

Global Innovation Index 2023

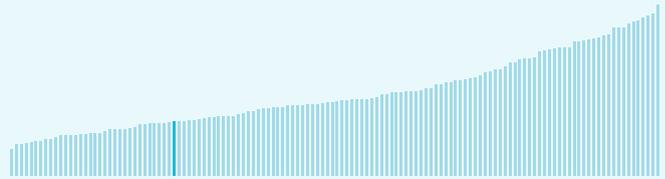


The Global Innovation Index (GII) ranks world economies according to their innovation capabilities.

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 **99th** among the 132 economies featured in the GII 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.

	GII Position	Innovation Inputs	Innovation Outputs
2020	108th	113rd	93rd
2021	112nd	114th	103rd
2022	95th	105th	88th
2023	99th	107th	85th

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.

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→ Expected vs. observed innovation performance

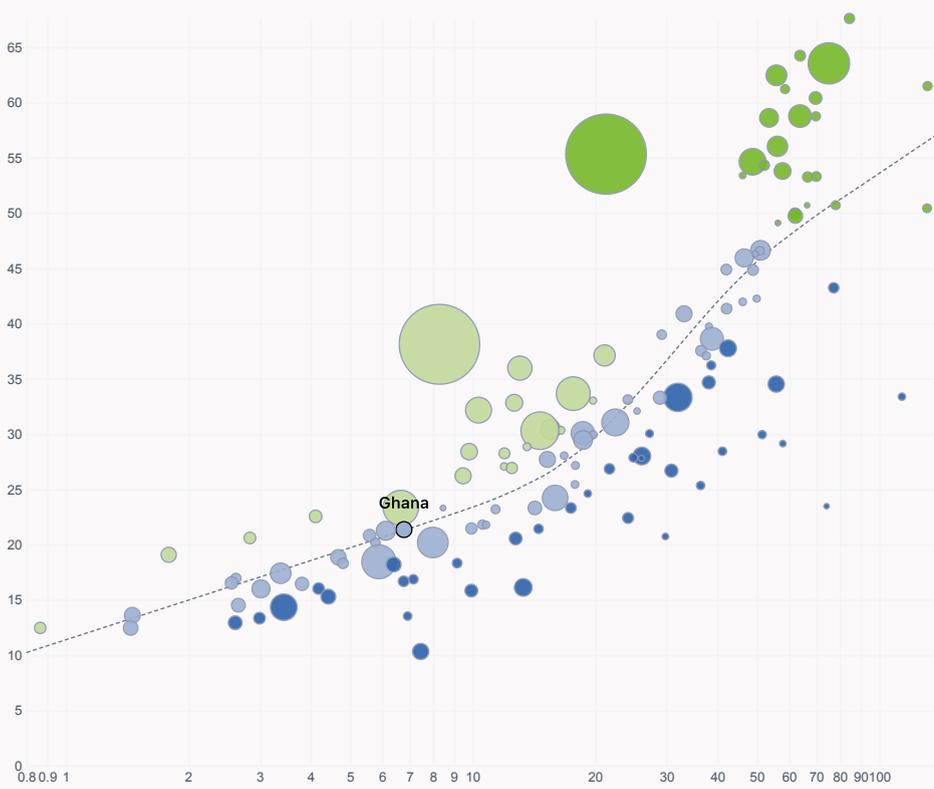
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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

↑ **GII Score**



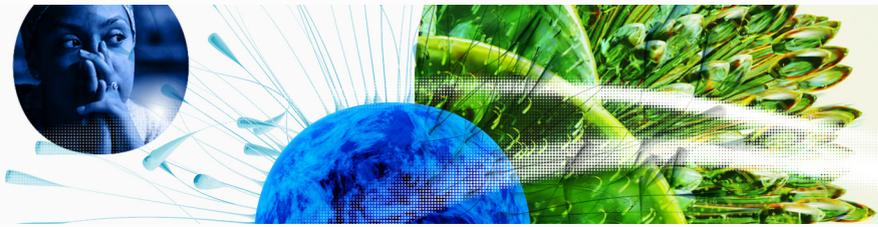
- Innovation leader
- Performing above expectations for level of development
- Performing at expectations for level of development
- Performing below expectations for level of development

Size legend (Population)



