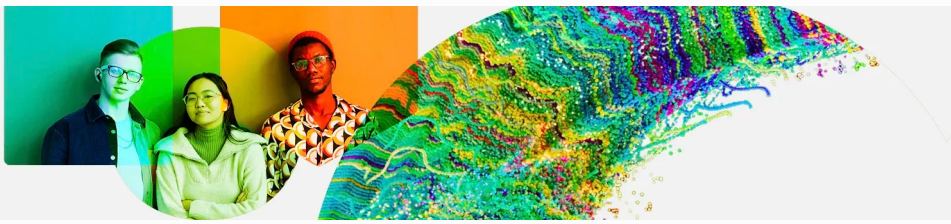
Japan performs above the regional average in all pillars.







Global Innovation Index 2024



Innovation strengths and weaknesses in Japan

The table below gives an overview of the indicator strengths and weaknesses of Japan in the GII 2024.

Japan's main innovation strengths are **Domestic market scale, bn PPP$** (rank 1), **Production and export complexity** (rank 1) and **E-participation*** (rank 1).

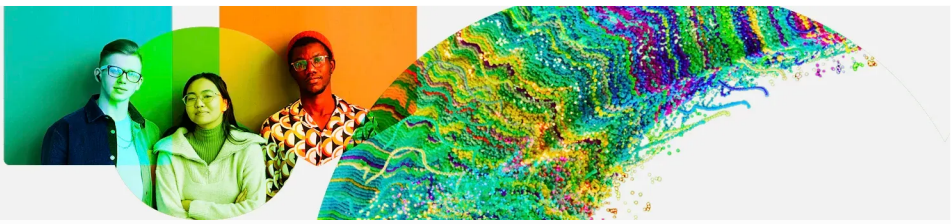
Strengths

Rank	Code	Indicator name
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	6.1.2	PCT patents by origin/bn PPP$ GDP
1	5.2.1	Public Research-Industry co-publications, %
2	5.1.4	GERD financed by business, %
3	4.1.2	Domestic credit to private sector, % GDP
3	5.2.5	Patent families/bn PPP$ GDP
3	6.1.1	Patents by origin/bn PPP$ GDP
3	2.1.4	PISA scales in reading, maths and science
4	5.1.3	GERD performed by business, % GDP

Weaknesses

Rank	Code	Indicator name
98	5.3.4	FDI net inflows, % GDP
95	6.2.1	Labor productivity growth, %
92	2.1.1	Expenditure on education, % GDP
81	6.3.4	ICT services exports, % total trade
80	2.2.2	Graduates in science and engineering, %
74	5.1.1	Knowledge-intensive employment, %
72	3.3.2	Low-carbon energy use, %
64	1.3.2	Entrepreneurship policies and culture†
59	7.2.1	Cultural and creative services exports, % total trade
53	4.2.4	VC received, value, % GDP

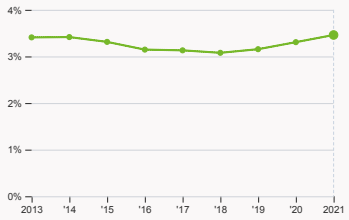
Global Innovation Index 2024



Japan's innovation system

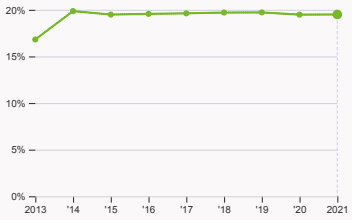
As far as practicable, the plots below present unscaled indicator data.

Innovation inputs in Japan



2.1.1 **Expenditure on education**

was equal to 3.46 % GDP in 2021, up by 0.15 percentage points from the year prior – and equivalent to an indicator rank of 92.

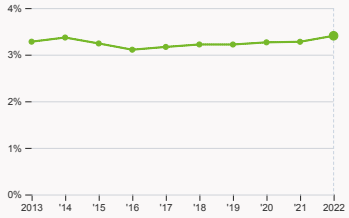


2.2.2 **Graduates in science and engineering**

was equal to 19.5 % of total graduates in 2021, up by 0.02 percentage points from the year prior – and equivalent to an indicator rank of 80.

