GLOBAL INNOVATION INDEX 2020

JAPAN

16th Japan ranks 16th among the 131 economies featured in the GII 2020.

The Global Innovation Index (GII) ranks world economies according to their innovation capabilities. Consisting of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation.

The following table shows the rankings of Japan over the past three years, noting that data availability and changes to the GII model framework influence year-on-year comparisons of the GII rankings. The statistical confidence interval for the ranking of Japan in the GII 2020 is between ranks 13 and 16.

Rankings of Japan (2018–2020)

	GII	Innovation inputs	Innovation outputs
2020	16	12	18
2019	15	14	17
2018	13	12	18

- Japan performs better in innovation inputs than innovation outputs in 2020.
- This year Japan ranks 12th in innovation inputs, higher than last year and the same compared to 2018.
- As for innovation outputs, Japan ranks 18th. This position is lower than last year and the same compared to 2018.

15th Japan ranks 15th among the 49 high-income group economies.

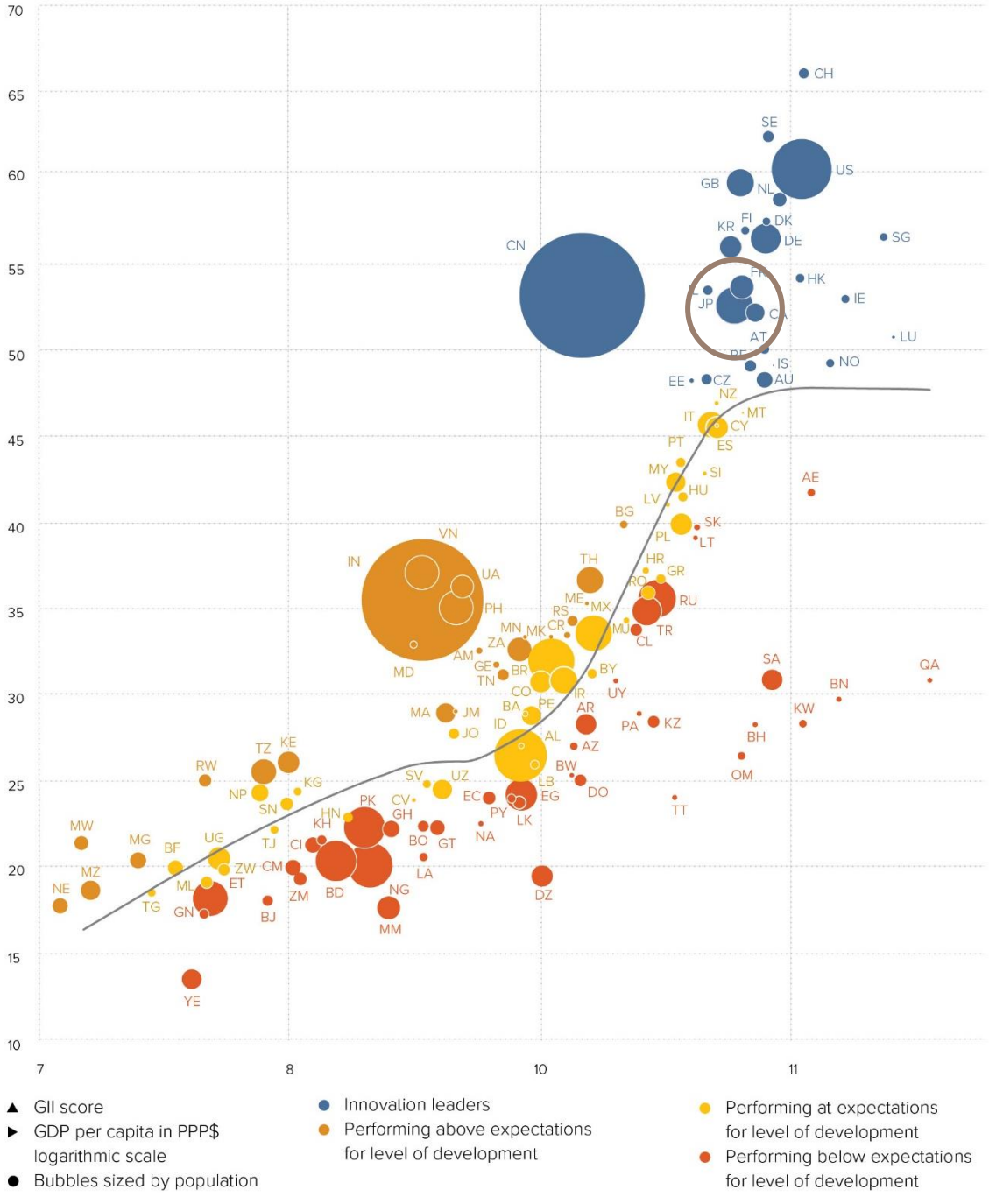
5th Japan ranks 5th among the 17 economies in South East Asia, East Asia, and Oceania.

