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.

Rwanda ranking in the Global Innovation Index 2023

> Rwanda ranks 103rd among the 132 economies featured in the GII 2023.

> Rwanda ranks 1st among the 12 low-income group economies.

> Rwanda ranks 9th among the 28 economies in Sub-Saharan Africa.

Rwanda GII Ranking (2020-2023)

The table shows the rankings of Rwanda 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 Rwanda in the GII 2023 is between ranks 95 and 110.

<table>
<thead>
<tr>
<th>GII Position</th>
<th>Innovation Inputs</th>
<th>Innovation Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020 91st</td>
<td>79th</td>
<td>112nd</td>
</tr>
<tr>
<td>2021 102nd</td>
<td>91st</td>
<td>108th</td>
</tr>
<tr>
<td>2022 105th</td>
<td>91st</td>
<td>123rd</td>
</tr>
<tr>
<td>2023 103rd</td>
<td>85th</td>
<td>113rd</td>
</tr>
</tbody>
</table>

Rwanda performs worse in innovation outputs than innovation inputs in 2023.

This year Rwanda ranks 85th in innovation inputs. This position is higher than last year.

Rwanda ranks 113rd in innovation outputs. This position is higher than last year.
Global Innovation Index 2023

→ **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, Rwanda is performing above expectations for its level of development.**

→ **Innovation overperformers relative to their economic development**

![Bubble chart showing the relationship between GDP per capita and GII score. The trend line indicates expected performance. Economies above the line are performing above expectations, below the line are performing below expectations.](chart.png)

→ 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.

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

Relationship between innovation inputs and outputs
Global Innovation Index 2023

→ Overview of Rwanda’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 Rwanda are those that rank above the GII (shown in blue) and the weakest are those that rank below.

> Highest rankings

Rwanda ranks highest in Institutions (33rd), Human capital and research (94th), Knowledge and technology outputs (100th) and Infrastructure (101st).

> Lowest rankings

Rwanda ranks lowest in Creative outputs (117th), Market sophistication (115th) and Business sophistication (109th).

The full WIPO Intellectual Property Statistics profile for Rwanda can be found on this link.
Benchmark of Rwanda against other country groupings for each of the seven areas of the GII Index

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

**Low-Income economies**
Rwanda performs above the low-income group average in Knowledge and technology outputs, Business sophistication, Market sophistication, Human capital and research, Infrastructure, Institutions.

**Sub-Saharan Africa**
Rwanda performs above the regional average in Knowledge and technology outputs, Business sophistication, Human capital and research, Infrastructure, Institutions.

**Knowledge and technology outputs**
- Top 10 | Score: 58.96
- Rwanda | Score: 13.64
- Sub-Saharan Africa | Score: 12.16
- Low income | Score: 11.03

**Creative outputs**
- Top 10 | 56.09
- Sub-Saharan Africa | 10.36
- Low income | 7.48
- Rwanda | 6.91

**Business sophistication**
- Top 10 | 64.39
- Rwanda | 20.03
- Sub-Saharan Africa | 19.85
- Low income | 16.81

**Market sophistication**
- Top 10 | 61.93
- Sub-Saharan Africa | 20.00
- Rwanda | 18.63
- Low income | 15.67

**Human capital and research**
- Top 10 | 60.28
- Rwanda | 22.61
- Sub-Saharan Africa | 17.80
- Low income | 15.55

**Infrastructure**
- Top 10 | 62.83
- Rwanda | 27.85
- Sub-Saharan Africa | 23.36
- Low income | 19.43

**Institutions**
- Top 10 | 79.85
- Rwanda | 65.39
- Sub-Saharan Africa | 43.27
- Low income | 38.42
### Innovation strengths and weaknesses in Rwanda

The table below gives an overview of the indicator strengths and weaknesses of Rwanda in the GII 2023.