2.3.1 **Researchers**

was equal to 5646.8 FTE per million population in 2022, up by 0.59% from the year prior – and equivalent to an indicator rank of 14.



2.3.2 **Gross expenditure on R&D**

was equal to 3.41 % GDP in 2022, up by 0.13 percentage points from the year prior – and equivalent to an indicator rank of 6.

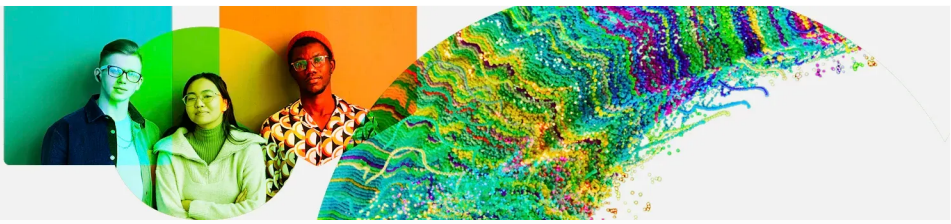
2.3.4 **QS university ranking**

was equal to an average score of 74.83 for the top three universities in 2023, down by 6.15% from the year prior – and equivalent to an indicator rank of 9.

4.2.4 **VC received, value**

was equal to 3.39 million USD in 2023, down by 23.82% from the year prior – and equivalent to an indicator rank of 53.

Global Innovation Index 2024



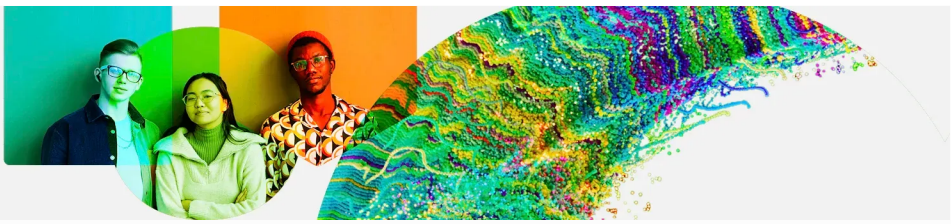
4.3.2 Domestic industry diversification

was equal to an index score of 0.11 in 2020, down by 1.41% from the year prior – and equivalent to an indicator rank of 31.

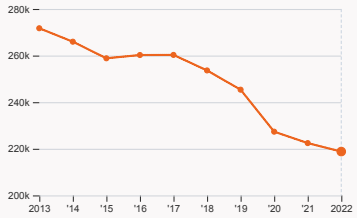
5.1.1 Knowledge-intensive employment

was equal to 20.88 % in 2023, up by 0.04 percentage points from the year prior – and equivalent to an indicator rank of 74.

Global Innovation Index 2024

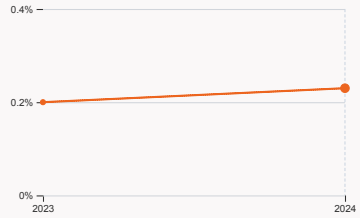


Innovation outputs in Japan



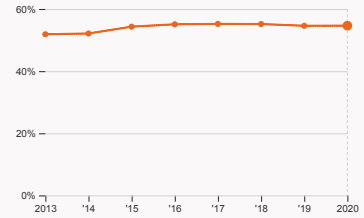
6.1.1 Patents by origin

was equal to 218.81 thousand patents in 2022, down by 1.64% from the year prior – and equivalent to an indicator rank of 3.



6.2.2 Unicorn valuation

was equal to 0.23 % GDP in 2024, up by 0.03 percentage points from the year prior – and equivalent to an indicator rank of 45.

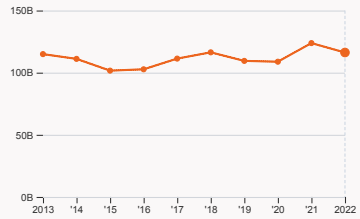


6.2.4 High-tech manufacturing

was equal to 54.63 % of total manufacturing output in 2020, up by 0.04 percentage points from the year prior – and equivalent to an indicator rank of 9.

