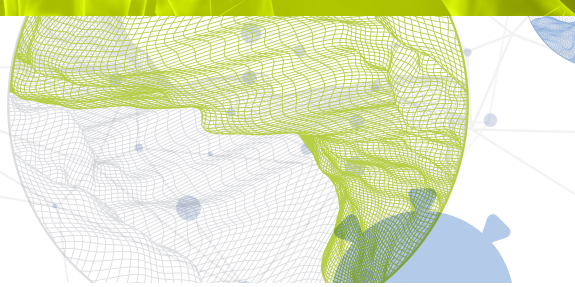
Global Innovation Index 2021



JAPAN

13th Japan ranks 13th among the 132 economies featured in the GII 2021.

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 2021 is between ranks 12 and 14.

Rankings for Japan (2019–2021)

	GII	Innovation inputs	Innovation outputs
2021	13	11	14
2020	16	12	18
2019	15	14	17

- Japan performs better in innovation inputs than innovation outputs in 2021.
- This year Japan ranks 11th in innovation inputs, higher than both 2020 and 2019.
- As for innovation outputs, Japan ranks 14th. This position is higher than both 2020 and 2019.

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

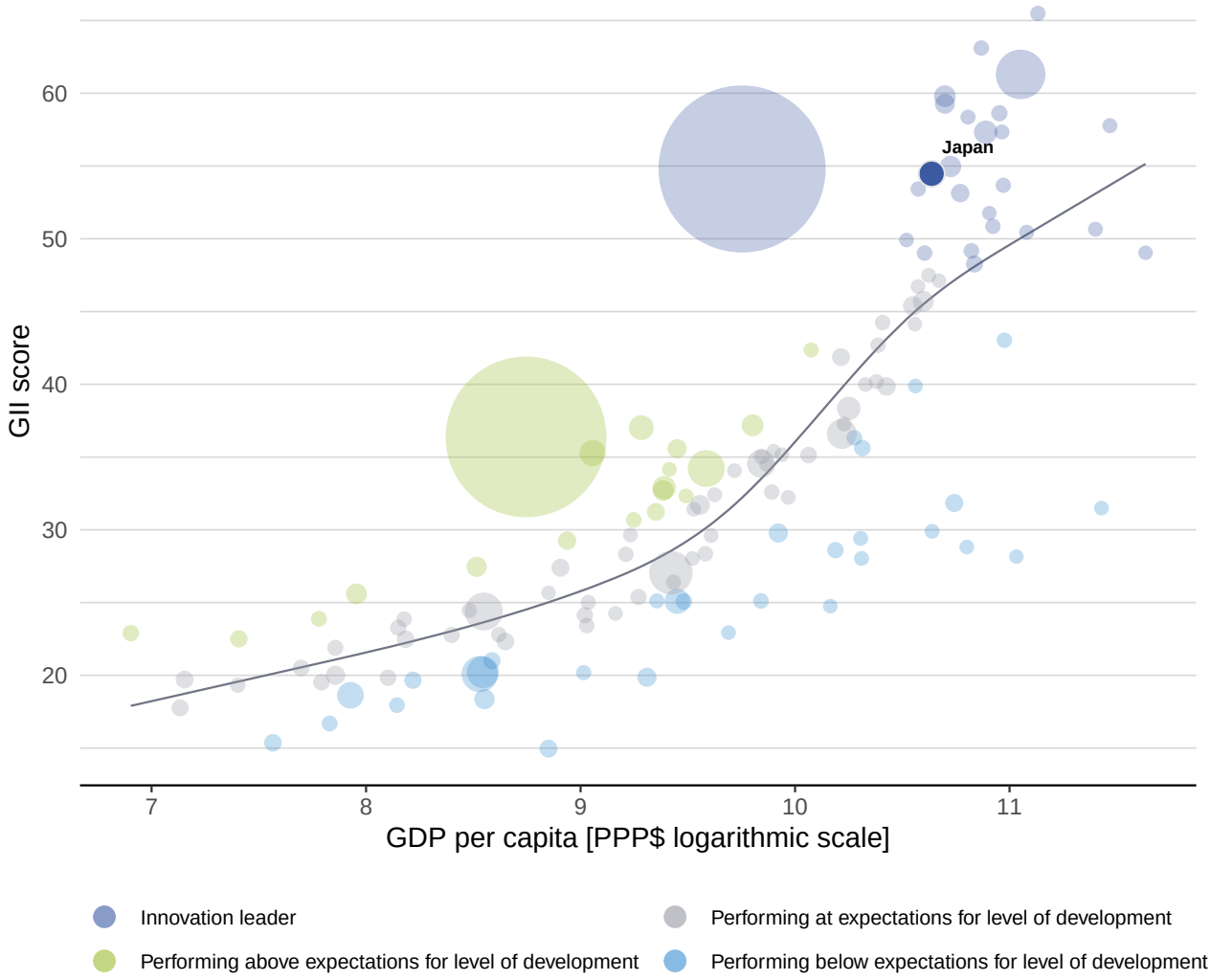
4th Japan ranks 4th among the 17 economies in South East Asia, East Asia, and Oceania.

