GLOBAL INNOVATION INDEX 2019

JAPAN

15th Japan ranks 15th among the 129 economies featured in the GII 2019.

The Global Innovation Index (GII) is a ranking of world economies based on 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 Japan over the past three years, noting that data availability and the GII model influence year-on-year comparisons of the GII ranks. The confidence interval for Japan's ranking in the GII 2019 is between 12 and 16.

Japan's Rankings, 2017 - 2019

	GII	Innovation Inputs	Innovation Outputs
2019	15	14	17
2018	13	12	18
2017	14	11	20

- Japan performs better in Innovation Inputs than Outputs.
- This year Japan ranks 14th in Innovation Inputs, worse than last year and compared to 2017.
- As for Innovation Outputs, Japan ranks 17th. This position is better than last year and compared to 2017.

14th Japan ranks 14th among the 50 high-income economies.

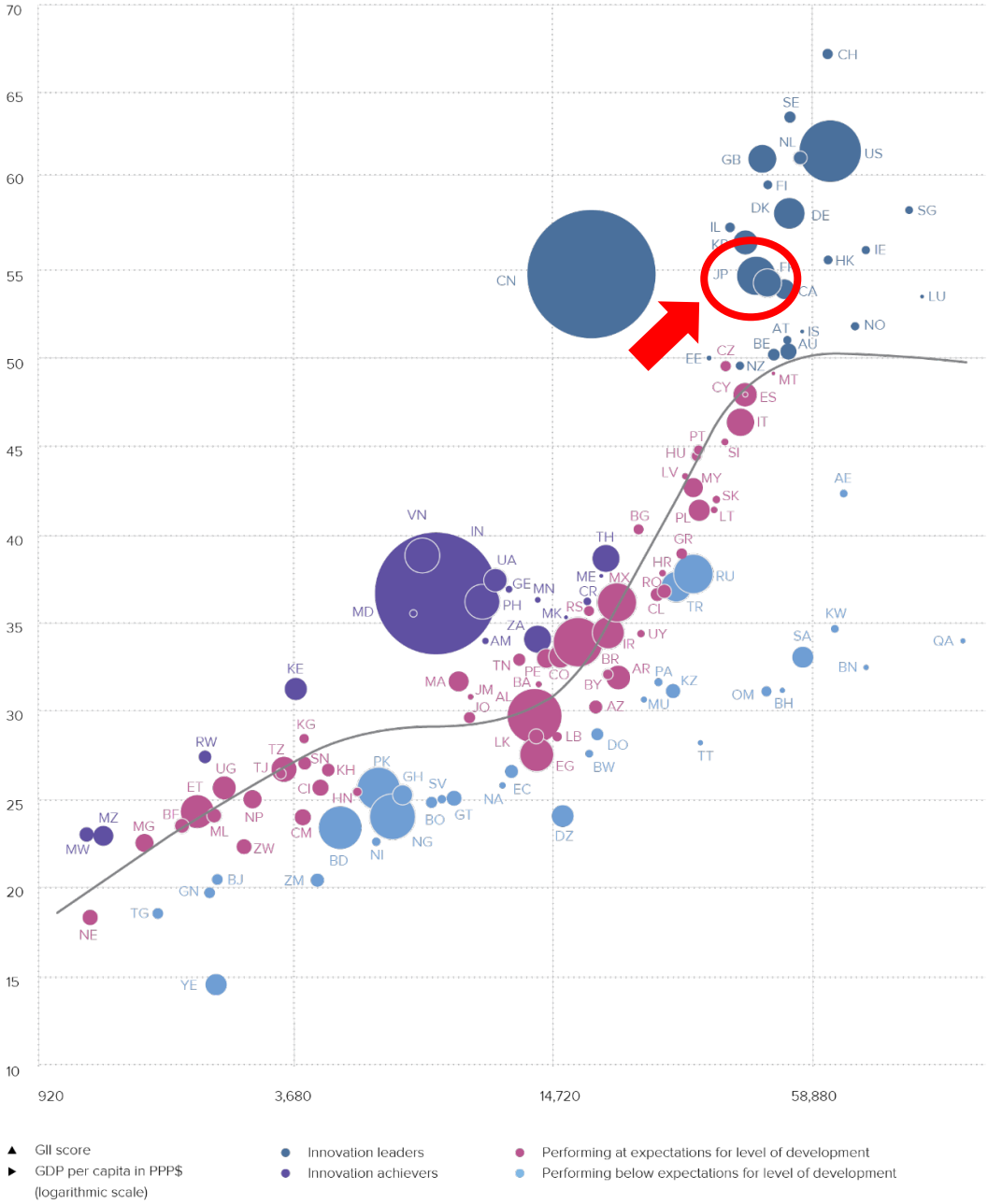
5th Japan ranks 5th among the 15 economies in South East Asia, East Asia, and Oceania.