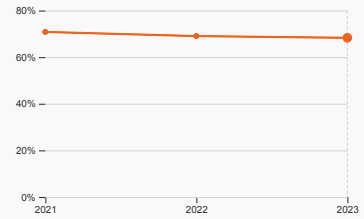
6.3.2 Production and export complexity

was equal to a score of 2.26 in 2021, down by 5.44% from the year prior – and equivalent to an indicator rank of 1.



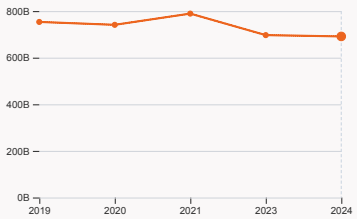
6.3.3 High-tech exports

was equal to 116.22 billion USD in 2022, down by 6.12% from the year prior – and equivalent to an indicator rank of 15.



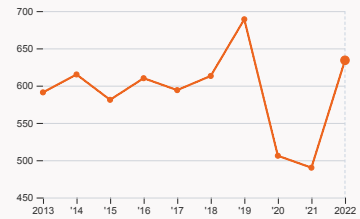
7.1.1 Intangible asset intensity

was equal to 68.29 % for the top 15 companies in 2023, down by 0.74 percentage points from the year prior – and equivalent to an indicator rank of 21.



7.1.3 Global brand value

was equal to 691.25 billion USD for the brands in the top 5,000 in 2024, down by 0.8% from the year prior – and equivalent to an indicator rank of 7.

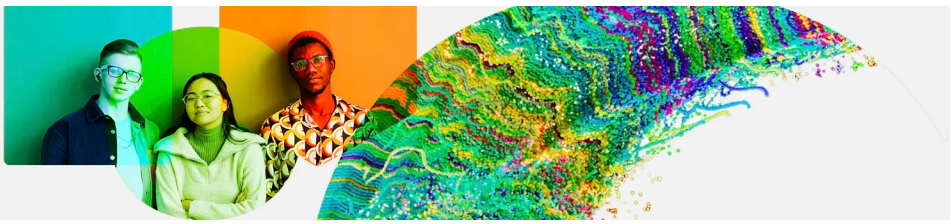


7.2.2 National feature films

was equal to 634 films in 2022, up by 29.39% from the year prior – and equivalent to an indicator rank of 13.

7.3.3 Mobile app creation

was equal to 3.25 billion global downloads of mobile apps in 2023 with no change from the year prior – and equivalent to an indicator rank of 41.



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]	[%]	[%]
16	TOYOTA MOTOR	Automobiles & Parts	8,776	10	3
33	HONDA MOTOR	Automobiles & Parts	6,221	7	5
36	NTT	Mobile Telecommunications	5,721	9	6
40	SONY	Leisure Goods	5,340	19	7

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

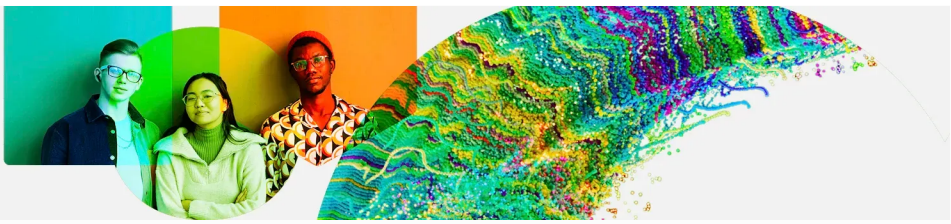
Rank	University	Score
28	THE UNIVERSITY OF TOKYO	84.30
46	KYOTO UNIVERSITY	76.30
80	OSAKA UNIVERSITY	63.90

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 Japan

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	SMARTNEWS	Media & Entertainment	Tokyo	2
1	PREFERRED NETWORKS	Industrials	Tokyo	2
3	SMARTHR	Enterprise Tech	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	SOFTBANK CORP.	74.87
2	TAKEDA PHARMACEUTICAL COMPANY LIMITED	84.96
3	KEYENCE CORPORATION	73.24

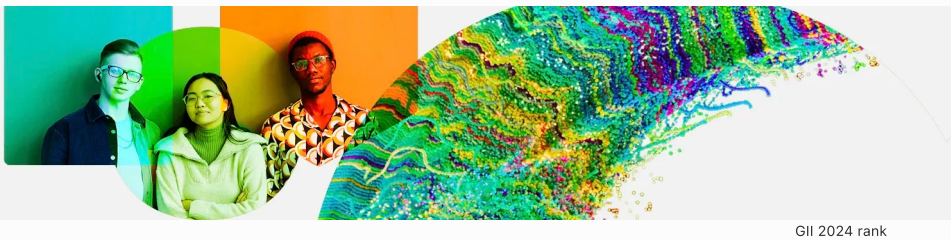
Source: Brand Finance (https://brandirectory.com/reports/gift-2022).
Note: Brand Finance only provides within economy ranks.