> Rwanda's main innovation strengths are **Labor productivity growth, % (rank 2)**, **Policies for doing business** (rank 11) and **Graduates in science and engineering, %** (rank 15).

<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>2</td>
<td>6.2.1</td>
</tr>
<tr>
<td>11</td>
<td>1.3.1</td>
</tr>
<tr>
<td>15</td>
<td>2.2.2</td>
</tr>
<tr>
<td>18</td>
<td>5.2.3</td>
</tr>
<tr>
<td>20</td>
<td>4.2.3</td>
</tr>
<tr>
<td>22</td>
<td>2.1.2</td>
</tr>
<tr>
<td>28</td>
<td>5.3.2</td>
</tr>
<tr>
<td>34</td>
<td>5.2.4</td>
</tr>
<tr>
<td>39</td>
<td>1.1.1</td>
</tr>
<tr>
<td>41</td>
<td>3.1.3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Rwanda’s innovation system

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

Innovation inputs in Rwanda

2.1.1 Expenditure on education, % GDP
was equal to 4.03% GDP in 2022, down by
1.55 percentage points from the year prior –
and equivalent to an indicator rank of 70.

2.2.2 Graduates in science and
engineering, %
was equal to 32.1% of total tertiary graduates
in 2020, up by 19.14 percentage points from
the year prior – and equivalent to an indicator
rank of 15.

2.3.1 Researchers, FTE/mn pop.
was equal to 58.76 FTE/mn pop. in 2019, up
by 323.95% from the year prior – and
equivalent to an indicator rank of 94.

2.3.2 Gross expenditure on R&D, % GDP
was equal to 0.758% GDP in 2019, up by 0.11
percentage points from the year prior – and
equivalent to an indicator rank of 48.

2.3.4 QS university ranking, top 3
was equal to an average score of 0 for the top
3 universities in 2022, equivalent to an
indicator rank of 71.

3.1.1 ICT access
was equal to a score of 6.3 in 2021, down by
0.32% from the year prior – and equivalent to
an indicator rank of 115.
4.2.4 VC received, value, % GDP
was equal to 0.00012% GDP in 2022, down by 0.00073 percentage points from the year prior – and equivalent to an indicator rank of 57.

4.3.2 Domestic industry diversification
was equal to an index score of 0.408 in 2020, up by 6.78% from the year prior – and equivalent to an indicator rank of 103.

5.1.1 Knowledge-intensive employment, %
was equal to 6.53% in 2021, down by 0.08 percentage points from the year prior – and equivalent to an indicator rank of 116.
Innovation outputs in Rwanda

6.1.1 Patents by origin
was equal to 0.015 Thousands in 2021, up by 150% from the year prior – and equivalent to an indicator rank of 82.

6.1.5 Citable documents H-index
was equal to an index value of 118 in 2022, up by 10.28% from the year prior – and equivalent to an indicator rank of 113.

6.2.2 Unicorn valuation, % GDP
was equal to 0 % GDP in 2023 – and equivalent to an indicator rank of 48.

6.2.3 Software spending, % GDP
was equal to 0.048% GDP in 2022, up by 0.00021 percentage points from the year prior – and equivalent to an indicator rank of 106.

6.2.4 High-tech manufacturing, %
was equal to 7.34% of total manufacturing output in 2020, down by 0.08 percentage points from the year prior – and equivalent to an indicator rank of 97.

6.3.1 Intellectual property receipts, % total trade
was equal to 0.019% total trade in 2021, up by 0.0021 percentage points from the year prior – and equivalent to an indicator rank of 92.
6.3.3 High-tech exports
was equal to 16,010,164 USD in 2021, up by 82.58% from the year prior – and equivalent to an indicator rank of 87.

7.1.3 Global brand value, top 5,000
was equal to 0 bn USD in 2023 – and equivalent to an indicator rank of 74.

7.2.1 Cultural and creative services exports
was equal to 468,000 USD in 2021, up by 6.12% from the year prior – and equivalent to an indicator rank of 99.