EXPECTED VS. OBSERVED INNOVATION PERFORMANCE

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

Relative to GDP, Japan's performance is above expectations for its level of development.

The positive relationship between innovation and development

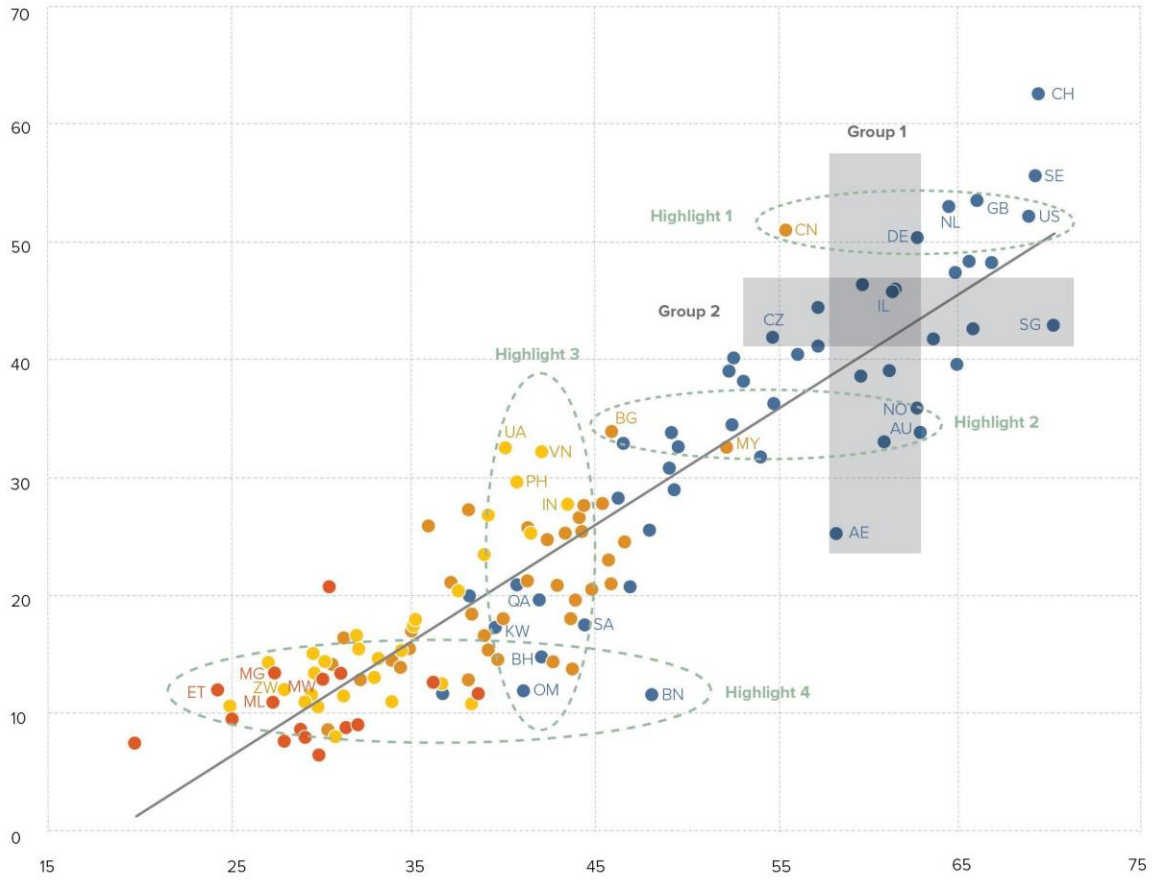


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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