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

Rank	Brand	Industry	Brand Value, mn USD
1	TOYOTA	Automobiles	52,672.6
2	MITSUBISHI GROUP	Diversified	35,546.5
3	MITSUI	Diversified	32,491

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

Global Innovation Index 2024



Japan

GII 2024 rank
13

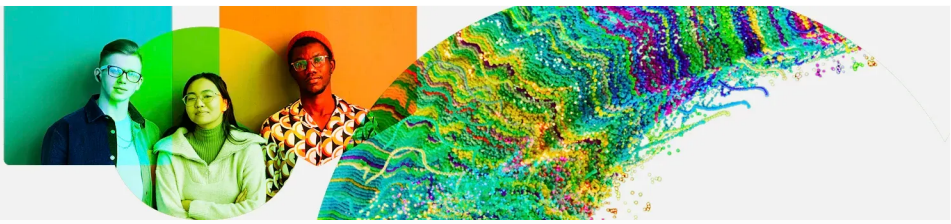
Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
14	12	High	SEAO	124.4	6,495.2	52,119.6

	Score / Value	Rank	
Institutions	**71.2**	**23**	
1.1 Institutional environment	**86.5**	**9**	
1.1.1 Operational stability for businesses*	86.7	9	
1.1.2 Government effectiveness*	86.3	7	
1.2 Regulatory environment	**84.1**	**16**	
1.2.1 Regulatory quality*	79.6	17	
1.2.2 Rule of law*	88.5	13	
1.3 Business environment	**42.9**	**74**	○ ◇
1.3.1 Policy stability for doing business†	63.2	36	
1.3.2 Entrepreneurship policies and culture†	22.7	64	○ ◇
Human capital and research	**52.9**	**19**	
2.1 Education	**60.4**	**35**	
2.1.1 Expenditure on education, % GDP	3.5	92	○ ◇
2.1.2 Government funding/pupil, secondary, % GDP/cap	24.8	21	
2.1.3 School life expectancy, years	15.4	45	◇
2.1.4 PISA scales in reading, maths and science	532.7	3	● ◆
2.1.5 Pupil–teacher ratio, secondary	10.6	36	
2.2 Tertiary education	**29.5**	**74**	○ ◇
2.2.1 Tertiary enrolment, % gross	63.2	50	◇
2.2.2 Graduates in science and engineering, %	19.5	80	○ ◇
2.2.3 Tertiary inbound mobility, %	5.6	47	
2.3 Research and development (R&D)	**68.6**	**6**	● ◆
2.3.1 Researchers, FTE/mn pop.	5,646.8	14	
2.3.2 Gross expenditure on R&D, % GDP	3.4	6	
2.3.3 Global corporate R&D investors, top 3, mn USD	85.5	6	
2.3.4 QS university ranking, top 3*	75.7	9	
Infrastructure	**56.3**	**13**	
3.1 Information and communication technologies (ICTs)	**93.5**	**8**	
3.1.1 ICT access*	95.8	43	
3.1.2 ICT use*	88.4	23	
3.1.3 Government's online service*	90	10	
3.1.4 E-participation*	100	1	● ◆
3.2 General infrastructure	**50**	**16**	
3.2.1 Electricity output, GWh/mn pop.	8,035.1	18	
3.2.2 Logistics performance*	81.8	13	
3.2.3 Gross capital formation, % GDP	26.3	42	
3.3 Ecological sustainability	**25.3**	**48**	
3.3.1 GDP/unit of energy use	13.5	40	
3.3.2 Low-carbon energy use, %	15	72	○
3.3.3 ISO 14001 environment/bn PPP$ GDP	3.6	27	
Market sophistication	**61.5**	**8**	
4.1 Credit	**63.2**	**9**	
4.1.1 Finance for startups and scaleups†	53.3	35	◇
4.1.2 Domestic credit to private sector, % GDP	194.9	3	● ◆
4.1.3 Loans from microfinance institutions, % GDP	n/a	n/a	
4.2 Investment	**27.7**	**29**	
4.2.1 Market capitalization, % GDP	129.8	10	
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	0.2	31	
4.2.3 VC recipients, deals/bn PPP$ GDP	0.1	22	
4.2.4 VC received, value, % GDP	0.001	53	○ ◇
4.3 Trade, diversification and market scale	**93.5**	**3**	● ◆
4.3.1 Applied tariff rate, weighted avg., %	1.3	52	
4.3.2 Domestic industry diversification	91	31	
4.3.3 Domestic market scale, bn PPP$	6,495.2	1	● ◆