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

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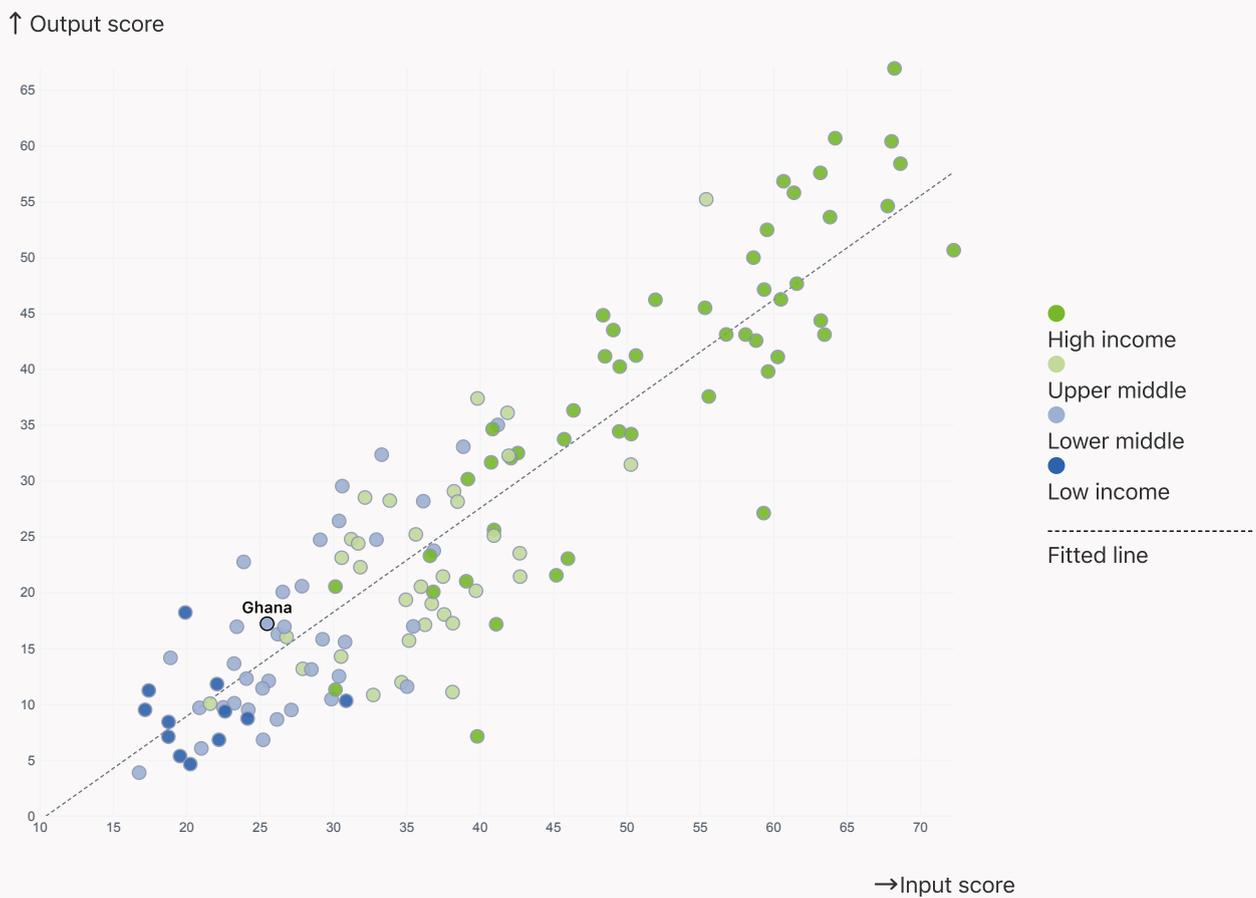
→ Effectively translating innovation investments into innovation outputs

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

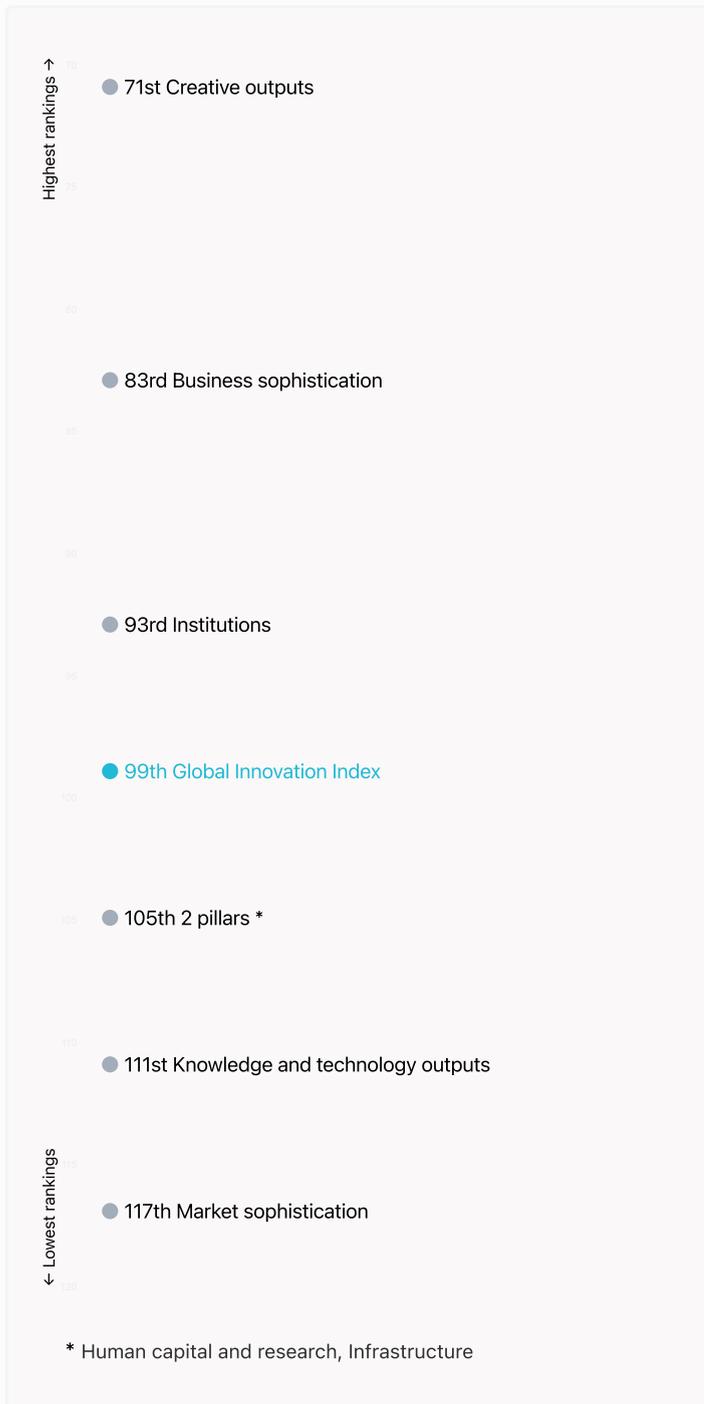


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→ Overview of Ghana's rankings in the seven areas of the GII in 2023

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).



