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.

Ghana ranking in the Global Innovation Index 2023


> Ghana ranks 19th among the 37 lower-middle-income group economies.

> Ghana ranks 7th among the 28 economies in Sub-Saharan Africa.

Ghana GII Ranking (2020-2023)

The table shows the rankings of Ghana 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 Ghana in the GII 2023 is between ranks 90 and 110.

<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>108th</td>
<td>113rd</td>
<td>93rd</td>
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<td>2021</td>
<td>112nd</td>
<td>114th</td>
<td>103rd</td>
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<tr>
<td>2022</td>
<td>95th</td>
<td>105th</td>
<td>88th</td>
</tr>
<tr>
<td>2023</td>
<td>99th</td>
<td>107th</td>
<td>85th</td>
</tr>
</tbody>
</table>

Ghana performs better in innovation outputs than innovation inputs in 2023.

This year Ghana ranks 107th in innovation inputs. This position is lower than last year.

Ghana ranks 85th in innovation outputs. This position is higher 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.

Relative to GDP, Ghana's performance is at expectations for its level of development.

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.

Ghana produces more innovation outputs relative to its level of innovation investments.

Relationship between innovation inputs and outputs

![Diagram showing the relationship between innovation inputs and outputs.](image)
Overview of Ghana'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 Ghana are those that rank above the GII (shown in blue) and the weakest are those that rank below.

- Highest rankings
  Ghana ranks highest in Creative outputs (71st), Business sophistication (83rd) and Institutions (93rd).

- Lowest rankings
  Ghana ranks lowest in Market sophistication (117th), Knowledge and technology outputs (111st) and Human capital and research, Infrastructure (105th).

* Human capital and research, Infrastructure
→ Benchmark of Ghana against other country groupings for each of the seven areas of the GII Index

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

> **Lower-Middle-Income economies**
Ghana performs below the lower-middle-income group average in Knowledge and technology outputs, Market sophistication, Human capital and research, Infrastructure.

> **Sub-Saharan Africa**
Ghana performs above the regional average in Creative outputs, Business sophistication, Human capital and research, Infrastructure.

### Knowledge and technology outputs
- **Top 10 | Score: 58.96**
- **Lower middle income | Score: 17.21**
- **Sub-Saharan Africa | Score: 12.16**
- **Ghana | Score: 11.71**

### Creative outputs
- **Top 10 | 56.09**
- **Ghana | 22.85**
- **Lower middle income | 16.35**
- **Sub-Saharan Africa | 10.36**

### Business sophistication
- **Top 10 | 64.39**
- **Ghana | 24.23**
- **Lower middle income | 22.71**
- **Sub-Saharan Africa | 19.85**

### Market sophistication
- **Top 10 | 61.93**
- **Lower middle income | 28.01**
- **Sub-Saharan Africa | 20.00**
- **Ghana | 17.08**

### Human capital and research
- **Top 10 | 60.28**
- **Lower middle income | 21.73**
- **Ghana | 18.44**
- **Sub-Saharan Africa | 17.80**

### Infrastructure
- **Top 10 | 62.83**
- **Lower middle income | 27.83**
- **Ghana | 26.75**
- **Sub-Saharan Africa | 23.36**

### Institutions
- **Top 10 | 79.85**
- **Sub-Saharan Africa | 43.27**
- **Ghana | 41.07**
- **Lower middle income | 39.43**
Innovation strengths and weaknesses in Ghana

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

> Ghana’s main innovation strengths are Cultural and creative services exports, % total trade (rank 8), Industrial designs by origin/bn PPP$ GDP (rank 20) and GDP/unit of energy use (rank 23).

<table>
<thead>
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<table>
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<th>Weaknesses</th>
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<td>7.3.2</td>
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<td>6.2.3</td>
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<td>40</td>
<td>2.3.3</td>
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</table>
Ghana’s innovation system

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

Innovation inputs in Ghana

2.1.1 Expenditure on education, % GDP
was equal to 3.89% GDP in 2018, up by 0.36 percentage points from the year prior – and equivalent to an indicator rank of 78.