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

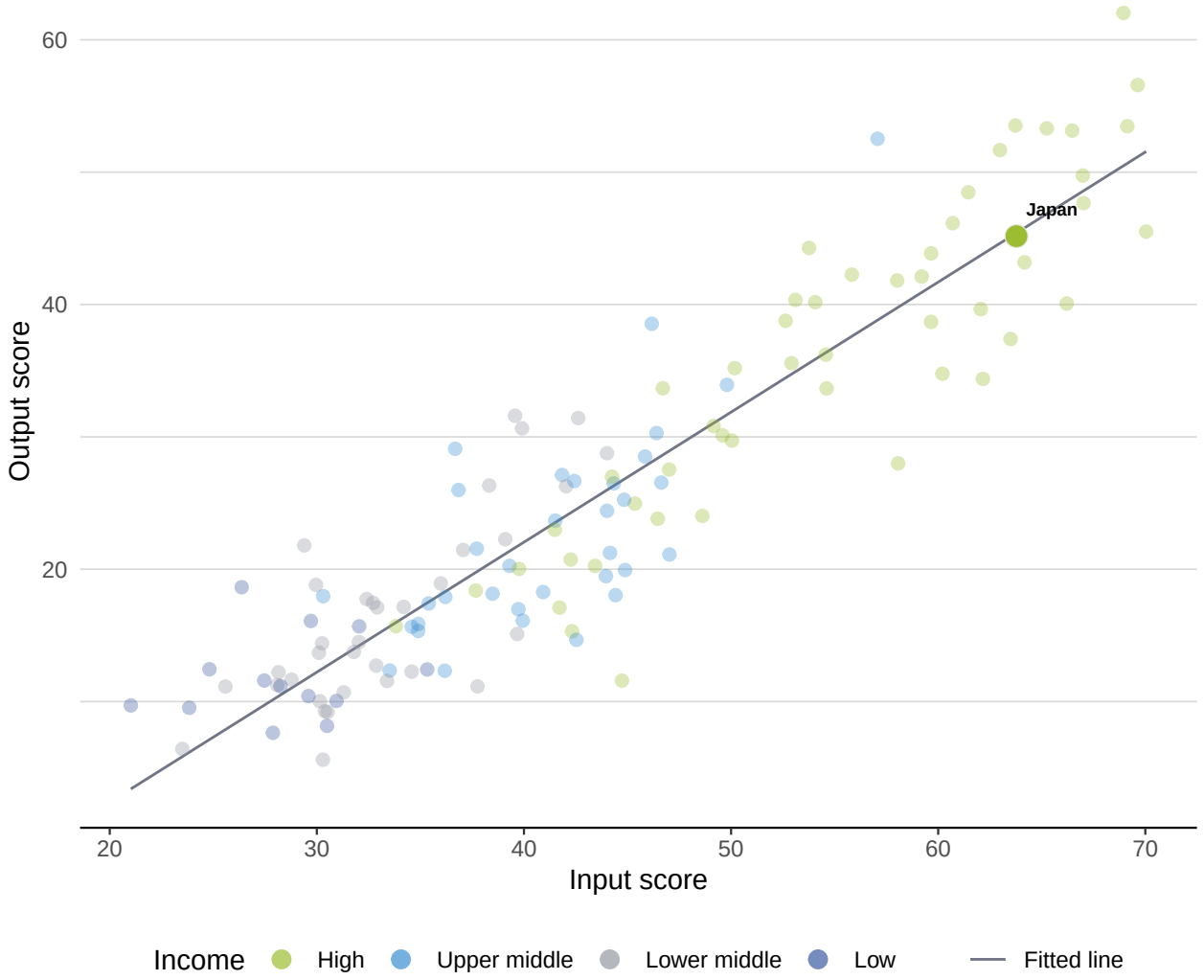


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