	Score / Value	Rank	
Business sophistication	**62.5**	**6**	● ◆
5.1 Knowledge workers	**66.8**	**16**	
5.1.1 Knowledge-intensive employment, %	20.9	74	○ ◇
5.1.2 Firms offering formal training, %	n/a	n/a	
5.1.3 GERD performed by business, % GDP	2.7	4	● ◆
5.1.4 GERD financed by business, %	78.5	2	● ◆
5.1.5 Females employed w/advanced degrees, %	22.9	23	
5.2 Innovation linkages	**61.7**	**9**	
5.2.1 Public Research-Industry co-publications, %	9	1	● ◆
5.2.2 University-industry R&D collaboration†	66.8	31	◇
5.2.3 State of cluster development†	66.4	36	◇
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP	0.03	41	◇
5.2.5 Patent families/bn PPP$ GDP	12.6	3	● ◆
5.3 Knowledge absorption	**59.1**	**3**	● ◆
5.3.1 Intellectual property payments, % total trade	3.2	7	
5.3.2 High-tech imports, % total trade	16.3	14	
5.3.3 ICT services imports, % total trade	2.3	25	
5.3.4 FDI net inflows, % GDP	1	98	○
5.3.5 Research talent, % in businesses	75.2	5	◆
Knowledge and technology outputs	**49.7**	**12**	
6.1 Knowledge creation	**58.3**	**8**	
6.1.1 Patents by origin/bn PPP$ GDP	35.6	3	● ◆
6.1.2 PCT patents by origin/bn PPP$ GDP	7.5	1	● ◆
6.1.3 Utility models by origin/bn PPP$ GDP	0.5	29	
6.1.4 Scientific and technical articles/bn PPP$ GDP	12	59	◇
6.1.5 Citable documents H-index	66.6	10	
6.2 Knowledge impact	**36.5**	**36**	
6.2.1 Labor productivity growth, %	0.005	95	○
6.2.2 Unicorn valuation, % GDP	0.2	45	◇
6.2.3 Software spending, % GDP	0.3	33	
6.2.4 High-tech manufacturing, %	54.6	9	
6.3 Knowledge diffusion	**54.3**	**9**	
6.3.1 Intellectual property receipts, % total trade	5.1	1	● ◆
6.3.2 Production and export complexity	100	1	● ◆
6.3.3 High-tech exports, % total trade	11.7	15	
6.3.4 ICT services exports, % total trade	1	81	○
6.3.5 ISO 9001 quality/bn PPP$ GDP	6.7	40	
Creative outputs	**45.1**	**22**	
7.1 Intangible assets	**54.7**	**13**	
7.1.1 Intangible asset intensity, top 15, %	68.3	21	
7.1.2 Trademarks by origin/bn PPP$ GDP	42.6	41	
7.1.3 Global brand value, top 5,000, % GDP	16.1	7	
7.1.4 Industrial designs by origin/bn PPP$ GDP	3.5	24	
7.2 Creative goods and services	**35.5**	**20**	
7.2.1 Cultural and creative services exports, % total trade	0.4	59	○
7.2.2 National feature films/mn pop. 15–69	7.8	13	
7.2.3 Entertainment and media market/th pop. 15–69	59.8	8	
7.2.4 Creative goods exports, % total trade	1.7	29	
7.3 Online creativity	**35.4**	**42**	◇
7.3.1 Top-level domains (TLDs)/th pop. 15–69	9.9	41	◇
7.3.2 GitHub commits/mn pop. 15–69	24.6	40	◇
7.3.3 Mobile app creation/bn PPP$ GDP	71.8	41	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question, 🕓 that the economy's data is outdated. Square brackets [ ] indicate the the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Global Innovation Index 2024