7.3.4 Mobile app creation/bn PPP$ GDP
was equal to 4,022.24 Apps/bn PPP$ GDP in 2022 – and equivalent to an indicator rank of 108.
## Global Innovation Index 2023
### Rwanda

<table>
<thead>
<tr>
<th>Output rank</th>
<th>Input rank</th>
<th>Income</th>
<th>Region</th>
<th>Population (mn)</th>
<th>GDP, PPP$ (bn)</th>
<th>GDP per capita, PPP$</th>
</tr>
</thead>
<tbody>
<tr>
<td>113</td>
<td>85</td>
<td>Low</td>
<td>SSA</td>
<td>13.8</td>
<td>37.6</td>
<td>2,835.8</td>
</tr>
</tbody>
</table>

### Key Performances
#### Institutions
- Score / Value Rank: 65.4 / 33
- 1.1 Institutional environment: 53.9 / 47
  - 1.1.1 Operational stability for businesses: 63.9 / 39
  - 1.1.2 Government effectiveness: 44.0 / 55
- 1.2 Regulatory environment: 63.2 / 66
  - 1.2.1 Regulatory quality: 43.9 / 70
  - 1.2.2 Rule of law: 45.6 / 56
  - 1.2.3 Cost of redundant dismissal: 17.3 / 70
- 1.3 Business environment: 78.1 / 8
  - 1.3.1 Policies for doing business: 79.1 / 11
  - 1.3.2 Entrepreneurship policies and culture: n/a / n/a
- **Human capital and research**
  - Score / Value Rank: 22.6 / 94
  - 2.1 Education: 37.7 / 106
    - 2.1.1 Expenditure on education, % GDP: 4.0 / 70
    - 2.1.2 Government funding/pupil, secondary, % GDP/cap: 24.8 / 22
    - 2.1.3 School life expectancy, years: 11.2 / 97
    - 2.1.4 PISA scales in reading, maths and science: n/a / n/a
    - 2.1.5 Pupil-teacher ratio, secondary: 274.16 / 16
  - 2.2 Tertiary education: 26.6 / 75
    - 2.2.1 Tertiary enrolment, % gross: 7.3 / 120
    - 2.2.2 Graduates in science and engineering, %: 32.1 / 5
    - 2.2.3 Tertiary inmobility, %: 4.2 / 55
- 2.3 Research and development (R&D): 3.5 / 85
  - 2.3.1 Researchers, FTE/mn pop.: 58.8 / 94
  - 2.3.2 Gross expenditure on R&D, % GDP: 0.8 / 48
  - 2.3.3 Global corporate R&D investors, top 3, mn US$: 0.0 / 40
  - 2.3.4 QS university ranking, top 3*: 0.0 / 71

#### Infrastructure
- Score / Value Rank: 27.9 / 101
- 3.1 Information and communication technologies (ICTs): 53.7 / 93
  - 3.1.1 ICT access*: 4.1 / 115
  - 3.1.2 ICT use*: 30.6 / 115
  - 3.1.3 Government’s online service*: 77.2 / 41
  - 3.1.4 E-petition*: 62.8 / 53
- 3.2 General infrastructure: 18.3 / 99
  - 3.2.1 Electricity output, GW/h/mn pop.: 67.2 / 124
  - 3.2.2 Logistics performance*: 31.8 / 71
  - 3.2.3 Gross capital formation, % GDP: 25.8 / 46
- 3.3 Ecological sustainability: 11.6 / 121
  - 3.3.1 GDP/unit of energy use: 5.5 / 112
  - 3.3.2 Environmental performance*: 23.6 / 100
  - 3.3.3 ISO 14001 environment/bn PPP$ GDP: 0.2 / 109