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

Innovation input to output performance, 2020



▲ Output score
► Input score

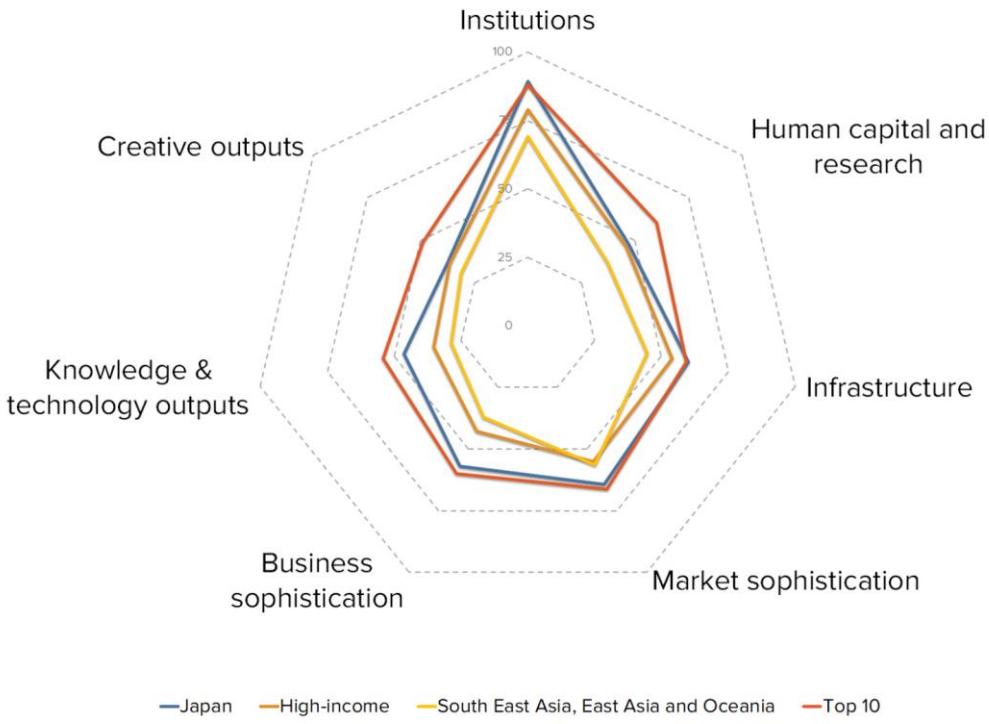
● High income group
● Upper middle-income group
● Lower middle-income group
● Low income group

— Fitted values

AU	Australia	IN	India	NL	Netherlands	CH	Switzerland
BH	Bahrain	IL	Israel	NO	Norway	UA	Ukraine
BN	Brunei Darussalam	KW	Kuwait	OM	Oman	AE	United Arab Emirates
BG	Bulgaria	MG	Madagascar	PH	Philippines	GB	United Kingdom
CN	China	MW	Malawi	QA	Qatar	US	United States of America
CZ	Czech Republic	ML	Mali	SA	Saudi Arabia	VN	Viet Nam
ET	Ethiopia	MY	Malaysia	SG	Singapore	ZW	Zimbabwe
DE	Germany			SE	Sweden		

BENCHMARKING JAPAN AGAINST OTHER HIGH-INCOME GROUP ECONOMIES AND SOUTH EAST ASIA, EAST ASIA, AND OCEANIA

Japan's scores in the seven GII pillars



High-income group economies

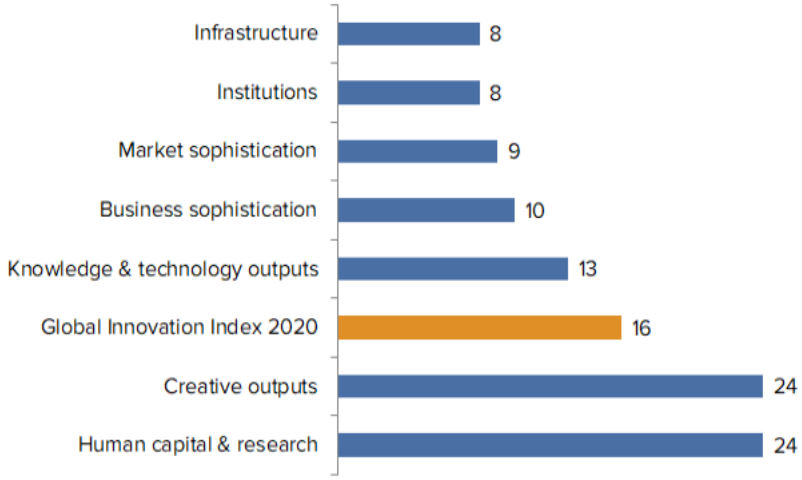
Japan has high scores in all GII pillars, which are above average for the high-income group.

