Global Innovation Index 2022

GHANA

95th Ghana ranks 95th among the 132 economies featured in the GII 2022.

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 Ghana 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 Ghana in the GII 2022 is between ranks 91 and 102.

Rankings for Ghana (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	108	113	93
2021	112	114	103
2022	95	105	88

- Ghana performs better in innovation outputs than innovation inputs in 2022.
- This year Ghana ranks 105th in innovation inputs, higher than both 2021 and 2020.
- As for innovation outputs, Ghana ranks 88th. This position is higher than both 2021 and 2020.

16th Ghana ranks 16th among the 36 lower-middle-income group economies.

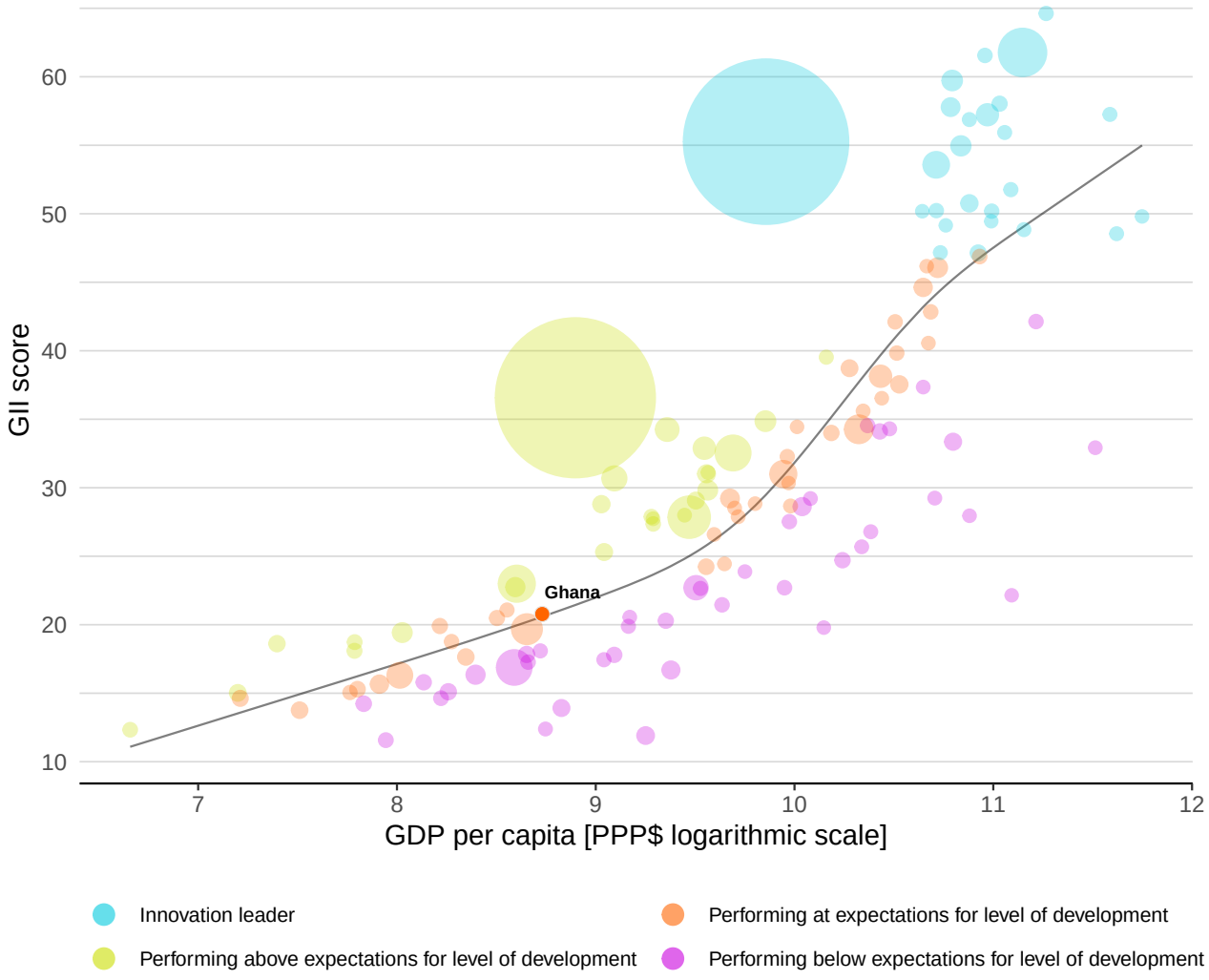
5th Ghana ranks 5th among the 27 economies in Sub-Saharan Africa.