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 considered Innovation under-performers relative to GDP.

Relative to GDP, Japan performs above its expected level of development.

GII scores and GDP per capita in PPP US$
(bubbles sized by population)

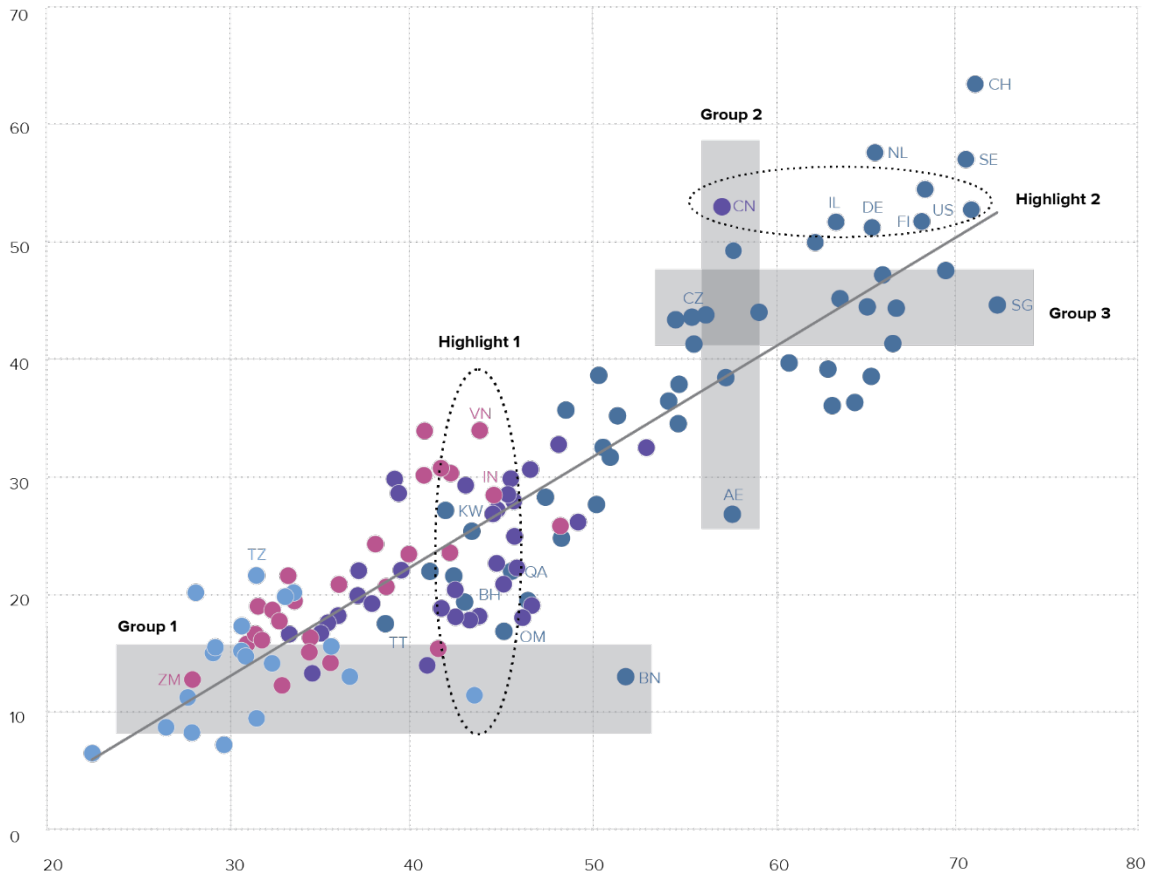


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs, indicating which economies best translate innovation inputs into innovation outputs. Economies appearing above the line are effectively translating their costly innovation investments into more and higher-quality outputs. In contrast, those below the line are not effectively translating innovation inputs into outputs.

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

Innovation input/output performance by income group, 2019



▲ Output score
▶ Input score

● High income