South East Asia, East Asia, and Oceania

Japan performs above the regional average in all GII pillars.

OVERVIEW OF JAPAN RANKINGS IN THE SEVEN GII AREAS

Japan performs best in Infrastructure and Institutions and its weakest performance is in Human capital & research, and Creative outputs.



*The highest possible ranking in each pillar is 1.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Japan in the GII 2020.

Strengths

Code	Indicator name	Rank
1.2.3	Cost of redundancy dismissal, salary weeks	1
1.3.2	Ease of resolving insolvency*	3
2.3	Research & development (R&D)	5
2.3.2	Gross expenditure on R&D, % GDP	5
3.2.2	Logistics performance*	5
4.1.2	Domestic credit to private sector, % GDP	4
4.3	Trade, competition, and market scale	2
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, %	2
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1
5.3	Knowledge absorption	4
5.3.5	Research talent, % in business enterprise	4
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*	82
2.1.1	Expenditure on education, % GDP	93
4.1.1	Ease of getting credit*	88
5.1.1	Knowledge-intensive employment, %	60
5.2.3	GERD financed by abroad, % GDP	66
5.3.4	FDI net inflows, % GDP	121
6.2.1	Growth rate of PPP$ GDP/worker, %	95
6.2.2	New businesses/th pop. 15–64	103
6.3.3	ICT services exports, % total trade	99
7.2.1	Cultural & creative services exports, % total trade	60

STRENGTHS

GII strengths for Japan are found in six of the seven GII pillars.

- Institutions (8): exhibits strengths in the indicators Cost of redundancy dismissal (1) and Ease of resolving insolvency (3).
- Human capital & research (24): shows strengths in the sub-pillar Research & development (5) and in the indicator Gross expenditure on R&D (5).
- Infrastructure (8): demonstrates strengths in the indicator Logistics performance (5).
- Market sophistication (9): displays strengths in the sub-pillar Trade, competition, and market scale (2) and in the indicators Domestic credit to private sector (4), Intensity of local competition (1) and Domestic market scale (4).
- Business sophistication (10): shows strengths in the sub-pillar Knowledge absorption (4) and in the indicators GERD performed by business (3), GERD financed by business (2), Patent families 2+ offices (1) and Research talent (4).
- Knowledge & technology outputs (13): reveals strengths in the indicators Patents by origin (1), PCT patents by origin (1) and Intellectual property receipts (1).

WEAKNESSES

GII weaknesses for Japan are found in six of the seven GII pillars.

- Institutions (8): exhibits weaknesses in the indicator Ease of starting a business (82).
- Human capital & research (24): the indicator Expenditure on education (93) is a weakness.
- Market sophistication (9): shows weaknesses in the indicator Ease of getting credit (88).
- Business sophistication (10): displays weaknesses in the indicator Knowledge-intensive employment (60), GERD financed by abroad (66) and FDI net inflows (121).
- Knowledge & technology outputs (13): reveals weaknesses in the indicators Growth rate of PPP$ GDP/worker (95), New businesses (103) and ICT services exports (99).
- Creative outputs (24): shows weaknesses in the indicator Cultural & creative services exports (60).

JAPAN

GII 2020 rank

16

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
18	12	High	SEAO	126.9	5,747.5	39,763.1	15