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.

The positive relationship between innovation and development

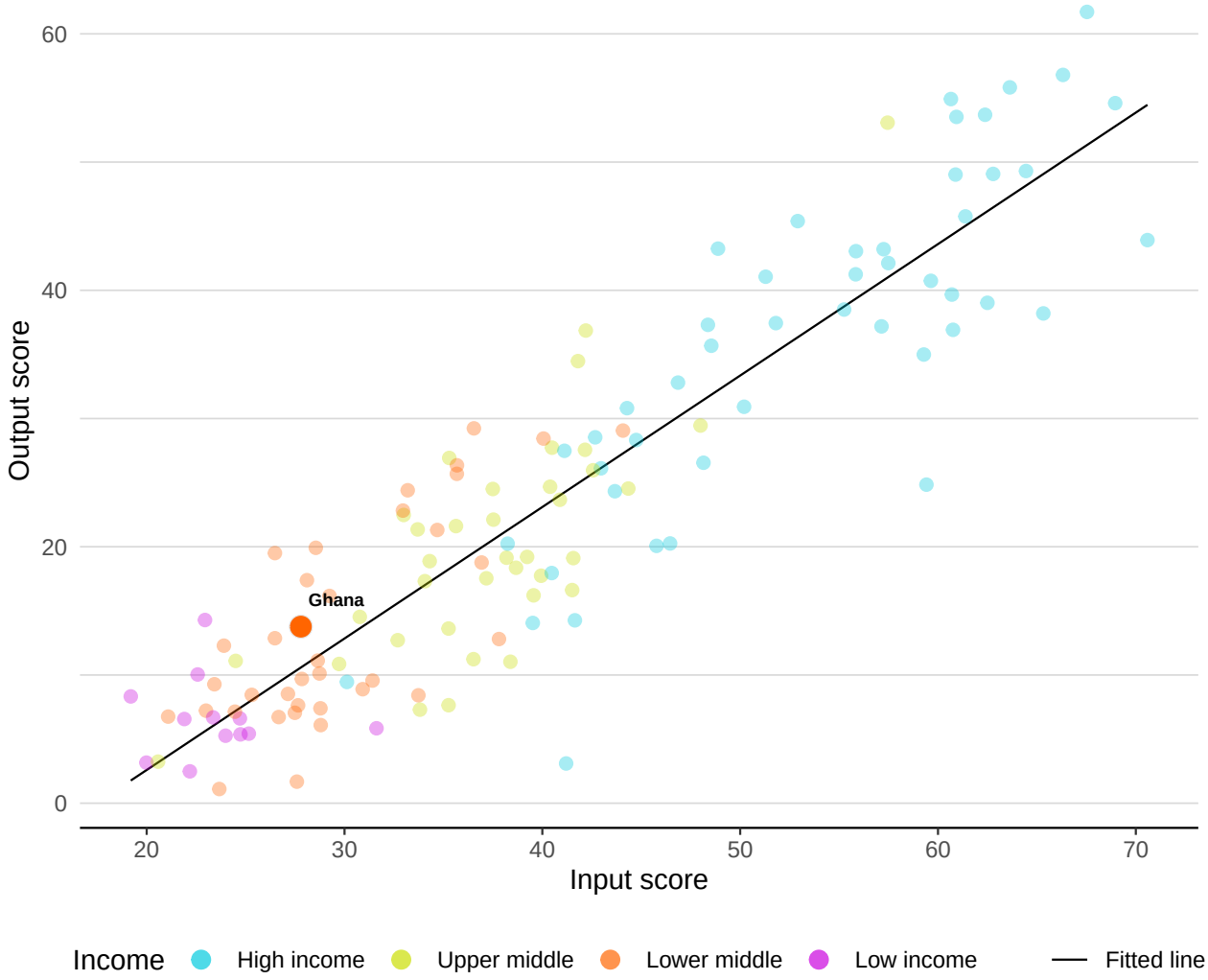


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

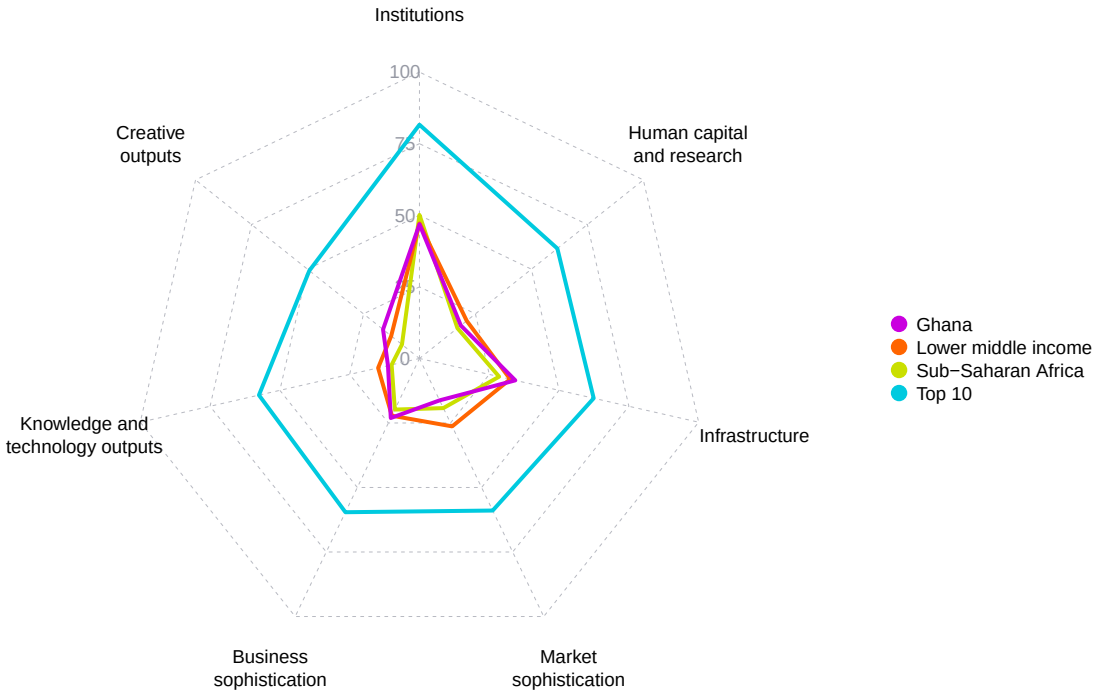
Ghana produces more innovation outputs relative to its level of innovation investments.

Innovation input to output performance



BENCHMARKING AGAINST OTHER LOWER MIDDLE-INCOME GROUP ECONOMIES AND SUB-SAHARAN AFRICA

The seven GII pillar scores for Ghana



Lower-middle-income group economies

