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.

<table>
<thead>
<tr>
<th>Year</th>
<th>GII Position</th>
<th>Innovation Inputs</th>
<th>Innovation Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>16th</td>
<td>12th</td>
<td>18th</td>
</tr>
<tr>
<td>2021</td>
<td>13th</td>
<td>11th</td>
<td>14th</td>
</tr>
<tr>
<td>2022</td>
<td>13th</td>
<td>11th</td>
<td>12th</td>
</tr>
<tr>
<td>2023</td>
<td>13th</td>
<td>11th</td>
<td>14th</td>
</tr>
</tbody>
</table>

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.
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

→ GDP per capita, PPP logarithmic scale (thousands of $)
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
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.

- 8th Market sophistication
- 11th Business sophistication
- 13th 2 pillars and the Global Innovation Index *
- 18th Human capital and research
- 21st Institutions
- 25th Creative outputs

* Infrastructure, Knowledge and technology outputs

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

The charts show 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.

---

**Creative outputs**
- Top 10 | Score: 56.09
  - Japan | 44.14
  - High income | 40.27
  - SEAO | 34.40

**Business sophistication**
- Top 10 | Score: 64.39
  - Japan | 59.88
  - High income | 46.38
  - SEAO | 40.54

**Market sophistication**
- Top 10 | Score: 61.93
  - Japan | 61.87
  - SEAO | 47.18
  - High income | 46.42

**Human capital and research**
- Top 10 | Score: 60.28
  - Japan | 53.75
  - High income | 46.30
  - SEAO | 40.81

**Infrastructure**
- Top 10 | Score: 62.83
  - Japan | 60.28
  - High income | 55.85
  - SEAO | 47.13

**Institutions**
- Top 10 | Score: 79.85
  - Japan | 72.26
  - High income | 68.16
  - SEAO | 62.54

* South East Asia, East Asia, and Oceania
### 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).

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rank</strong></td>
<td><strong>Code</strong></td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>1</td>
<td>1.2.3</td>
</tr>
<tr>
<td>1</td>
<td>4.3.3</td>
</tr>
<tr>
<td>1</td>
<td>6.3.2</td>
</tr>
<tr>
<td>1</td>
<td>3.1.4</td>
</tr>
<tr>
<td>1</td>
<td>6.3.1</td>
</tr>
<tr>
<td>1</td>
<td>5.2.5</td>
</tr>
<tr>
<td>1</td>
<td>6.1.2</td>
</tr>
<tr>
<td>2</td>
<td>5.1.4</td>
</tr>
<tr>
<td>3</td>
<td>4.1.2</td>
</tr>
<tr>
<td>3</td>
<td>6.1.1</td>
</tr>
<tr>
<td>4</td>
<td>5.1.3</td>
</tr>
<tr>
<td>5</td>
<td>2.3.2</td>
</tr>
<tr>
<td>6</td>
<td>2.3.3</td>
</tr>
</tbody>
</table>
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.
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.
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.
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

<table>
<thead>
<tr>
<th>Rank</th>
<th>Firm</th>
<th>Industry</th>
<th>R&amp;D</th>
<th>R&amp;D Growth</th>
<th>R&amp;D Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>TOYOTA MOTOR</td>
<td>Automobiles &amp; Parts</td>
<td>8,691</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24</td>
<td>HONDA MOTOR</td>
<td>Automobiles &amp; Parts</td>
<td>6,373</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>31</td>
<td>NTT</td>
<td>Fixed Line Telecommunications</td>
<td>5,732</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>39</td>
<td>SONY</td>
<td>Leisure Goods</td>
<td>4,902</td>
<td>21</td>
<td>6</td>
</tr>
</tbody>
</table>


2.3.4 QS university ranking of Japan’s top universities

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>THE UNIVERSITY OF TOKYO</td>
<td>85.30</td>
</tr>
<tr>
<td>36</td>
<td>KYOTO UNIVERSITY</td>
<td>81.40</td>
</tr>
<tr>
<td>55</td>
<td>TOKYO INSTITUTE OF TECHNOLOGY</td>
<td>72.50</td>
</tr>
</tbody>
</table>

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2022). 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=x" or a range "x-y".