Data availability

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

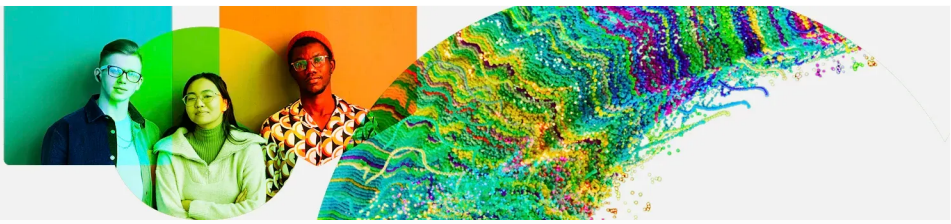
Japan has missing data for two indicators and outdated data for eight indicators.

Missing data for Japan

Code	Indicator name	Economy Year	Model Year	Source
4.1.3	Loans from microfinance institutions, % GDP	n/a	2022	International Monetary Fund, Financial Access Survey (FAS)
5.1.2	Firms offering formal training, %	n/a	2023	World Bank Enterprise Surveys

Outdated data for Japan

Code	Indicator name	Economy Year	Model Year	Source
2.1.1	Expenditure on education, % GDP	2021	2022	UNESCO Institute for Statistics
2.1.3	School life expectancy, years	2021	2022	UNESCO Institute for Statistics
2.1.5	Pupil–teacher ratio, secondary	2021	2022	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2021	2022	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	2021	2022	UNESCO Institute for Statistics
4.3.2	Domestic industry diversification	2020	2021	United Nations Industrial Development Organization (UNIDO), Industrial Statistics Database (INDSTAT) Rev.3 and 4
5.1.5	Females employed w/advanced degrees, %	2020	2023	International Labour Organization
6.2.4	High-tech manufacturing, %	2020	2021	United Nations Industrial Development Organization