Ghana performs above the lower-middle-income group average in three pillars, namely: Infrastructure; Business sophistication; and, Creative outputs.

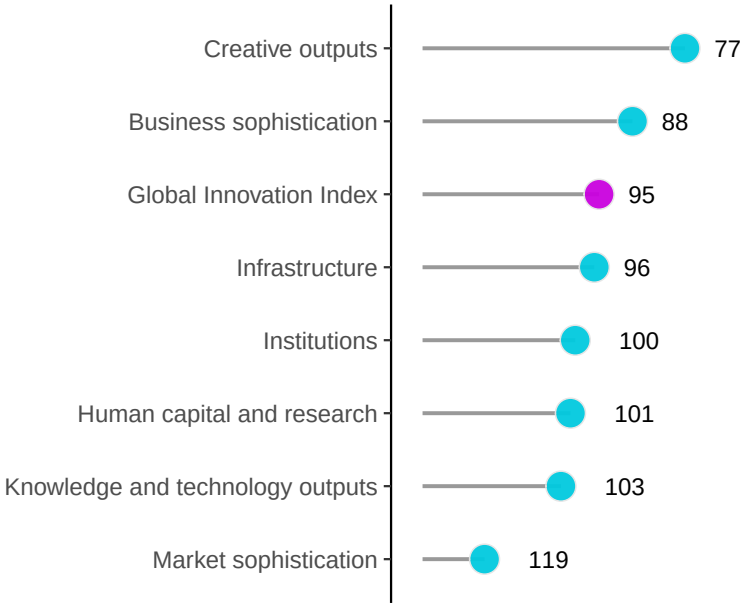
Sub-Saharan Africa

Ghana performs above the regional average in five pillars, namely: Human capital and research; Infrastructure; Business sophistication; Knowledge and technology outputs; and, Creative outputs.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Ghana performs best in Creative outputs and its weakest performance is in Market sophistication.