The full WIPO Intellectual Property Statistics profile for Ghana can be found on [this link](#).

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→ 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.

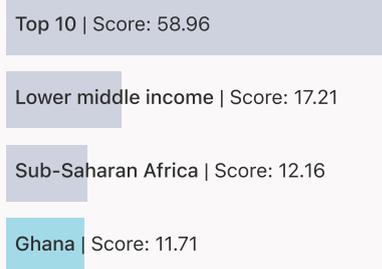


> Sub-Saharan Africa

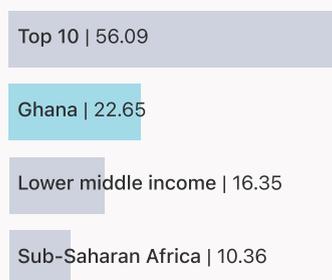
Ghana performs above the regional average in Creative outputs, Business sophistication, Human capital and research, Infrastructure.



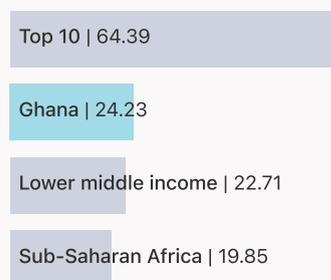
Knowledge and technology outputs



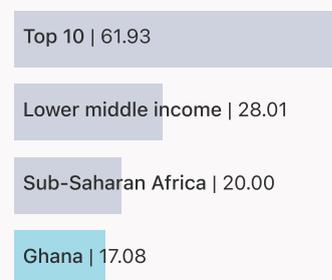
Creative outputs



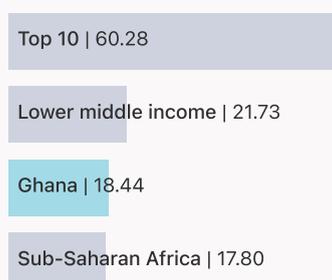
Business sophistication



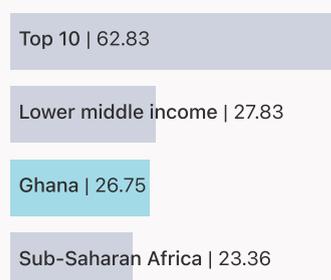
Market sophistication



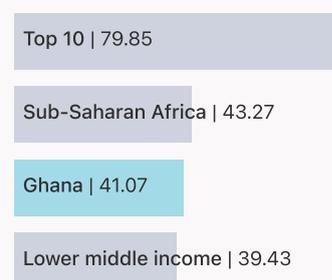
Human capital and research



Infrastructure



Institutions



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→ 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)**.

Strengths

Weaknesses

Rank	Code	Indicator name	Rank	Code	Indicator name
8	7.2.1	Cultural and creative services exports, % total trade	129	5.3.2	High-tech imports, % total trade
20	7.1.4	Industrial designs by origin/bn PPP\$ GDP	128	6.3.3	High-tech exports, % total trade
23	3.3.1	GDP/unit of energy use	127	7.3.2	Country-code TLDs/th pop. 15-69
32	5.3.4	FDI net inflows, % GDP	127	6.2.3	Software spending, % GDP
32	6.2.1	Labor productivity growth, %	127	1.2.3	Cost of redundancy dismissal
42	6.3.1	Intellectual property receipts, % total trade	126	3.3.2	Environmental performance
43	4.2.3	VC recipients, deals/bn PPP\$ GDP	101	6.1.2	PCT patents by origin/bn PPP\$ GDP
45	1.3.1	Policies for doing business	95	5.2.5	Patent families/bn PPP\$ GDP
47	5.2.2	State of cluster development	71	2.3.4	QS university ranking, top 3
			48	6.2.2	Unicorn valuation, % GDP
			40	2.3.3	Global corporate R&D investors, top 3, mn US\$

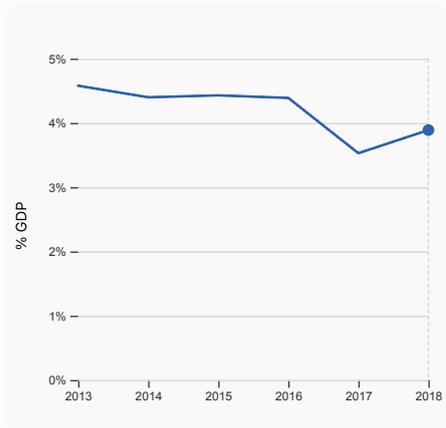
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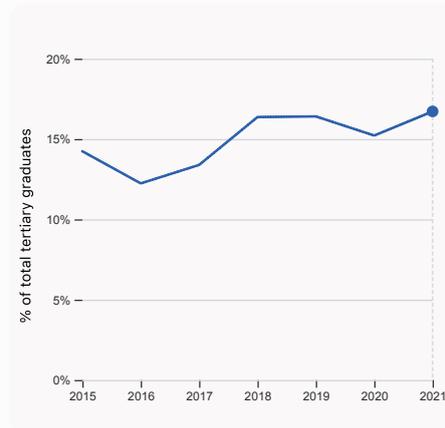
→ Ghana's innovation system