#### Market sophistication
- Score / Value Rank: 18.6 / 115
- 4.1 Credit
  - 4.1.1 Finance for startups and scaleups*: 6.1 / 88
    - 4.1.2 Domestic credit to private sector, % GDP: 25.0 / 110
    - 4.1.3 Loans from microfinance institutions, % GDP: 0.7 / 33
  - 4.2 Investment: 18.0 / 39
    - 4.2.1 Market capitalization, % GDP: 31.0 / 46
    - 4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP: n/a / n/a
    - 4.2.3 VC recipients, deals/bn PPP$ GDP: 0.1 / 20
    - 4.2.4 VC received, value, % GDP: 0.0 / 57
  - 4.3 Trade, diversification, and market scale: 29.7 / 116
    - 4.3.1 Applied tariff rate, weighted avg., %: 10.2 / 119
    - 4.3.2 Domestic industry diversification: 54.4 / 103
    - 4.3.3 Domestic market scale, bn PPP$: 37.6 / 121

### Business sophistication
- Score / Value Rank: 20.0 / 109
- 5.1 Knowledge workers: 12.1 / 115
  - 5.1.1 Knowledge-intensive employment, %: 6.5 / 116
  - 5.1.2 Firms offering formal training, %: 35.9 / 43
  - 5.1.3 GERD performed by business, % GDP: 0.0 / 73
  - 5.1.4 GERD financed by business, %: 0.6 / 94
  - 5.1.5 Females employed w/advanced degrees, %: 3.3 / 100
- 5.2 Innovation linkages
  - 5.2.1 University-industry R&D collaboration*: 3.5 / 82
  - 5.2.2 State of cluster development*: 39.5 / 72
  - 5.2.3 GERD financed by abroad, % GDP: 0.2 / 18
- 5.3 Research talent, % in businesses: 1.0 / 71

#### Knowledge and technology outputs
- Score / Value Rank: 13.6 / 100
- 6.1 Knowledge creation
  - 6.1.1 Patents by origin/bn PPP$ GDP: 0.5 / 82
  - 6.1.2 PCT patents by origin/bn PPP$ GDP: 0.0 / 101
- 6.2 Software spending, % GDP: 0.1 / 61
- 6.3 High-tech exports, % total trade: 0.6 / 87
- 6.4 ICT services exports, % total trade: 1.0 / 88
- 6.5 ISO 9001 quality/bn PPP$ GDP: 0.5 / 118

#### Creative outputs
- Score / Value Rank: 6.9 / 117
- 7.1 Intangible assets: 7.0 / 114
- 7.1.1 Intangible asset intensity, top 15, %: n/a / n/a
- 7.1.2 Trademarks by origin/bn PPP$ GDP: 20.6 / 92
- 7.1.3 Global brand value, top 5,000: 0.0 / 74
- 7.1.4 Industrial designs by origin/bn PPP$ GDP: 0.3 / 95
- 7.2 Creative goods and services: 1.5 / 110
- 7.2.1 Cultural and creative services exports, % total trade: 0.0 / 99
  - 7.2.2 National feature films/mn pop. 15-69: n/a / n/a
  - 7.2.3 Entertainment and media market share 15-69: n/a / n/a
  - 7.2.4 Creative goods exports, % total trade: 0.2 / 76
- 7.3 Online creativity: 12.2 / 109
- 7.3.1 Generic top-level domains (TLDs) 15-69: 0.2 / 121
- 7.3.2 Country-code TLDs 15-69: 0.2 / 115
- 7.3.3 GitHub commits/mn pop. 15-69: 2.7 / 93
- 7.3.4 Mobile app creation/bn PPP$ GDP: 45.7 / 108

NOTES: ● indicates a strength; ○ a weakness; ● an income group strength; ○ an income group weakness; * an index; ● a survey question; n/a indicates that the economy’s data are older than the base year; see appendices for details, including the year of the data, at https://wipo.int/gii-ranking. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.
Global Innovation Index 2023

→ Data availability

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

> Rwanda has missing data for eight indicators and outdated data for eleven indicators.