The seven GII pillar ranks for Ghana



Note: The highest possible ranking in each pillar is 1.

The full WIPO Intellectual Property Statistics profile for Ghana can be found at:

https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=GH.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the indicator strengths and weaknesses of Ghana in the GII 2022.

Strengths and weaknesses for Ghana

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
1.3.1	Policies for doing business	53	1.2.3	Cost of redundancy dismissal	128
3.3.1	GDP/unit of energy use	25	2.3.3	Global corporate R&D investors, top 3, mn USD	38
5.1.2	Firms offering formal training, %	33	2.3.4	QS university ranking, top 3	72
5.2.2	State of cluster development and depth	42	3.3.2	Environmental performance	124
5.3.4	FDI net inflows, % GDP	22	4.1.2	Domestic credit to private sector, % GDP	125
6.2.1	Labor productivity growth, %	39	5.2.5	Patent families/bn PPP$ GDP	101
6.3.1	Intellectual property receipts, % total trade	26	5.3.2	High-tech imports, % total trade	127
7.1.4	Industrial designs by origin/bn PPP$ GDP	22	6.2.3	Software spending, % GDP	121
7.2.1	Cultural and creative services exports, % total trade	7	6.3.3	High-tech exports, % total trade	126
7.2.4	Printing and other media, % manufacturing	20	7.3.4	Mobile app creation/bn PPP$ GDP	113

GII 2022 rank

Ghana

95

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
88	105	Lower middle	SSA	31.7	193.6	6,190

		Score/ Value	Rank
Institutions		**46.9**	**100**
1.1	**Political environment**	55.9	79
1.1.1	Political and operational stability*	65.5	74
1.1.2	Government effectiveness*	46.4	78
1.2	**Regulatory environment**	31.1	128 ○ ◇
1.2.1	Regulatory quality*	44.9	73 ◆
1.2.2	Rule of law*	45.1	61 ◆
1.2.3	Cost of redundancy dismissal	49.8	128 ○ ◇
1.3	**Business environment**	53.5	[51]
1.3.1	Policies for doing business†	53.5	53 ●
1.3.2	Entrepreneurship policies and culture*	n/a	n/a
Human capital and research		**18.5**	**101**
2.1	**Education**	44.5	82
2.1.1	Expenditure on education, % GDP	3.9	82
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.9	59
2.1.3	School life expectancy, years	12.0	91
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary	14.5	68
2.2	**Tertiary education**	10.7	108
2.2.1	Tertiary enrolment, % gross	18.7	99
2.2.2	Graduates in science and engineering, %	15.2	96
2.2.3	Tertiary inbound mobility, %	1.0	88
2.3	**Research and development (R&D)**	0.2	114
2.3.1	Researchers, FTE/mn pop.	89.1	91
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a
2.3.3	Global corporate R&D investors, top 3, mn USD	0.0	38 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	72 ○ ◇
Infrastructure		**34.3**	**96**
3.1	**Information and communication technologies (ICTs)**	62.3	91
3.1.1	ICT access*	72.4	93
3.1.2	ICT use*	50.1	93
3.1.3	Government's online service*	63.5	80
3.1.4	E-participation*	63.1	82
3.2	**General infrastructure**	16.6	116
3.2.1	Electricity output, GWh/mn pop.	634.4	104
3.2.2	Logistics performance*	24.2	97
3.2.3	Gross capital formation, % GDP	18.6	103
3.3	**Ecological sustainability**	24.1	77
3.3.1	GDP/unit of energy use	15.0	25 ● ◆
3.3.2	Environmental performance*	27.7	124 ○
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	89
Market sophistication		**16.2**	**119**
4.1	**Credit**	1.9	130 ○ ◇
4.1.1	Finance for startups and scaleups*	n/a	n/a
4.1.2	Domestic credit to private sector, % GDP	11.5	125 ○
4.1.3	Loans from microfinance institutions, % GDP	0.1	54
4.2	**Investment**	6.2	68
4.2.1	Market capitalization, % GDP	13.5	69
4.2.2	Venture capital investors, deals/bn PPP$ GDP	0.0	55
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	0.0	45
4.2.4	Venture capital received, value, % GDP	0.0	61
4.3	**Trade, diversification, and market scale**	40.6	98
4.3.1	Applied tariff rate, weighted avg., %	10.5	121
4.3.2	Domestic industry diversification	85.7	58
4.3.3	Domestic market scale, bn PPP$	193.6	70