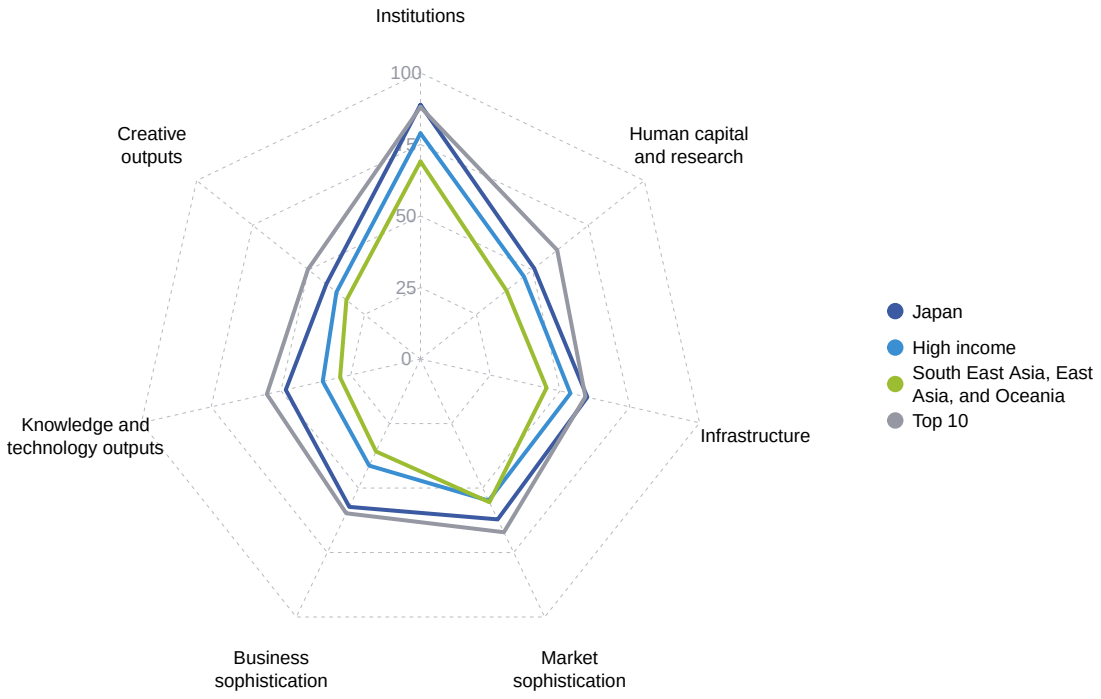
Japan produces less innovation outputs relative to its level of innovation investments.