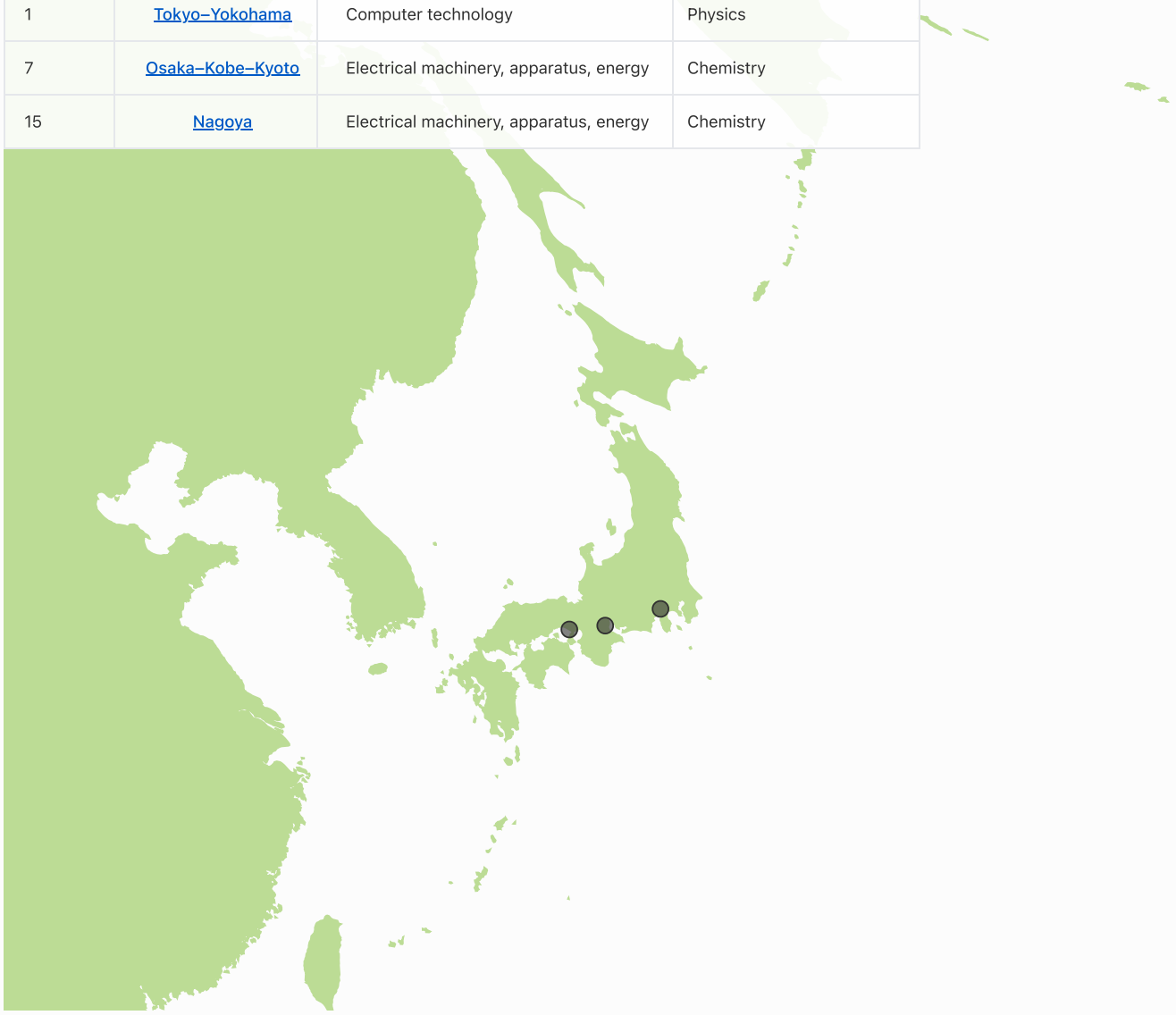


Top science and technology clusters in Japan

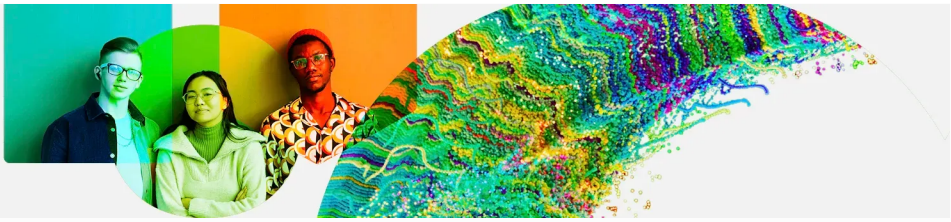
Japan has 3 clusters in the top 100 S&T clusters of the Global Innovation Index, 1 less than in 2023.

The table and map below give an overview of the top science and technology clusters in Japan.

Rank	Cluster name	Top patent field	Top academic subject
1	Tokyo–Yokohama	Computer technology	Physics
7	Osaka–Kobe–Kyoto	Electrical machinery, apparatus, energy	Chemistry
15	Nagoya	Electrical machinery, apparatus, energy	Chemistry