		Score/ Value	Rank
Business sophistication		**23.1**	**88**
5.1	**Knowledge workers**	22.6	[86]
5.1.1	Knowledge-intensive employment, %	9.6	108
5.1.2	Firms offering formal training, %	40.1	33 ●
5.1.3	GERD performed by business, % GDP	n/a	n/a
5.1.4	GERD financed by business, %	n/a	n/a
5.1.5	Females employed w/advanced degrees, %	2.9	101
5.2	**Innovation linkages**	25.7	52 ● ◆
5.2.1	University-industry R&D collaboration†	44.8	62
5.2.2	State of cluster development and depth†	52.8	42 ●
5.2.3	GERD financed by abroad, % GDP	n/a	n/a
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	79
5.2.5	Patent families/bn PPP$ GDP	0.0	101 ○ ◇
5.3	**Knowledge absorption**	20.9	106
5.3.1	Intellectual property payments, % total trade	0.6	60
5.3.2	High-tech imports, % total trade	2.8	127 ○
5.3.3	ICT services imports, % total trade	0.6	109
5.3.4	FDI net inflows, % GDP	4.3	22 ●
5.3.5	Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs		**11.3**	**103**
6.1	**Knowledge creation**	5.8	100
6.1.1	Patents by origin/bn PPP$ GDP	0.1	119
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	96
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	75
6.1.4	Scientific and technical articles/bn PPP$ GDP	14.3	66
6.1.5	Citable documents H-index	8.5	83
6.2	**Knowledge impact**	16.0	105
6.2.1	Labor productivity growth, %	1.8	39 ●
6.2.2	New businesses/th pop. 15–64	0.9	84
6.2.3	Software spending, % GDP	0.0	121 ○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.6	115
6.2.5	High-tech manufacturing, %	11.0	86
6.3	**Knowledge diffusion**	12.0	96
6.3.1	Intellectual property receipts, % total trade	0.7	26 ● ◆
6.3.2	Production and export complexity	21.6	98
6.3.3	High-tech exports, % total trade	0.0	126 ○
6.3.4	ICT services exports, % total trade	0.4	108
Creative outputs		**16.3**	**[77]**
7.1	**Intangible assets**	16.4	[87]
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a
7.1.2	Trademarks by origin/bn PPP$ GDP	4.8	120
7.1.3	Global brand value, top 5,000, % GDP	n/a	n/a
7.1.4	Industrial designs by origin/bn PPP$ GDP	5.2	22 ●
7.2	**Creative goods and services**	31.8	[22]
7.2.1	Cultural and creative services exports, % total trade	2.5	7 ● ◆
7.2.2	National feature films/mn pop. 15–69	n/a	n/a
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	1.6	20 ●
7.2.5	Creative goods exports, % total trade	0.0	118
7.3	**Online creativity**	0.4	113
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.6	100
7.3.2	Country-code TLDs/th pop. 15–69	0.0	124
7.3.3	GitHub commit pushes received/mn pop. 15–69	1.0	101
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	113 ○

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/global_innovation_index/en/2022. 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.

Missing data for Ghana

Code	Indicator name	Economy year	Model year	Source
1.3.2	Entrepreneurship policies and culture	n/a	2021	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	2020	UNESCO Institute for Statistics
4.1.1	Finance for startups and scaleups	n/a	2021	Global Entrepreneurship Monitor
5.1.3	GERD performed by business, % GDP	n/a	2020	UNESCO Institute for Statistics
5.1.4	GERD financed by business, %	n/a	2019	UNESCO Institute for Statistics
5.2.3	GERD financed by abroad, % GDP	n/a	2019	UNESCO Institute for Statistics
5.3.5	Research talent, % in businesses	n/a	2020	UNESCO Institute for Statistics
7.1.1	Intangible asset intensity, top 15, %	n/a	2021	Brand Finance
7.1.3	Global brand value, top 5,000, % GDP	n/a	2021	Brand Finance
7.2.2	National feature films/mn pop. 15–69	n/a	2019	OMDIA
7.2.3	Entertainment and media market/th pop. 15–69	n/a	2021	PwC, GEMO