2.2.2 Graduates in science and engineering, %
was equal to 16.72% of total tertiary graduates in 2021, up by 1.5 percentage points from the year prior – and equivalent to an indicator rank of 93.

2.3.1 Researchers, FTE/mn pop.
was equal to 89.11 FTE/mn pop. in 2015, equivalent to an indicator rank of 91.

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 7.23 in 2021, down by 0.14% from the year prior – and equivalent to an indicator rank of 100.

4.2.4 VC received, value, % GDP
was equal to 0.00146% GDP in 2022, up by 0.0011 percentage points from the year prior – and equivalent to an indicator rank of 56.
4.3.2 Domestic industry diversification was equal to an index score of 0.166 in 2013, equivalent to an indicator rank of 56.

5.1.1 Knowledge-intensive employment, % was equal to 9.58% in 2017, down by 2.03 percentage points from the year prior – and equivalent to an indicator rank of 107.
6.1.1 Patents by origin
was equal to 0.012 Thousands in 2020, down by 76.9% from the year prior – and equivalent to an indicator rank of 119.

6.1.5 Citable documents H-index
was equal to an index value of 215 in 2022, up by 125.7% from the year prior – and equivalent to an indicator rank of 82.

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 0.013% GDP in 2022, up by 0.00018 percentage points from the year prior – and equivalent to an indicator rank of 127.

6.2.4 High-tech manufacturing, %
was equal to 10.96% of total manufacturing output in 2013 – and equivalent to an indicator rank of 86.

6.3.1 Intellectual property receipts, % total trade
was equal to 0.233% total trade in 2021, up by 0.026 percentage points from the year prior – and equivalent to an indicator rank of 42.
6.3.2 Production and export complexity
was equal to a score of -1.024 in 2020, down by 20.015% from the year prior – and equivalent to an indicator rank of 111.

6.3.3 High-tech exports
was equal to 9,928,798 USD in 2019, down by 80.15% from the year prior – and equivalent to an indicator rank of 128.

7.1.1 Intangible asset intensity, top 15, %
was equal to -52.754 % in 2022 – and equivalent to an indicator rank of 78.

7.2.1 Cultural and creative services exports
was equal to 619,118,000 USD in 2021, up by 20.82% from the year prior – and equivalent to an indicator rank of 8.

7.3.4 Mobile app creation/bn PPP$ GDP
was equal to 9 34.62 Apps/bn PPP$ GDP in 2022, up by 1159.94% from the year prior – and equivalent to an indicator rank of 117.
Ghana's innovation top performers

### 7.1.1 Top 15 intangible-asset intensive companies in Ghana

<table>
<thead>
<tr>
<th>Rank</th>
<th>Firm</th>
<th>Intensity, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCANCOM PLC</td>
<td>24.26</td>
</tr>
<tr>
<td>2</td>
<td>UNILEVER GHANA PLC</td>
<td>65.46</td>
</tr>
<tr>
<td>3</td>
<td>DIGICUT ADVERTISING &amp; PRODUCTION LTD</td>
<td>42.82</td>
</tr>
</tbody>
</table>

Note: Brand Finance only provides within economy ranks.
Global Innovation Index 2023

Ghana

Output rank 85  Input rank 107  Income Region SSA  Population (mn) 33.5  GDP, PPP$ (bn) 217.5  GDP per capita, PPP$ 6,780.3