● Upper-middle income

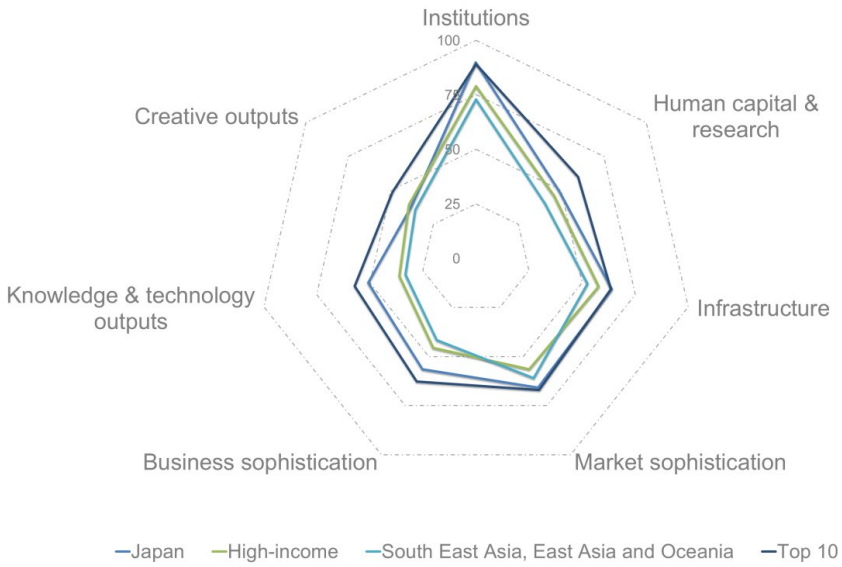
● Lower-middle income
● Low income

— Fitted values

AE	United Arab Emirates	CZ	Czech Republic	NL	Netherlands	TZ	United Republic of Tanzania
BH	Bahrain	DE	Germany	OM	Oman	US	United States of America
BN	Brunei Darussalam	FI	Finland	QA	Qatar	VN	Viet Nam
CH	Switzerland	IL	Israel	SE	Sweden	ZM	Zambia
CN	China	IN	India	SG	Singapore		
		KW	Kuwait	TT	Trinidad and Tobago		

BENCHMARKING JAPAN TO OTHER HIGH-INCOME ECONOMIES AND THE SOUTH EAST ASIA, EAST ASIA, AND OCEANIA REGION

Japan's scores in the seven GII pillars



High-income economies

Japan has high scores in 6 out of the 7 GII pillars: Institutions, Human capital & research, Infrastructure, Market sophistication, Business sophistication and Knowledge & technology outputs, which are above the average of the high-income group.