6.2.2 Top Unicorn Companies in Japan

<table>
<thead>
<tr>
<th>Rank</th>
<th>Unicorn Company</th>
<th>Industry</th>
<th>City</th>
<th>Valuation, bn USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PREFERRED NETWORKS</td>
<td>Artificial intelligence</td>
<td>Tokyo</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>SMARTNEWS</td>
<td>Mobile &amp; telecommunications</td>
<td>Tokyo</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>SMARTHR</td>
<td>Fintech</td>
<td>Tokyo</td>
<td>2</td>
</tr>
</tbody>
</table>

7.1.1 Top 15 intangible-asset intensive companies in Japan

<table>
<thead>
<tr>
<th>Rank</th>
<th>Firm</th>
<th>Intensity, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KEYENCE CORP</td>
<td>74.15</td>
</tr>
<tr>
<td>2</td>
<td>TAKEDA PHARMACEUTICAL CO LTD</td>
<td>97.51</td>
</tr>
<tr>
<td>3</td>
<td>SOFTBANK CORP</td>
<td>73.30</td>
</tr>
</tbody>
</table>


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

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Industry</th>
<th>Brand Value, mn USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TOYOTA</td>
<td>Automobiles</td>
<td>52,493.1</td>
</tr>
<tr>
<td>2</td>
<td>NTT GROUP</td>
<td>Telecoms</td>
<td>36,590.8</td>
</tr>
<tr>
<td>3</td>
<td>MITSUBISHI GROUP</td>
<td>Automobiles</td>
<td>34,962.1</td>
</tr>
</tbody>
</table>

Source: Brand Finance (https://brandirectory.com). Note: Rank corresponds to within economy ranks.
Global Innovation Index 2023

Japan

Output rank 14  Input rank 11  Income High  Region SEAO

Population (mn) 124.0  GDP, PPP$ (bn) 6,110.0  GDP per capita, PPP$ 48,812.8

Business sophistication 59.9  11

6.1 Knowledge workers 62.9  18

6.2 Innovation linkages 50.2  20

5.1 Knowledge creation 59.1  12

5.2 UNU Institute for Train. & Res. in Law 8.3  14

5.3 Knowledge absorption 66.6  4

5.4 Science and technological output 60.5  18

6.2.1 Productivity growth, % 0.6  111

6.2.2 Value added, % 0.2  15

6.2.3 Software spending, % GDP 0.2  100

6.2.4 High-tech manufacturing, % 54.6  8

6.3 Knowledge diffusion 59.2  6

6.3.1 Intellectual property rights, % total trade 5.3  1

6.3.2 Production and export complexity 100.0  10

6.3.3 High-tech exports, % total trade 12.6  11

6.3.4 ICT services exports, % total trade 12.8  83

6.3.5 ISO 9001 quality, % GDP 7.3  37

Creative outputs 44.1  25

7.1 Intangible assets 55.7  14

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/tmn 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) 19.1  31

7.3.2 Country-code TLDs pop. 15-69 6.4  51

7.3.3 GitHub commits/mn pop. 15-69 21.9  41

7.3.4 Mobile app creation/tmn 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.
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

<table>
<thead>
<tr>
<th>Code</th>
<th>Indicator name</th>
<th>Economy Year</th>
<th>Model Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.2</td>
<td>Government funding/pupil, secondary, % GDP/cap</td>
<td>n/a</td>
<td>2019</td>
<td>UNESCO Institute for Statistics</td>
</tr>
<tr>
<td>4.1.3</td>
<td>Loans from microfinance institutions, % GDP</td>
<td>n/a</td>
<td>2021</td>
<td>International Monetary Fund, Financial Access Survey (FAS)</td>
</tr>
<tr>
<td>5.1.2</td>
<td>Firms offering formal training, %</td>
<td>n/a</td>
<td>2019</td>
<td>World Bank Enterprise Surveys</td>
</tr>
</tbody>
</table>

### Outdated data for Japan

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

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.