**Business sophistication** 24.2 83

5.1 Knowledge workers 23.1 89
5.1.1 Knowledge-intensive employment, % 9.6 107
5.1.2 Firms offering formal training, % 40.1 34
5.1.3 GERD performed by business, % GDP 0 0
5.1.4 GERD financed by business, % 0 0
5.1.5 Females employed w/advanced degrees, % 2.9 104
5.2 Innovation linkages 25.0 53
5.2.1 University-industry R&D collaboration 45.2 61
5.2.2 State of cluster development 49.4 47
5.2.3 GERD financed by abroad, % GDP 0 0
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP 0 0
5.2.5 Patents families/bn PPP$ GDP 0 0
5.3 Knowledge absorption 24.6 106
5.3.1 Intellectual property payments, % total trade 0.7 56
5.3.2 High-tech imports, % total trade 2.8 129
5.3.3 ICT services imports, % total trade 0.6 105
5.3.4 FD net inflows, % GDP 3.9 32
5.3.5 Research talent, % in businesses 0 0

**Knowledge and technology outputs** 11.7 111

6.1 Knowledge creation 7.3 98
6.1.1 Patents by origin/bn PPP$ GDP 0.1 119
6.1.2 Patents by origin/bn PPP$ GDP 0.0 101
6.1.3 Utility models by origin/bn PPP$ GDP 0 0
6.1.4 Scientific and technical articles/bn PPP$ GDP 0 0
6.1.5 Oitable documents H-index 9.6 82
6.2 Knowledge impact 18.9 110
6.2.1 Labor productivity growth, % 2.0 32
6.2.2 Uncomp. valuation, % GDP 0.0 48
6.2.3 Software spending, % GDP 0 0
6.2.4 High-tech manufacturing, % GDP 11.0 86
6.3 Knowledge diffusion 9.0 111
6.3.1 Intellectual property receipts, % total trade 0.2 42
6.3.2 Production and export complexity 31.1 111
6.3.3 High-tech exports, % total trade 0.6 128
6.3.4 ICT services exports, % total trade 0.6 96
6.3.5 ISD 001-quality/bn PPP$ GDP 0.7 113

**Creative outputs** 22.6 71

7.1 Intangible assets 27.4 74
7.1.1 Intangible asset intensity, top 15, % 52.8 78
7.1.2 Trademarks by origin/bn PPP$ GDP 4.8 123
7.1.3 Global brand value, top 5,000 0 0
7.1.4 Industrial designs by origin/bn PPP$ GDP 5.2 20
7.2 Creative goods and services 26.3 39
7.2.1 Cultural and creative services exports, % total trade 2.6 8
7.2.2 National feature films/mn pop. 15-69 0 0
7.2.3 Entertainment and media market/th pop. 15-69 0 0
7.2.4 Creative goods exports, % total trade 0.0 120
7.3 Online creativity 9.5 116
7.3.1 Generic top-level domain (TLD) threats 0.6 106
7.3.2 Country-code TLDs threats pop. 15-69 0 0
7.3.3 GitHub commits/mn pop. 15-69 2.9 92
7.3.4 Mobile app creation/bn PPP$ GDP 34.3 117

**Human capital and research** 18.4 105

2.1 Education 43.4 87
2.1.1 Expenditure on education, % GDP 3.9 78
2.1.2 Government funding/pupil, secondary, % GDP/cap 19.5 57
2.1.3 School life expectancy, years 12.3 91
2.1.4 PISA scales in reading, maths and science 0 0
2.1.5 Pupil-teacher ratio, secondary 16.1 83
2.2 Secondary education 11.7 10
2.2.1 Secondary enrolment, % gross 19.5 100
2.2.2 Graduates in science and engineering, % 16.7 93
2.2.3 Secondary enrolment, % gross 0.9 91
2.3 Research and development (R&D) 0.3 114
2.3.1 Researchers/F,16/mn pop. 89.1 91
2.3.2 Gross expenditure on R&D, % GDP 0 0
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** 26.8 105