Innovation input to output performance



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

The seven GII pillar scores for Japan



High-income group economies

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

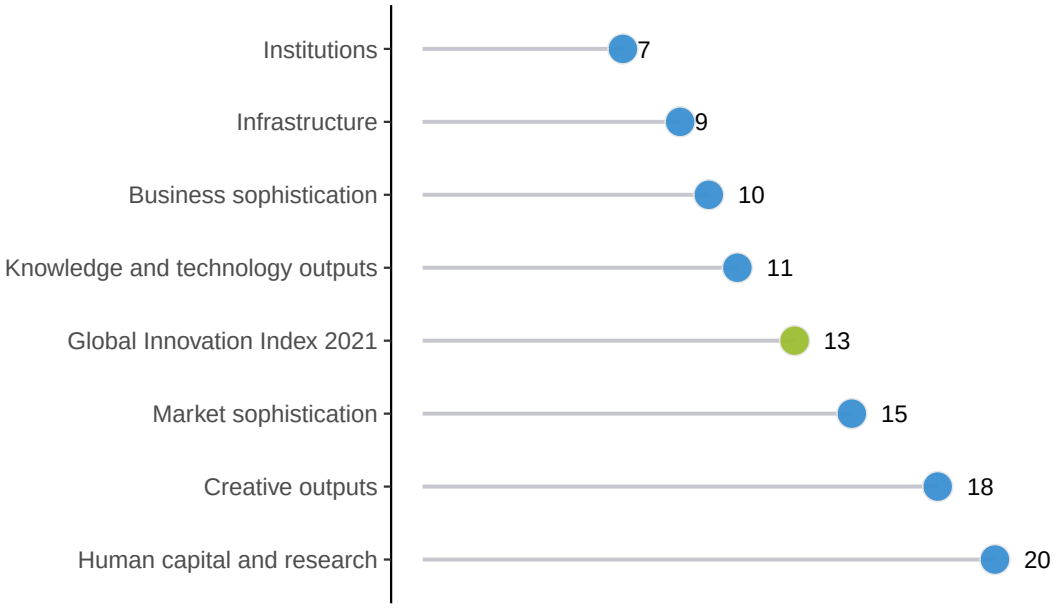
South East Asia, East Asia, and Oceania

Japan performs above the regional average in all GII pillars.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2021 AREAS

Japan performs best in Institutions and its weakest performance is in Human capital and research.

The seven GII pillar ranks for Japan



Note: The highest possible ranking in each pillar is one.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Japan in the GII 2021.

Strengths and weaknesses for Japan

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
1.2.3	Cost of redudancy dismissal	1	1.3.1	Ease of starting a business	82
1.3.2	Ease of resolving insolvency	3	2.1.1	Expenditure on education, % GDP	91
2.3	Research and development (R&D)	4	2.2	Tertiary education	87
2.3.2	Gross expenditure on R&D, % GDP	4	2.2.2	Graduates in science and engineering, %	74
2.3.3	Global corporate R&D investors, top 3, mn US$	5	4.1.1	Ease of getting credit	88
3.1.4	E-participation	4	4.3.1	Applied tariff rate, weighted avg., %	70
4.1.2	Domestic credit to private sector, % GDP	3	5.2.3	GERD financed by abroad, % GDP	68
4.3	Trade, diversification, and market scale	5	5.3.4	FDI net inflows, % GDP	118
4.3.3	Domestic market scale, bn PPP$	4	6.2.1	Labor productivity growth, %	102
5.1.3	GERD performed by business, % GDP	3	6.2.2	New businesses/th pop. 15–64	103
5.1.4	GERD financed by business, %	2	6.3.4	ICT services exports, % total trade	89
5.2.5	Patent families/bn PPP$ GDP	1			
5.3	Knowledge absorption	3			
5.3.5	Research talent, % in businesses	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			
6.3.2	Production and export complexity	1			

Japan

GII 2021 rank

13

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
14	**11**	**High**	**SEAO**	**126.5**	**5,236.1**	**41,637**	**16**