		Score/Value	Rank	
INSTITUTIONS		**89.3**	**8**	
1.1	**Political environment**	**88.7**	**11**	
1.1.1	Political and operational stability*	91.1	5	
1.1.2	Government effectiveness*	87.6	11	
1.2	**Regulatory environment**	**90.9**	**12**	
1.2.1	Regulatory quality*	76.9	22	
1.2.2	Rule of law*	86.7	17	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**88.2**	**9**	
1.3.1	Ease of starting a business*	86.1	82	○ ◇
1.3.2	Ease of resolving insolvency*	90.2	3	● ◆
HUMAN CAPITAL & RESEARCH		**47.3**	**[24]**	
2.1	**Education**	**48.6**	**[57]**	
2.1.1	Expenditure on education, % GDP ⊙	3.2	93	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths, & science	520.0	5	
2.1.5	Pupil-teacher ratio, secondary ⊙	11.1	45	
2.2	**Tertiary education**	**18.4**	**[99]**	
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, %	4.3	54	
2.3	**Research & development (R&D)**	**74.9**	**5**	●
2.3.1	Researchers, FTE/mn pop	5,331.2	13	
2.3.2	Gross expenditure on R&D, % GDP	3.3	5	●
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	91.1	6	
2.3.4	QS university ranking, average score top 3*	78.6	8	
INFRASTRUCTURE		**60.0**	**8**	
3.1	**Information & communication technologies (ICTs)**	**90.2**	**10**	
3.1.1	ICT access*	85.6	11	
3.1.2	ICT use*	81.9	15	
3.1.3	Government's online service*	95.1	9	
3.1.4	E-participation*	98.3	5	
3.2	**General infrastructure**	**42.3**	**18**	
3.2.1	Electricity output, kWh/mn pop	8,054.7	21	
3.2.2	Logistics performance*	91.8	5	●
3.2.3	Gross capital formation, % GDP	24.6	55	
3.3	**Ecological sustainability**	**47.5**	**23**	
3.3.1	GDP/unit of energy use	11.4	40	
3.3.2	Environmental performance*	75.1	12	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.1	25	
MARKET SOPHISTICATION		**64.3**	**9**	
4.1	**Credit**	**65.7**	**12**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	168.8	4	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**41.5**	**56**	
4.2.1	Ease of protecting minority investors*	64.0	56	
4.2.2	Market capitalization, % GDP	111.7	8	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	35	◇
4.3	**Trade, competition, and market scale**	**85.6**	**2**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.5	61	
4.3.2	Intensity of local competition+	87.2	1	● ◆
4.3.3	Domestic market scale, bn PPP$	5,747.5	4	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**57.1**	**10**	
5.1	**Knowledge workers**	**65.1**	**10**	
5.1.1	Knowledge-intensive employment, %	24.8	60	○ ◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.6	3	●
5.1.4	GERD financed by business, %	79.1	2	● ◆
5.1.5	Females employed w/advanced degrees, %	21.8	24	
5.2	**Innovation linkages**	**47.7**	**17**	
5.2.1	University/industry research collaboration+	62.4	20	
5.2.2	State of cluster development+	67.7	11	
5.2.3	GERD financed by abroad, % GDP	0.0	66	○ ◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	43	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	13.2	1	● ◆
5.3	**Knowledge absorption**	**58.6**	**4**	●
5.3.1	Intellectual property payments, % total trade	2.5	9	
5.3.2	High-tech imports, % total trade	13.6	16	
5.3.3	ICT services imports, % total trade	1.7	36	
5.3.4	FDI net inflows, % GDP	0.6	121	○
5.3.5	Research talent, % in business enterprise	74.4	4	● ◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**46.4**	**13**	
6.1	**Knowledge creation**	**57.2**	**11**	
6.1.1	Patents by origin/bn PPP$ GDP	45.3	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	9.2	1	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	31	
6.1.4	Scientific & technical articles/bn PPP$ GDP	9.7	53	◇
6.1.5	Citable documents H-index	69.9	6	
6.2	**Knowledge impact**	**32.1**	**35**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.1	95	○
6.2.2	New businesses/th pop. 15-64	0.4	103	○ ◇
6.2.3	Computer software spending, % GDP	0.0	46	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.4	35	
6.2.5	High- and medium-high-tech manufacturing, % ⊙	55.1	8	
6.3	**Knowledge diffusion**	**49.8**	**12**	
6.3.1	Intellectual property receipts, % total trade	4.9	1	● ◆
6.3.2	High-tech net exports, % total trade	12.0	13	
6.3.3	ICT services exports, % total trade	0.5	99	○ ◇
6.3.4	FDI net outflows, % GDP	3.5	17	
CREATIVE OUTPUTS		**37.2**	**24**	◇
7.1	**Intangible assets**	**47.3**	**17**	
7.1.1	Trademarks by origin/bn PPP$ GDP	78.3	24	
7.1.2	Global brand value, top 5,000, % GDP	146.2	10	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.2	28	
7.1.4	ICTs & organizational model creation+	67.8	22	
7.2	**Creative goods and services**	**30.0**	**27**	
7.2.1	Cultural & creative services exports, % total trade	0.3	60	○
7.2.2	National feature films/mn pop. 15-69	6.9	31	
7.2.3	Entertainment & Media market/th pop. 15-69	68.9	5	
7.2.4	Printing and other media, % manufacturing ⊙	1.7	24	
7.2.5	Creative goods exports, % total trade	1.9	30	
7.3	**Online creativity**	**24.2**	**48**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	14.9	31	◇
7.3.2	Country-code TLDs/th pop. 15-69	5.7	50	◇
7.3.3	Wikipedia edits/mn pop. 15-69	65.3	49	◇
7.3.4	Mobile app creation/bn PPP$ GDP	13.0	37	

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 either missing or outdated for Japan.