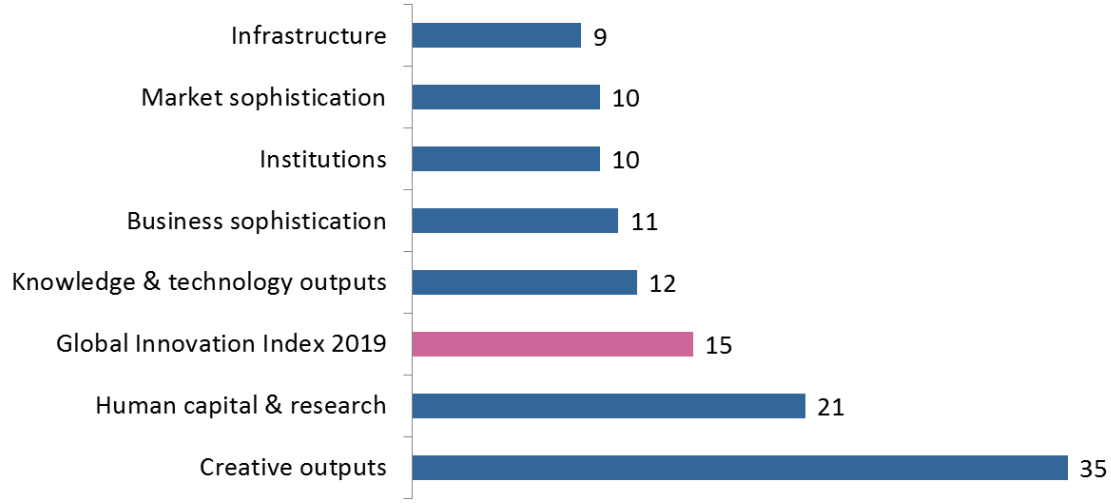
South East Asia, East Asia, and Oceania Region

Compared to other economies in the South East Asia, East Asia, and Oceania region, Japan performs above average in all of the 7 GII pillars.

Top ranks are found in areas such as Business environment, Research and development (R&D), Information & communication technologies, Trade, competition, & market scale, Knowledge absorption, and Knowledge diffusion, where the country ranks in the top 10 worldwide.

OVERVIEW OF JAPAN'S RANKINGS IN THE 7 GII AREAS

Japan performs the best in Infrastructure and its weakest performance is in Creative outputs.



*The highest possible ranking in each pillar is 1.

JAPAN'S INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of Japan's strengths and weaknesses in the GII 2019.

Strengths

Code	Indicator name	Rank
1.2.3	Cost of redundancy dismissal, salary weeks	1
1.3	Business environment	5
1.3.2	Ease of resolving insolvency*	1
2.1.4	PISA scales in reading, maths & science	3
2.3	Research & development (R&D)	5
2.3.3	Global R&D companies, top 3, in mn US$	5
4.1.2	Domestic credit to private sector, % GDP	5
4.3	Trade, competition, & market scale	3
4.3.2	Intensity of local competition†	1
4.3.3	Domestic market scale, bn PPP$	4
5.1.3	GERD performed by business, % GDP	3
5.1.4	GERD financed by business, %	1
5.3.5	Research talent, % in business enterprise	3
6.1.1	Patents by origin/bn PPP$ GDP	1
6.1.2	PCT patents by origin/bn PPP$ GDP	1
6.3.1	Intellectual property receipts, % total trade	1

Weaknesses

Code	Indicator name	Rank
1.3.1	Ease of starting a business*	74
2.1.1	Expenditure on education, % GDP	95
4.1.1	Ease of getting credit*	77
4.2.1	Ease of protecting minority investors*	61
4.2.3	Venture capital deals/bn PPP$ GDP	51
5.2.3	GERD financed by abroad, %	94
5.3.4	FDI net inflows, % GDP, 3-year average	121
6.2.1	Growth rate of PPP$ GDP/worker, %, 3-year average	89
6.2.2	New businesses/th pop. 15–64	95
6.3.3	ICT services exports, % total trade	98