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

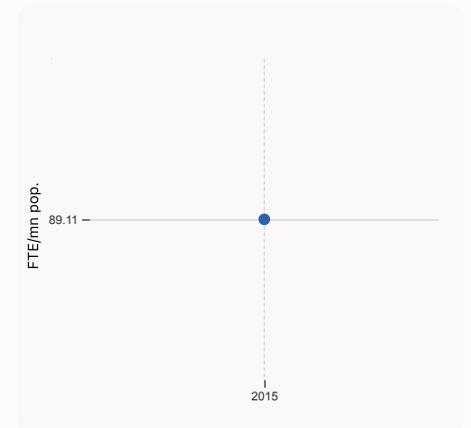
> Innovation inputs in Ghana



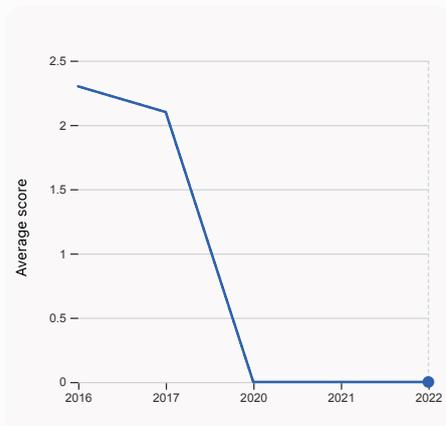
2.1.1 Expenditure on education, % GDP was equal to 3.89% GDP in 2018, up by 0.36 percentage points from the year prior – and equivalent to an indicator rank of 78.



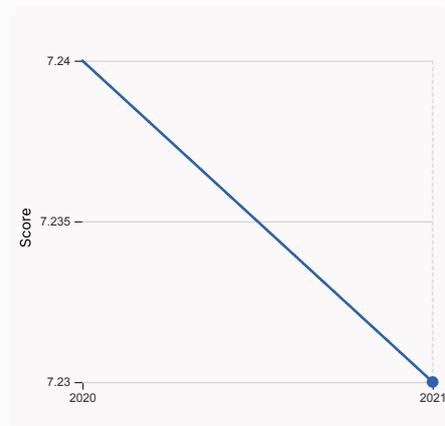
2.2.2 Graduates in science and engineering, % was equal to 16.72% of total tertiary graduates in 2021, up by 1.5 percentage points from the year prior – and equivalent to an indicator rank of 93.



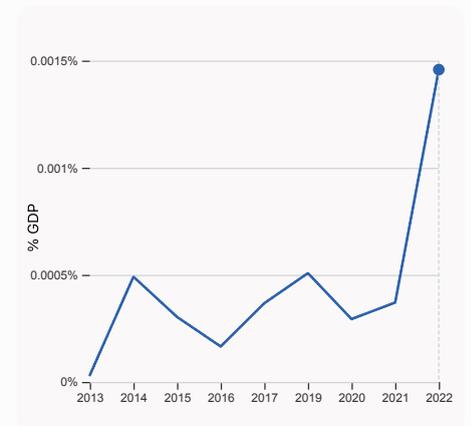
2.3.1 Researchers, FTE/mn pop. was equal to 89.11 FTE/mn pop. in 2015, equivalent to an indicator rank of 91.



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.

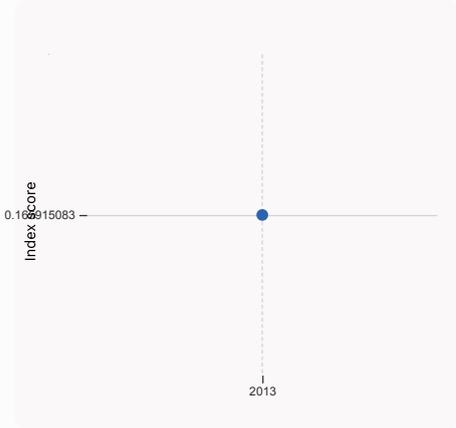


3.1.1 ICT access was equal to a score of 7.23 in 2021, down by 0.14% from the year prior – and equivalent to an indicator rank of 100.

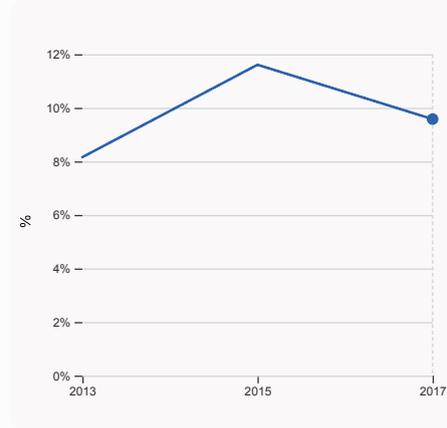


4.2.4 VC received, value, % GDP was equal to 0.00146% GDP in 2022, up by 0.0011 percentage points from the year prior – and equivalent to an indicator rank of 56.

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4.3.2 Domestic industry diversification was equal to an index score of 0.166 in 2013, equivalent to an indicator rank of 56.

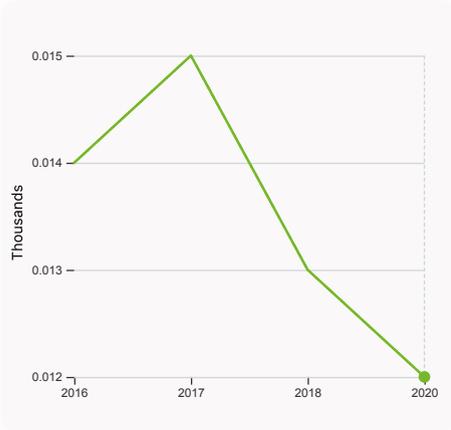


5.1.1 Knowledge-intensive employment, % was equal to 9.58% in 2017, down by 2.03 percentage points from the year prior – and equivalent to an indicator rank of 107.