3.1 Information and communication technologies (ICTs) 51.2 98
3.1.1 ICT access 58.2 100
3.1.2 ICT use 53.6 101
3.1.3 Government’s online service 48.7 93
3.1.4 E-participation 44.2 83
3.2 General Infrastructure 10.5 121
3.2.1 Electricity output, GWh/mn pop. 634.3 105
3.2.2 Logistics performance 18.2 89
3.2.3 Grass capital formation, % GDP 18.0 11
3.3 Ecological sustainability 18.6 87
3.3.1 GDP/Unit of energy use 15.3 23
3.3.2 Environmental performance 14.9 126
3.3.3 ISO 14001 environment/bn PPP$ GDP 0.4 96

**Market sophistication** 17.1 117

4.1 Credit 2.2 130
4.1.1 Finance for startups and scaleups* 0 0
4.1.2 Domestic credit to private sector, % GDP 13.2 122
4.1.3 Loans from microfinance institutions, % GDP 0.1 50
4.2 Investment 7.5 61
4.2.1 Market capitalization, % GDP 13.2 68
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP 0.0 57
4.2.3 VC recipients, deals/bn PPP$ GDP 0.1 43
4.2.4 VC received, value, % GDP 0.0 56
4.3 Trade, diversification, and market scale 41.5 100
4.3.1 Applied tariff rate, weighted avg., % 10.5 121
4.3.2 Domestic industry diversification 88.0 56
4.3.3 Domestic market scale, bn PPP$ 217.5 66

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 Ghana.

> Ghana has missing data for eleven indicators and outdated data for sixteen indicators.

### Missing data for Ghana

<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>
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<tr>
<td>2.1.4</td>
<td>PISA scales in reading, maths and science</td>
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<td>OECD, PISA</td>
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<td>2.3.2</td>
<td>Gross expenditure on R&amp;D, % GDP</td>
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<td>UNESCO Institute for Statistics; Eurostat; OECD; RICYT</td>
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<td>4.1.1</td>
<td>Finance for startups and scaleups</td>
<td>n/a</td>
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<td>5.1.3</td>
<td>GERD performed by business, % GDP</td>
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<td>GERD financed by business, %</td>
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<td>GERD financed by abroad, % GDP</td>
<td>n/a</td>
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<td>5.3.5</td>
<td>Research talent, % in businesses</td>
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<td>n/a</td>
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<td>Entertainment and media market, h pop. 15–69</td>
<td>n/a</td>
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### Outdated data for Ghana

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<td>5.1.2</td>
<td>Firms offering formal training, %</td>
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<td>2019</td>
<td>World Bank Enterprise Surveys</td>
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<td>5.1.5</td>
<td>Females employed w/advanced degrees, %</td>
<td>2017</td>
<td>2022</td>
<td>International Labour Organization</td>
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<td>5.3.2</td>
<td>High-tech imports, % total trade</td>
<td>2019</td>
<td>2021</td>
<td>United Nations Comtrade Database; World Trade Organization and United Nations Conference on Trade and Development</td>
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<td>6.1.1</td>
<td>Patents by origin/bn PPP$ GDP</td>
<td>2020</td>
<td>2021</td>
<td>World Intellectual Property Organization; International Monetary Fund</td>
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<td>6.1.3</td>
<td>Utility models by origin/bn PPP$ GDP</td>
<td>2018</td>
<td>2021</td>
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<td>6.2.4</td>
<td>High-tech manufacturing, %</td>
<td>2013</td>
<td>2020</td>
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<td>6.3.3</td>
<td>High-tech exports, % total trade</td>
<td>2019</td>
<td>2021</td>
<td>United Nations Comtrade Database; World Trade Organization and United Nations Conference on Trade and Development; Trade Data Monitor.</td>
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<td>7.1.2</td>
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<td>2021</td>
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<td>7.1.4</td>
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<td>2021</td>
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<tr>
<td>7.2.4</td>
<td>Creative goods exports, % total trade</td>
<td>2019</td>
<td>2021</td>
<td>United Nations Comtrade Database; World Trade Organization and United Nations Conference on Trade and Development</td>
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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.