STRENGTHS

- GII strengths for Japan are found in five of the seven GII pillars, and mostly on the innovation input side of the GII.
- In Institutions (10), Japan's strengths are sub-pillar Business environment (5) and indicators Cost of redundancy dismissal and Ease of resolving insolvency, where it ranks 1st worldwide.
- In Human capital & research (21), GII strengths are sub-pillar Research & development (R&D) (5) and indicators PISA results (3) and Global R&D companies (5).
- In Market sophistication (10), sub-pillar Trade, competition, & market scale (3) and two of its three indicators - Intensity of local competition (1) and Domestic market scale (4) - are relative strengths for the country. In this pillar, Japan's GII strength is also indicator Domestic credit to private sector (5).
- In Business sophistication (11), indicators R&D performed by business (3), R&D financed by business (1), and Research talent (3) are relative strengths for this country.
- On the innovation output side of the GII, only three relative weaknesses are found in Knowledge & technology outputs (12). Here Japan has strengths and is world leader in indicators Patents by origin, PCT patents by origin, and Intellectual property receipts.

WEAKNESSES

- Japan's weaknesses in the GII are found in five of the seven GII pillars.
- Several of these weaknesses are in Market sophistication (10), where indicators Ease of getting credit (77), Ease of protecting minority investors (61), and Venture capital deals (51) are relative weaknesses for Japan.
- Other three relative weaknesses are in pillar Knowledge & technology outputs (12) where the country has GII weaknesses in three indicators: Labor productivity growth (89), New businesses (95), and ICT services exports (98).
- In Business sophistication (11), Japan's weaknesses are indicators R&D financed by abroad (94) and FDI inflows (121).
- The last two weaknesses are indicators Ease of starting a business (74) in Institutions (10) and Expenditure on education (95) in Human capital & research (21).

JAPAN

GII 2019 rank

15

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2018 rank
17	**14**	**High**	**SEAO**	**127.2**	**5,632.5**	**44,227.2**	**13**