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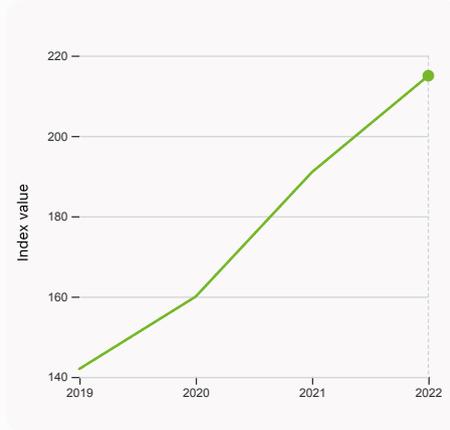


> Innovation outputs in Ghana



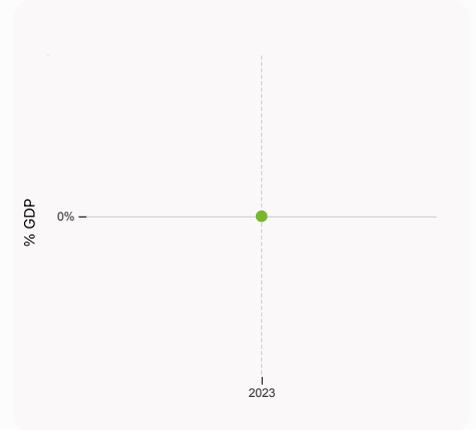
6.1.1 Patents by origin

was equal to 0.012 Thousands in 2020, down by 7.69% from the year prior – and equivalent to an indicator rank of 119.



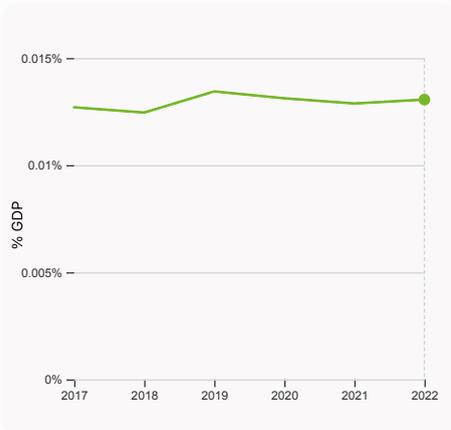
6.1.5 Citable documents H-index

was equal to an index value of 215 in 2022, up by 12.57% from the year prior – and equivalent to an indicator rank of 82.



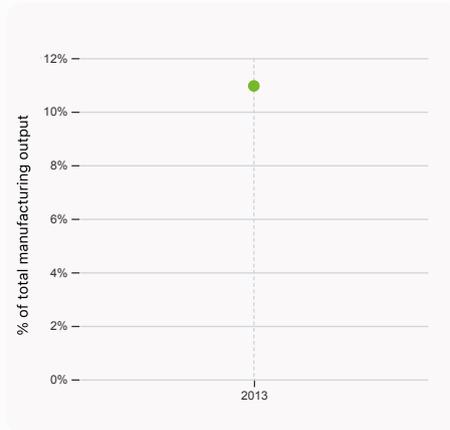
6.2.2 Unicorn valuation, % GDP

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



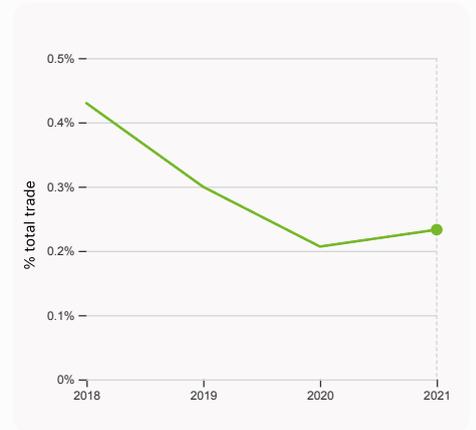
6.2.3 Software spending, % GDP

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, %

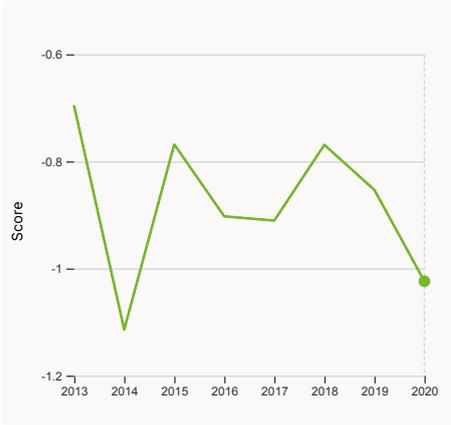
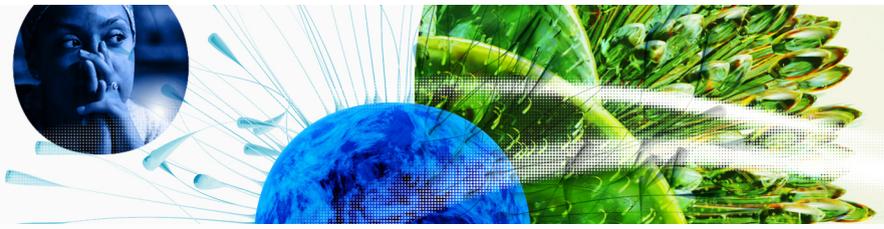
was equal to 10.96 % of total manufacturing output in 2013 – and equivalent to an indicator rank of 86.



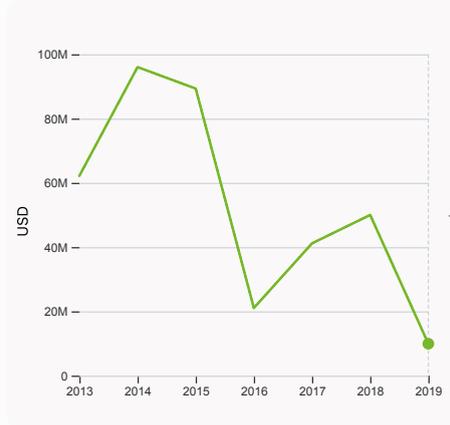
6.3.1 Intellectual property receipts, % total trade

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.