		Score/ Value	Rank
Institutions		**88.8**	**7**
1.1	**Political environment**	**87.0**	**11**
1.1.1	Political and operational stability*	89.3	6
1.1.2	Government effectiveness*	85.9	12
1.2	**Regulatory environment**	**91.4**	**11**
1.2.1	Regulatory quality*	78.2	21
1.2.2	Rule of law*	87.2	17
1.2.3	Cost of redundancy dismissal	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 and research		**50.8**	**20**
2.1	**Education**	**54.1**	**[53]**
2.1.1	Expenditure on education, % GDP	3.2	91 ○ ◇
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 and science	520.0	5
2.1.5	Pupil-teacher ratio, secondary ◴	11.0	38
2.2	**Tertiary education**	**24.1**	**87** ○ ◇
2.2.1	Tertiary enrolment, % gross	n/a	n/a
2.2.2	Graduates in science and engineering, %	19.7	74 ○
2.2.3	Tertiary inbound mobility, %	4.7	49
2.3	**Research and development (R&D)**	**74.3**	**4** ●
2.3.1	Researchers, FTE/mn pop.	5,374.6	14
2.3.2	Gross expenditure on R&D, % GDP	3.2	4 ●
2.3.3	Global corporate R&D investors, top 3, mn US$	90.0	5 ●
2.3.4	QS university ranking, top 3*	77.6	8
Infrastructure		**59.8**	**9**
3.1	**Information and communication technologies (ICTs)**	**90.1**	**8**
3.1.1	ICT access*	88.5	9
3.1.2	ICT use*	82.4	16
3.1.3	Government's online service*	90.6	12
3.1.4	E-participation*	98.8	4 ●
3.2	**General infrastructure**	**46.0**	**16**
3.2.1	Electricity output, GWh/mn pop.	8,307.1	19
3.2.2	Logistics performance*	91.8	5
3.2.3	Gross capital formation, % GDP	24.9	47
3.3	**Ecological sustainability**	**43.2**	**28**
3.3.1	GDP/unit of energy use	12.7	40
3.3.2	Environmental performance*	75.1	12
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.3	27
Market sophistication		**62.1**	**15**
4.1	**Credit**	**64.2**	**11**
4.1.1	Ease of getting credit*	55.0	88 ○
4.1.2	Domestic credit to private sector, % GDP	174.7	3 ● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**34.3**	**51**
4.2.1	Ease of protecting minority investors*	64.0	56
4.2.2	Market capitalization, % GDP	118.9	9
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	31 ◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	36
4.3	**Trade, diversification, and market scale**	**87.9**	**5** ●
4.3.1	Applied tariff rate, weighted avg., %	3.5	70 ○
4.3.2	Domestic industry diversification	94.7	30
4.3.3	Domestic market scale, bn PPP$	5,236.1	4 ● ◆

		Score/ Value	Rank
Business sophistication		**57.3**	**10**
5.1	**Knowledge workers**	**65.2**	**11**
5.1.1	Knowledge-intensive employment, %	25.2	59 ◇
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, %	78.9	2 ● ◆
5.1.5	Females employed w/advanced degrees, %	22.4	24
5.2	**Innovation linkages**	**46.4**	**18**
5.2.1	University-industry R&D collaboration†	60.1	22
5.2.2	State of cluster development and depth†	63.2	18
5.2.3	GERD financed by abroad, % GDP	0.0	68 ○ ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	40 ◇
5.2.5	Patent families/bn PPP$ GDP	14.1	1 ● ◆
5.3	**Knowledge absorption**	**60.3**	**3** ● ◆
5.3.1	Intellectual property payments, % total trade	2.6	10
5.3.2	High-tech imports, % total trade	13.9	16
5.3.3	ICT services imports, % total trade	2.2	27
5.3.4	FDI net inflows, % GDP	0.5	118 ○
5.3.5	Research talent, % in businesses	74.4	3 ● ◆
Knowledge and technology outputs		**48.3**	**11**
6.1	**Knowledge creation**	**58.3**	**11**
6.1.1	Patents by origin/bn PPP$ GDP	45.0	1 ● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	9.6	1 ● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	30
6.1.4	Scientific and technical articles/bn PPP$ GDP	16.8	50 ◇
6.1.5	Citable documents H-index	69.0	6
6.2	**Knowledge impact**	**35.1**	**43**
6.2.1	Labor productivity growth, %	–2.0	102 ○ ◇
6.2.2	New businesses/th pop. 15–64	0.4	103 ○ ◇
6.2.3	Software spending, % GDP	0.3	46
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.1	46
6.2.5	High-tech manufacturing, %	55.1	9
6.3	**Knowledge diffusion**	**51.5**	**11**
6.3.1	Intellectual property receipts, % total trade	5.0	1 ● ◆
6.3.2	Production and export complexity	100.0	1 ● ◆
6.3.3	High-tech exports, % total trade	11.6	13
6.3.4	ICT services exports, % total trade	0.8	89 ○
Creative outputs		**42.1**	**18**
7.1	**Intangible assets**	**56.9**	**9**
7.1.1	Trademarks by origin/bn PPP$ GDP	86.5	15 ◆
7.1.2	Global brand value, top 5,000, % GDP	150.9	11
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.2	28
7.1.4	ICTs and organizational model creation†	67.8	22
7.2	**Creative goods and services**	**29.6**	**25**
7.2.1	Cultural and creative services exports, % total trade	0.4	58
7.2.2	National feature films/mn pop. 15–69	6.9	31
7.2.3	Entertainment and media market/th pop. 15–69	71.5	5
7.2.4	Printing and other media, % manufacturing ◴	1.7	23
7.2.5	Creative goods exports, % total trade	1.8	33
7.3	**Online creativity**	**24.9**	**46** ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	15.5	31 ◇
7.3.2	Country-code TLDs/th pop. 15–69	5.8	50 ◇
7.3.3	Wikipedia edits/mn pop. 15–69	63.5	46 ◇
7.3.4	Mobile app creation/bn PPP$ GDP	12.8	43