Missing data

Code	Indicator name	Country year	Model year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2016	UNESCO Institute for Statistics
2.1.3	School life expectancy, years	n/a	2017	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	2017	UNESCO Institute for Statistics
4.1.3	Microfinance gross loans, % GDP	n/a	2018	Microfinance Information Exchange
5.1.2	Firms offering formal training, %	n/a	2018	World Bank

Outdated data

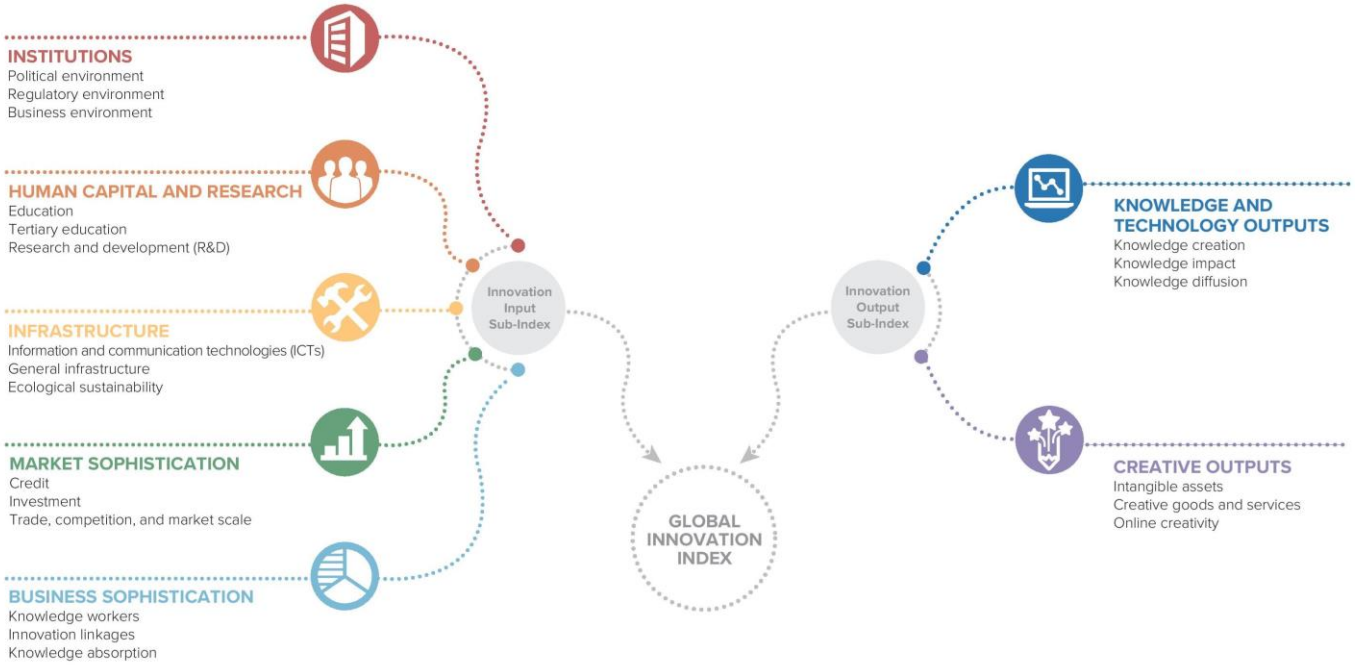
Code	Indicator name	Country year	Model year	Source
2.1.1	Expenditure on education, % GDP	2016	2018	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2017	2018	UNESCO Institute for Statistics
6.2.5	High- and medium-high-tech manufacturing, %	2016	2017	United Nations Industrial Development Organization
7.2.4	Printing and other media, % manufacturing	2016	2017	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 2020, the GII presents its 13th edition devoted to the theme *Who Will Finance Innovation?*

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.

Framework of the Global Innovation Index 2020



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.