		Score/Value	Rank	
INSTITUTIONS		**89.9**	**10**	
1.1	**Political environment**	**88.2**	**12**	
1.1.1	Political and operational stability*	93.0	7	
1.1.2	Government effectiveness*	85.7	13	
1.2	**Regulatory environment**	**91.7**	**15**	
1.2.1	Regulatory quality*	78.8	20	
1.2.2	Rule of law*	87.8	18	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**89.8**	**5**	●
1.3.1	Ease of starting a business*	86.1	74	○ ◇
1.3.2	Ease of resolving insolvency*	93.5	1	● ◆
HUMAN CAPITAL & RESEARCH		**49.1**	**21**	
2.1	**Education**	**57.3**	**37**	
2.1.1	Expenditure on education, % GDP	3.5	95	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.2	47	◇
2.1.4	PISA scales in reading, maths, & science	528.9	3	● ◆
2.1.5	Pupil-teacher ratio, secondary 🕘	11.2	40	
2.2	**Tertiary education**	**13.6**	**[103]**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	3.7	57	◇
2.3	**Research & development (R&D)**	**76.3**	**5**	●
2.3.1	Researchers, FTE/mn pop	5,304.9	10	
2.3.2	Gross expenditure on R&D, % GDP	3.2	5	
2.3.3	Global R&D companies, avg. exp. top 3, mn US$	92.0	5	●
2.3.4	QS university ranking, average score top 3*	79.2	8	
INFRASTRUCTURE		**64.0**	**9**	
3.1	**Information & communication technologies(ICTs)**	**90.3**	**7**	
3.1.1	ICT access*	86.3	11	
3.1.2	ICT use*	81.3	12	
3.1.3	Government's online service*	95.1	9	
3.1.4	E-participation*	98.3	5	
3.2	**General infrastructure**	**50.7**	**15**	
3.2.1	Electricity output, kWh/mn pop	8,500.2	19	
3.2.2	Logistics performance*	91.8	5	
3.2.3	Gross capital formation, % GDP	24.5	48	
3.3	**Ecological sustainability**	**50.9**	**27**	
3.3.1	GDP/unit of energy use	11.2	39	
3.3.2	Environmental performance*	74.7	20	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.4	26	
MARKET SOPHISTICATION		**65.8**	**10**	
4.1	**Credit**	**68.5**	**12**	
4.1.1	Ease of getting credit*	55.0	77	○
4.1.2	Domestic credit to private sector, % GDP	168.2	5	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**42.9**	**63**	◇
4.2.1	Ease of protecting minority investors*	60.0	61	○
4.2.2	Market capitalization, % GDP	113.1	8	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	51	○ ◇
4.3	**Trade, competition, & market scale**	**85.9**	**3**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.5	59	
4.3.2	Intensity of local competition†	87.2	1	● ◆
4.3.3	Domestic market scale, bn PPP$	5,632.5	4	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**56.5**	**11**	
5.1	**Knowledge workers**	**63.1**	**21**	
5.1.1	Knowledge-intensive employment, %	25.2	56	◇
5.1.2	Firms offering formal training, % firms	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.5	3	● ◆
5.1.4	GERD financed by business, %	78.3	1	● ◆
5.1.5	Females employed w/advanced degrees, % 🕘	21.0	22	
5.2	**Innovation linkages**	**50.2**	**12**	
5.2.1	University/industry research collaboration†	64.5	18	
5.2.2	State of cluster development†	72.3	7	
5.2.3	GERD financed by abroad, %	0.6	94	○ ◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	36	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	13.2	4	◆
5.3	**Knowledge absorption**	**56.2**	**10**	
5.3.1	Intellectual property payments, % total trade	2.4	9	
5.3.2	High-tech imports, % total trade	13.8	14	
5.3.3	ICT services imports, % total trade	1.7	34	
5.3.4	FDI net inflows, % GDP	0.4	121	○
5.3.5	Research talent, % in business enterprise	73.7	3	● ◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**50.8**	**12**	
6.1	**Knowledge creation**	**56.1**	**11**	
6.1.1	Patents by origin/bn PPP$ GDP	47.8	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	8.8	1	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.8	28	
6.1.4	Scientific & technical articles/bn PPP$ GDP	9.2	53	◇
6.1.5	Citable documents H-index	71.0	6	
6.2	**Knowledge impact**	**39.7**	**50**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	0.0	89	○
6.2.2	New businesses/th pop. 15-64 🕘	0.2	95	○ ◇
6.2.3	Computer software spending, % GDP	0.3	47	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	8.9	35	
6.2.5	High- & medium-high-tech manufactures, % 🕘	0.5	9	
6.3	**Knowledge diffusion**	**56.4**	**9**	
6.3.1	Intellectual property receipts, % total trade	4.8	1	● ◆
6.3.2	High-tech net exports, % total trade	12.1	12	
6.3.3	ICT services exports, % total trade	0.6	98	○
6.3.4	FDI net outflows, % GDP	3.4	20	
CREATIVE OUTPUTS		**37.9**	**35**	◇
7.1	**Intangible assets**	**54.5**	**22**	
7.1.1	Trademarks by origin/bn PPP$ GDP	91.1	21	
7.1.2	Industrial designs by origin/bn PPP$ GDP	4.5	29	
7.1.3	ICTs & business model creation†	73.2	25	
7.1.4	ICTs & organizational model creation†	67.8	22	◇
7.2	**Creative goods & services**	**30.9**	**26**	
7.2.1	Cultural & creative services exports, % total trade	0.4	55	
7.2.2	National feature films/mn pop. 15-69	7.0	30	
7.2.3	Entertainment & Media market/th pop. 15-69	67.1	6	
7.2.4	Printing & other media, % manufacturing 🕘	1.7	26	
7.2.5	Creative goods exports, % total trade	2.0	27	
7.3	**Online creativity**	**11.6**	**49**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	15.4	31	◇
7.3.2	Country-code TLDs/th pop. 15-69	5.1	48	◇
7.3.3	Wikipedia edits/mn pop. 15-69	18.6	50	◇
7.3.4	Mobile app creation/bn PPP$ GDP	13.2	35	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