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 Appendix IV 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 for Japan

Code	Indicator name	Economy year	Model year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2017	UNESCO Institute for Statistics
2.1.3	School life expectancy, years	n/a	2018	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	n/a	2018	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	2019	World Bank

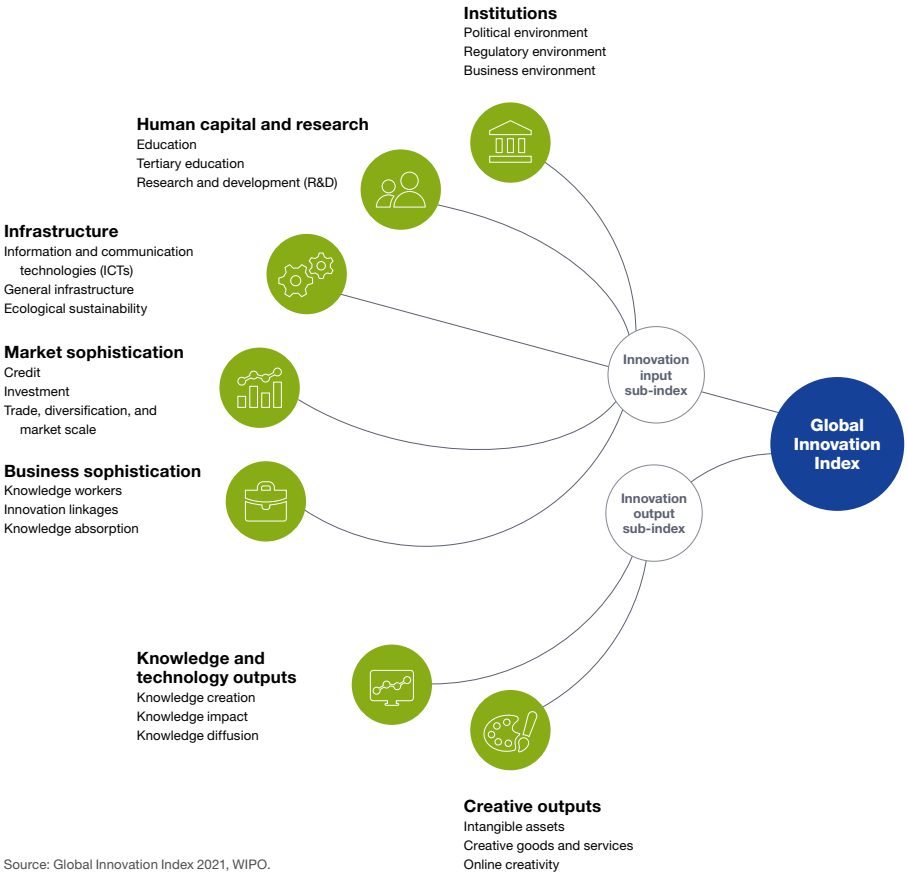
Outdated data for Japan

Code	Indicator name	Economy year	Model year	Source
2.1.5	Pupil-teacher ratio, secondary	2018	2019	UNESCO Institute for Statistics
7.2.4	Printing and other media, % manufacturing	2016	2018	United Nations Industrial Development Organization

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 2021, WIPO.

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.