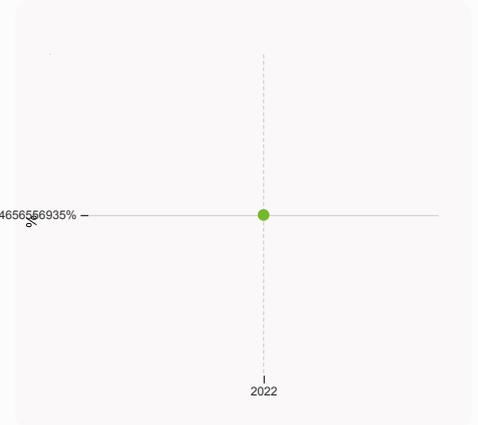
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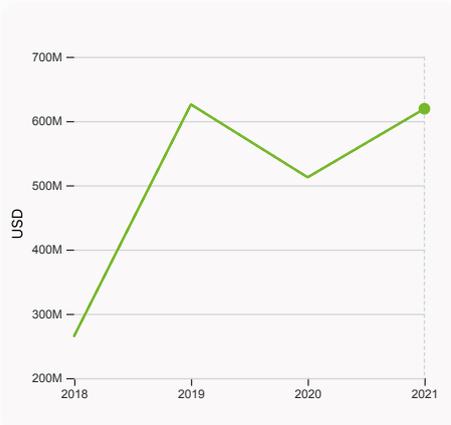
6.3.2 Production and export complexity was equal to a score of -1.024 in 2020, down by 20.015% from the year prior – and equivalent to an indicator rank of 111.



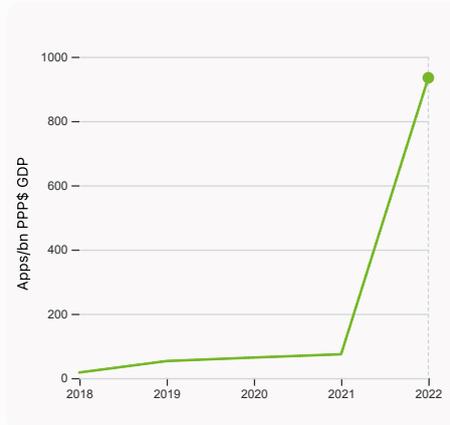
6.3.3 High-tech exports was equal to 9,928,798 USD in 2019, down by 80.15% from the year prior – and equivalent to an indicator rank of 128.



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 934.62 Apps/bn PPP\$ GDP in 2022, up by 1159.94% from the year prior – and equivalent to an indicator rank of 117.

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→ Ghana's innovation top performers

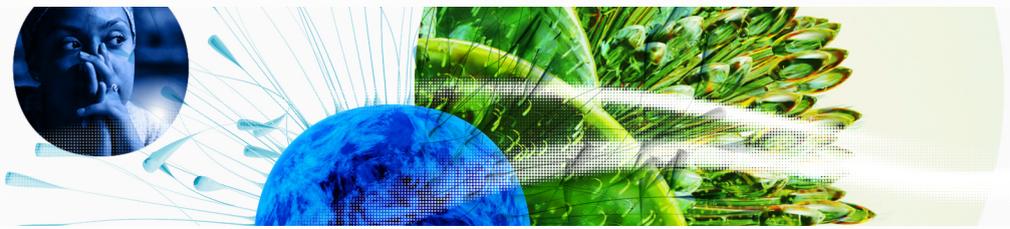
> 7.1.1 Top 15 intangible-asset intensive companies in Ghana

Rank	Firm	Intensity, %
1	SCANCOM PLC	24.26
2	UNILEVER GHANA PLC	65.46
3	DIGICUT ADVERTISING & PRODUCTION LTD	42.62

Source: Brand Finance (<https://brandirectory.com/reports/gift-2022>).

Note: Brand Finance only provides within economy ranks.