DATA AVAILABILITY

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

Missing data

Code	Indicator name	Country year	Model year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2015	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	n/a	2017	UNESCO Institute for Statistics
2.2.2	Graduates in science & engineering, %	n/a	2016	UNESCO Institute for Statistics
4.1.3	Microfinance gross loans, % GDP	n/a	2017	Microfinance Information Exchange
5.1.2	Firms offering formal training, % firms	n/a	2013	World Bank

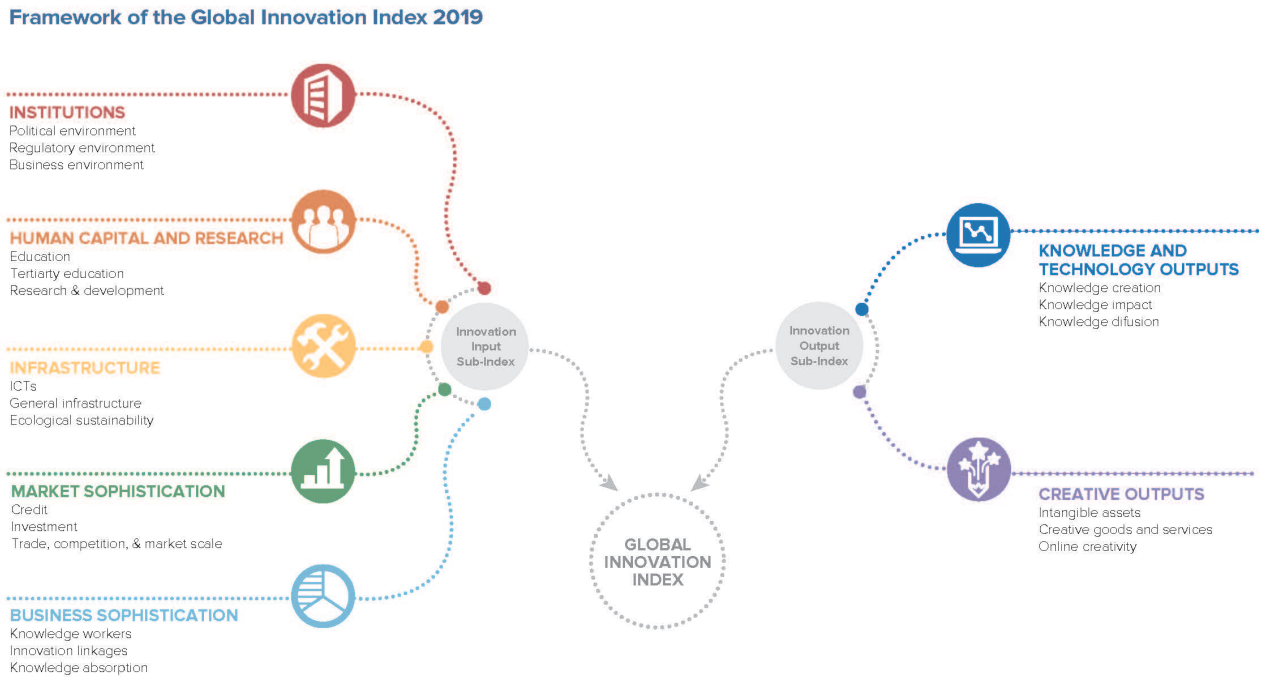
Outdated data

Code	Indicator name	Country year	Model year	Source
2.1.5	Pupil-teacher ratio, secondary	2016	2017	UNESCO Institute for Statistics
5.1.5	Females employed w/advanced degrees, %	2016	2017	International Labour Organization
6.2.2	New businesses/th pop. 15–64	2014	2016	World Bank
6.2.5	High- & medium-high-tech manufactures, %	2015	2016	United Nations Industrial Development Organization
7.2.4	Printing & other media, % manufacturing	2015	2016	United Nations Industrial Development Organization

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations. In 2019, the GII presents its 12th edition devoted to the theme **Creating Healthy Lives—The Future of Medical Innovation**.

Recognizing that innovation is a key driver of economic development, the GII aims to provide a rich innovation ranking and 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 countries 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 includes 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 containing three sub-pillars.