> Missing data for Rwanda

<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>1.3.2</td>
<td>Entrepreneurship policies and culture</td>
<td>n/a</td>
<td>2022</td>
<td>Global Entrepreneurship Monitor</td>
</tr>
<tr>
<td>2.1.4</td>
<td>PISA scales in reading, maths and science</td>
<td>n/a</td>
<td>2018</td>
<td>OECD, PISA</td>
</tr>
<tr>
<td>4.1.1</td>
<td>Finance for startups and scaleups</td>
<td>n/a</td>
<td>2022</td>
<td>Global Entrepreneurship Monitor</td>
</tr>
<tr>
<td>4.2.2</td>
<td>Venture capital (VC) investors, deals/bn PPPS GDP</td>
<td>n/a</td>
<td>2022</td>
<td>Refinitiv; International Monetary Fund</td>
</tr>
<tr>
<td>6.3.2</td>
<td>Production and export complexity</td>
<td>n/a</td>
<td>2020</td>
<td>Harvard University, Growth Lab</td>
</tr>
<tr>
<td>7.1.1</td>
<td>Intangible asset intensity, top 15, %</td>
<td>n/a</td>
<td>2022</td>
<td>Brand Finance</td>
</tr>
<tr>
<td>7.2.2</td>
<td>National feature films/mn pop. 15-69</td>
<td>n/a</td>
<td>2021</td>
<td>OMDIA; United Nations, World Population Prospects</td>
</tr>
<tr>
<td>7.2.3</td>
<td>Entertainment and media market size pop. 15-69</td>
<td>n/a</td>
<td>2022</td>
<td>PwC, GEMO; United Nations, World Population Prospects; International Monetary Fund</td>
</tr>
</tbody>
</table>

> Outdated data for Rwanda

<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>2.1.3</td>
<td>School life expectancy, years</td>
<td>2019</td>
<td>2020</td>
<td>UNESCO Institute for Statistics</td>
</tr>
<tr>
<td>2.3.1</td>
<td>Researchers, FTE/mn pop.</td>
<td>2019</td>
<td>2021</td>
<td>UNESCO Institute for Statistics; Eurostat; OECD; RICYT</td>
</tr>
<tr>
<td>2.3.2</td>
<td>Gross expenditure on R&amp;D, % GDP</td>
<td>2019</td>
<td>2021</td>
<td>UNESCO Institute for Statistics; Eurostat; OECD; RICYT</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Electricity output, GWh/mn pop.</td>
<td>2020</td>
<td>2021</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>4.2.1</td>
<td>Market capitalization, % GDP</td>
<td>2019</td>
<td>2020</td>
<td>World Federation of Exchanges; World Bank</td>
</tr>
<tr>
<td>5.1.1</td>
<td>Knowledge-intensive employment, %</td>
<td>2021</td>
<td>2022</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>5.1.3</td>
<td>GERD performed by business, % GDP</td>
<td>2016</td>
<td>2021</td>
<td>UNESCO Institute for Statistics; Eurostat; OECD;</td>
</tr>
</tbody>
</table>
## Global Innovation Index 2023

<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>5.1.4</td>
<td>GERD financed by business, %</td>
<td>2016</td>
<td>2020</td>
<td>UNESCO Institute for Statistics; Eurostat; OECD; RICYT</td>
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<tr>
<td>5.1.5</td>
<td>Females employed w/advanced degrees, %</td>
<td>2021</td>
<td>2022</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>5.2.3</td>
<td>GERD financed by abroad, % GDP</td>
<td>2016</td>
<td>2020</td>
<td>UNESCO Institute for Statistics; Eurostat; OECD; RICYT</td>
</tr>
<tr>
<td>5.3.5</td>
<td>Research talent, % in businesses</td>
<td>2016</td>
<td>2021</td>
<td>UNESCO Institute for Statistics; Eurostat; OECD; RICYT</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.