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GII 2023 rank

99

Ghana

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

Score / Value Rank

Score / Value Rank

Institutions		41.1 93		Business sophistication		24.2 83	
1.1 Institutional environment		39.2 79		5.1 Knowledge workers		23.1 [89]	
1.1.1 Operational stability for businesses*		45.8 79		5.1.1 Knowledge-intensive employment, %		9.6 107	
1.1.2 Government effectiveness*		32.6 81		5.1.2 Firms offering formal training, %		40.1 34	
1.2 Regulatory environment		27.2 128		5.1.3 GERD performed by business, % GDP		n/a n/a	
1.2.1 Regulatory quality*		36.9 82		5.1.4 GERD financed by business, %		n/a n/a	
1.2.2 Rule of law*		37.3 67		5.1.5 Females employed w/advanced degrees, %		2.9 104	
1.2.3 Cost of redundancy dismissal		49.8 127		5.2 Innovation linkages		25.0 53	
1.3 Business environment		56.8 [42]		5.2.1 University-industry R&D collaboration+		45.2 61	
1.3.1 Policies for doing business*		56.8 45		5.2.2 State of cluster development*		49.4 47	
1.3.2 Entrepreneurship policies and culture*		n/a n/a		5.2.3 GERD financed by abroad, % GDP		n/a n/a	
Human capital and research		18.4 105		5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP		0.0 75	
2.1 Education		43.4 87		5.2.5 Patent families/bn PPP\$ GDP		0.0 95	
2.1.1 Expenditure on education, % GDP		3.9 78		5.3 Knowledge absorption		24.6 106	
2.1.2 Government funding/pupil, secondary, % GDP/cap		19.5 57		5.3.1 Intellectual property payments, % total trade		0.7 56	
2.1.3 School life expectancy, years		12.3 91		5.3.2 High-tech imports, % total trade		2.8 129	
2.1.4 PISA scales in reading, maths and science		n/a n/a		5.3.3 ICT services imports, % total trade		0.6 105	
2.1.5 Pupil-teacher ratio, secondary		16.1 83		5.3.4 FDI net inflows, % GDP		3.9 32	
2.2 Tertiary education		11.7 110		5.3.5 Research talent, % in businesses		n/a n/a	
2.2.1 Tertiary enrolment, % gross		19.5 100		Knowledge and technology outputs		11.7 111	
2.2.2 Graduates in science and engineering, %		16.7 93		6.1 Knowledge creation		7.3 98	
2.2.3 Tertiary inbound mobility, %		0.9 91		6.1.1 Patents by origin/bn PPP\$ GDP		0.1 119	
2.3 Research and development (R&D)		0.3 114		6.1.2 PCT patents by origin/bn PPP\$ GDP		0.0 101	
2.3.1 Researchers, FTE/mn pop.		89.1 91		6.1.3 Utility models by origin/bn PPP\$ GDP		0.0 71	
2.3.2 Gross expenditure on R&D, % GDP		n/a n/a		6.1.4 Scientific and technical articles/bn PPP\$ GDP		n/a n/a	
2.3.3 Global corporate R&D investors, top 3, mn US\$		0.0 40		6.1.5 Citable documents H-index		9.6 82	
2.3.4 QS university ranking, top 3*		0.0 71		6.2 Knowledge impact		18.9 110	
Infrastructure		26.8 105		6.2.1 Labor productivity growth, %		2.0 32	
3.1 Information and communication technologies (ICTs)		51.2 98		6.2.2 Unicorn valuation, % GDP		0.0 48	
3.1.1 ICT access*		58.2 100		6.2.3 Software spending, % GDP		0.0 127	
3.1.2 ICT use*		53.6 101		6.2.4 High-tech manufacturing, %		11.0 86	
3.1.3 Government's online service*		48.7 93		6.3 Knowledge diffusion		9.0 111	
3.1.4 E-participation*		44.2 83		6.3.1 Intellectual property receipts, % total trade		0.2 42	
3.2 General infrastructure		10.5 121		6.3.2 Production and export complexity		31.1 111	
3.2.1 Electricity output, GWh/mn pop.		634.3 105		6.3.3 High-tech exports, % total trade		0.0 128	
3.2.2 Logistics performance*		18.2 89		6.3.4 ICT services exports, % total trade		0.6 96	
3.2.3 Gross capital formation, % GDP		18.0 111		6.3.5 ISO 9001 quality/bn PPP\$ GDP		0.7 113	
3.3 Ecological sustainability		18.6 87		Creative outputs		22.6 71	
3.3.1 GDP/unit of energy use		15.3 23		7.1 Intangible assets		27.4 74	
3.3.2 Environmental performance*		14.9 126		7.1.1 Intangible asset intensity, top 15, %		-52.8 78	
3.3.3 ISO 14001 environment/bn PPP\$ GDP		0.4 96		7.1.2 Trademarks by origin/bn PPP\$ GDP		4.8 123	
Market sophistication		17.1 117		7.1.3 Global brand value, top 5,000		n/a n/a	
4.1 Credit		2.2 130		7.1.4 Industrial designs by origin/bn PPP\$ GDP		5.2 20	
4.1.1 Finance for startups and scaleups*		n/a n/a		7.2 Creative goods and services		26.3 [39]	
4.1.2 Domestic credit to private sector, % GDP		13.2 122		7.2.1 Cultural and creative services exports, % total trade		2.6 8	
4.1.3 Loans from microfinance institutions, % GDP		0.1 50		7.2.2 National feature films/mn pop. 15-69		n/a n/a	
4.2 Investment		7.5 61		7.2.3 Entertainment and media market/th pop. 15-69		n/a n/a	
4.2.1 Market capitalization, % GDP		13.2 68		7.2.4 Creative goods exports, % total trade		0.0 120	
4.2.2 Venture capital (VC) investors, deals/bn PPP\$ GDP		0.0 57		7.3 Online creativity		9.5 116	
4.2.3 VC recipients, deals/bn PPP\$ GDP		0.1 43		7.3.1 Generic top-level domains (TLDs)/th pop. 15-69		0.6 106	
4.2.4 VC received, value, % GDP		0.0 56		7.3.2 Country-code TLDs/th pop. 15-69		0.0 127	
4.3 Trade, diversification, and market scale		41.5 100		7.3.3 GitHub commits/mn pop. 15-69		2.9 92	
4.3.1 Applied tariff rate, weighted avg., %		10.5 121		7.3.4 Mobile app creation/bn PPP\$ GDP		34.3 117	
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

Code	Indicator name	Economy Year	Model Year	Source
1.3.2	Entrepreneurship policies and culture	n/a	2022	Global Entrepreneurship Monitor
2.1.4	PISA scales in reading, maths and science	n/a	2018	OECD, PISA
2.3.2	Gross expenditure on R&D, % GDP	n/a	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
4.1.1	Finance for startups and scaleups	n/a	2022	Global Entrepreneurship Monitor
5.1.3	GERD performed by business, % GDP	n/a	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.1.4	GERD financed by business, %	n/a	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.2.3	GERD financed by abroad, % GDP	n/a	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.3.5	Research talent, % in businesses	n/a	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
7.1.3	Global brand value, top 5,000	n/a	2023	Brand Finance; International Monetary Fund
7.2.2	National feature films/mn pop. 15-69	n/a	2021	OMDIA; United Nations, World Population Prospects
7.2.3	Entertainment and media market/th pop. 15-69	n/a	2022	PwC, GEMO; United Nations, World Population Prospects; International Monetary Fund