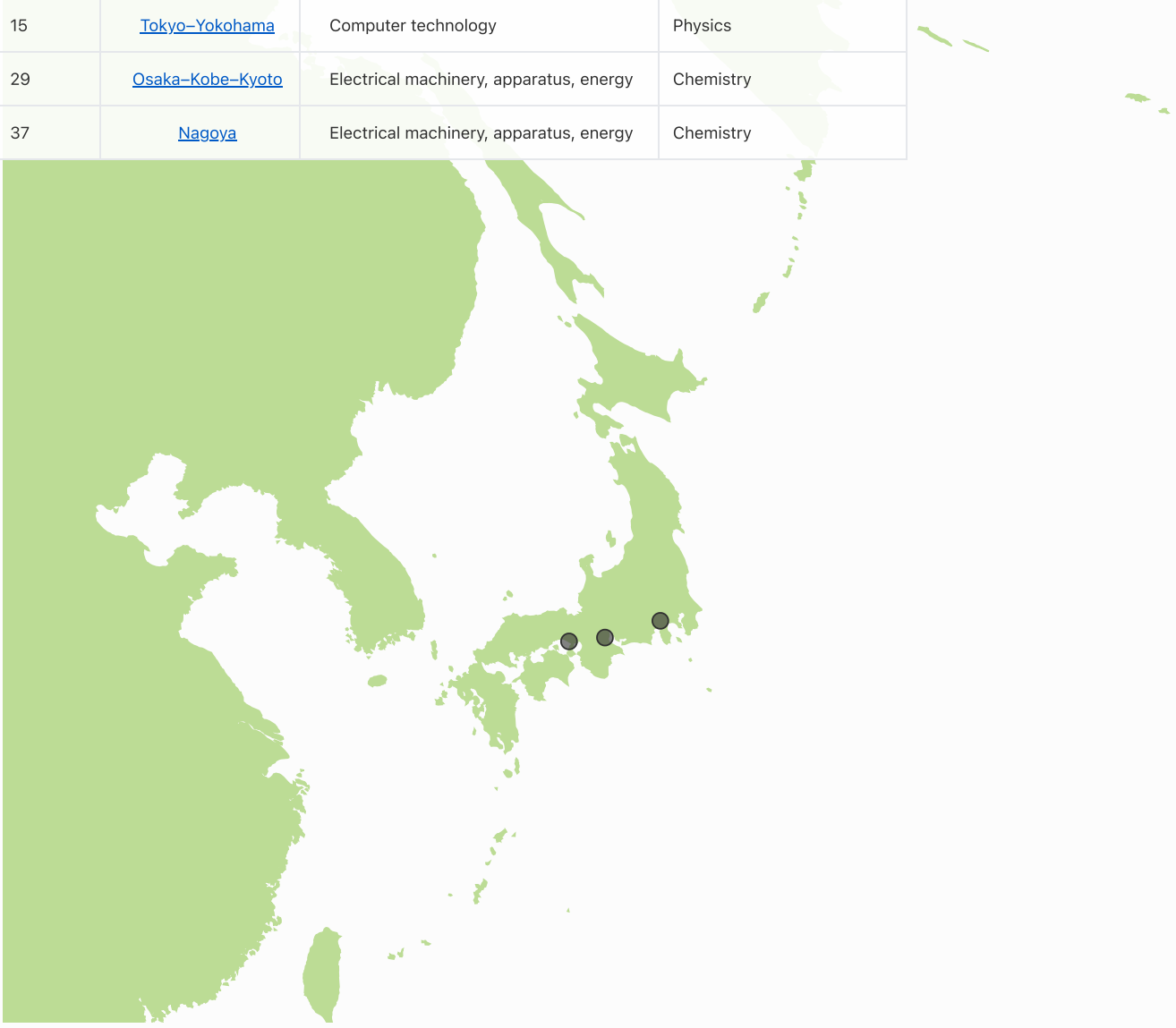


Global Innovation Index 2024



The table and map below give an overview of the top science and technology clusters by intensity in Japan.

Rank	Cluster name	Top patent field	Top academic subject
15	Tokyo–Yokohama	Computer technology	Physics
29	Osaka–Kobe–Kyoto	Electrical machinery, apparatus, energy	Chemistry
37	Nagoya	Electrical machinery, apparatus, energy	Chemistry



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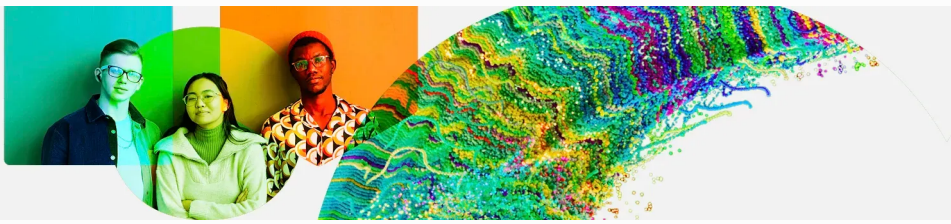

About the Global Innovation Index

- 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, 2024.

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.