> Outdated data for Ghana

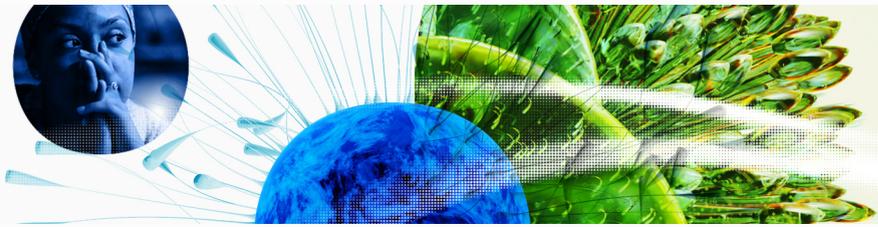
Code	Indicator name	Economy Year	Model Year	Source
2.1.1	Expenditure on education, % GDP	2018	2021	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	2014	2019	UNESCO Institute for Statistics

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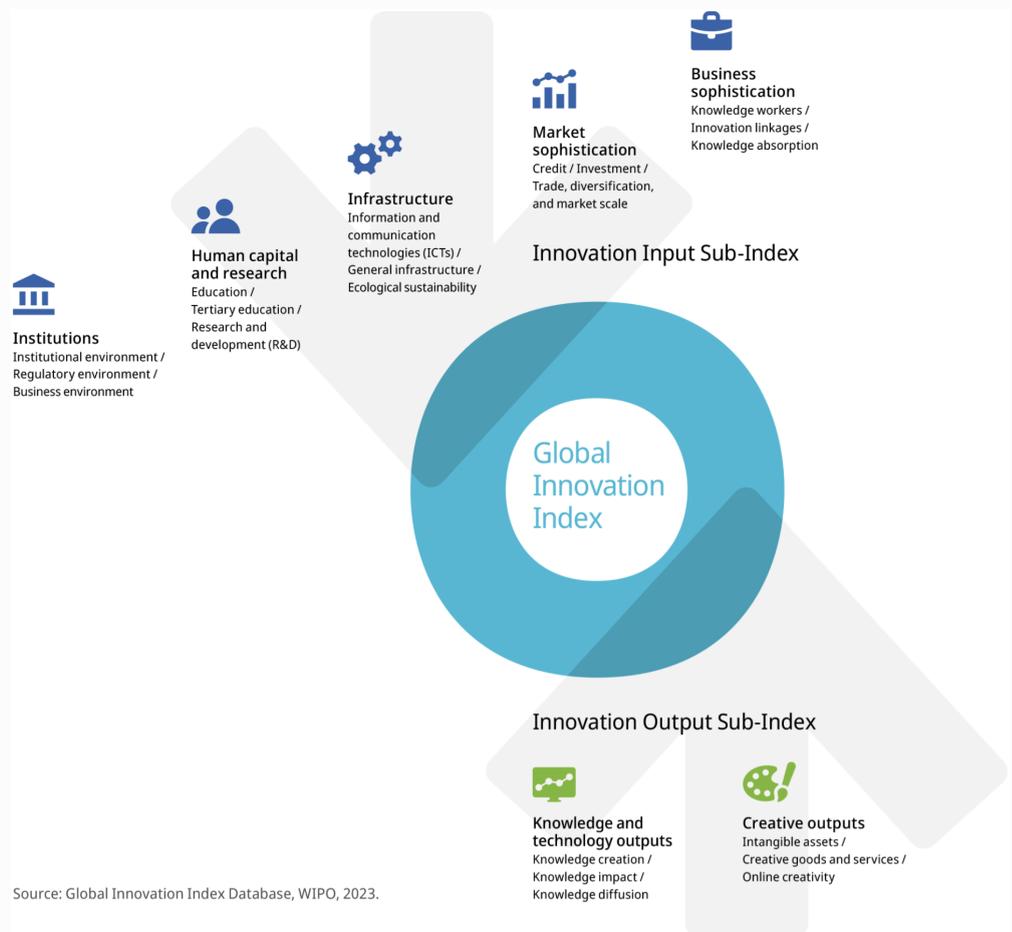
Code	Indicator name	Economy Year	Model Year	Source
2.3.1	Researchers, FTE/mn pop.	2015	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
3.2.1	Electricity output, GWh/mn pop.	2020	2021	International Energy Agency
4.3.2	Domestic industry diversification	2013	2020	United Nations Industrial Development Organization
5.1.1	Knowledge-intensive employment, %	2017	2022	International Labour Organization
5.1.2	Firms offering formal training, %	2013	2019	World Bank Enterprise Surveys
5.1.5	Females employed w/advanced degrees, %	2017	2022	International Labour Organization
5.3.2	High-tech imports, % total trade	2019	2021	United Nations Comtrade Database; World Trade Organization and United Nations Conference on Trade and Development
6.1.1	Patents by origin/bn PPP\$ GDP	2020	2021	World Intellectual Property Organization; International Monetary Fund
6.1.3	Utility models by origin/bn PPP\$ GDP	2018	2021	World Intellectual Property Organization; International Monetary Fund
6.2.4	High-tech manufacturing, %	2013	2020	United Nations Industrial Development Organization
6.3.3	High-tech exports, % total trade	2019	2021	United Nations Comtrade Database; World Trade Organization and United Nations Conference on Trade and Development; Trade Data Monitor.
7.1.2	Trademarks by origin/bn PPP\$ GDP	2020	2021	World Intellectual Property Organization; International Monetary Fund
7.1.4	Industrial designs by origin/bn PPP\$ GDP	2020	2021	World Intellectual Property Organization; International Monetary Fund
7.2.4	Creative goods exports, % total trade	2019	2021	United Nations Comtrade Database; World Trade Organization and United Nations Conference on Trade and Development

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→ 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.



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.