Outdated data for Ghana

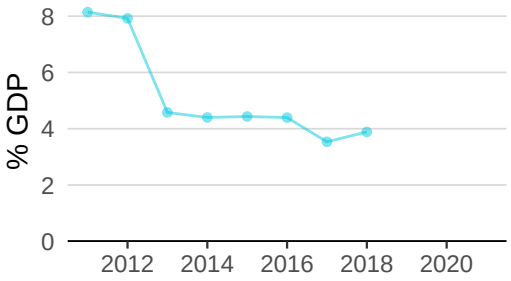
Code	Indicator name	Economy year	Model year	Source
2.1.1	Expenditure on education, % GDP	2018	2020	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	2014	2018	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2015	2020	UNESCO Institute for Statistics
4.3.2	Domestic industry diversification	2013	2019	United Nations Industrial Development Organization
5.1.1	Knowledge-intensive employment, %	2017	2021	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	2021	International Labour Organization
5.3.1	Intellectual property payments, % total trade	2019	2020	World Trade Organization and United Nations Conference on Trade and Development
5.3.2	High-tech imports, % total trade	2019	2020	United Nations Comtrade Database
5.3.3	ICT services imports, % total trade	2019	2020	World Trade Organization and United Nations Conference on Trade and Development

Code	Indicator name	Economy year	Model year	Source
6.1.3	Utility models by origin/bn PPP$ GDP	2018	2020	World Intellectual Property Organization
6.2.2	New businesses/th pop. 15–64	2012	2020	World Bank, Enterpreneurship Database
6.2.5	High-tech manufacturing, %	2013	2019	United Nations Industrial Development Organization
6.3.1	Intellectual property receipts, % total trade	2019	2020	World Trade Organization and United Nations Conference on Trade and Development
6.3.3	High-tech exports, % total trade	2019	2020	United Nations Comtrade Database
6.3.4	ICT services exports, % total trade	2019	2020	World Trade Organization and United Nations Conference on Trade and Development
7.2.4	Printing and other media, % manufacturing	2013	2019	United Nations Industrial Development Organization
7.2.5	Creative goods exports, % total trade	2019	2020	United Nations Comtrade Database

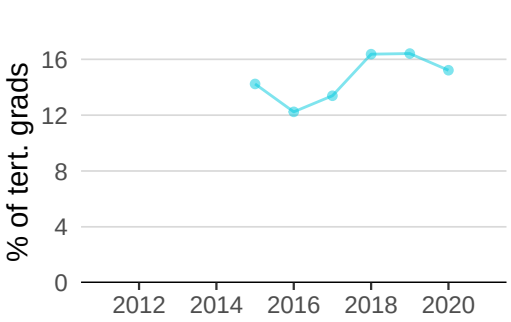
GHANA'S INNOVATION SYSTEM

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

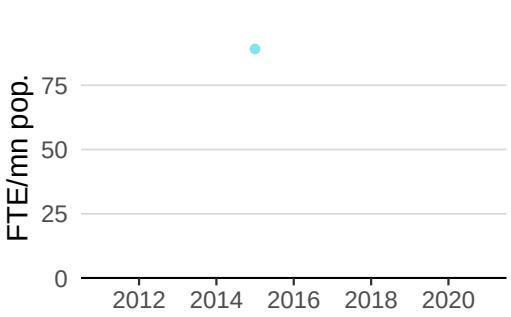
Innovation inputs



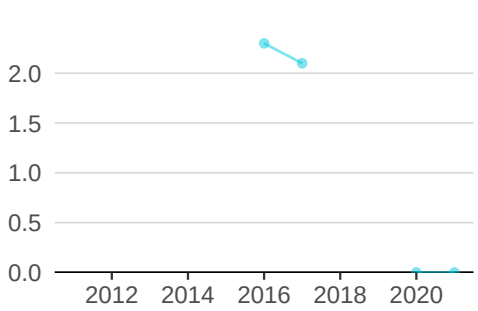
2.1.1 Expenditure on education was equal to 3.9% GDP in 2018–up by 10 percentage points from the year prior–and equivalent to an indicator rank of 82.



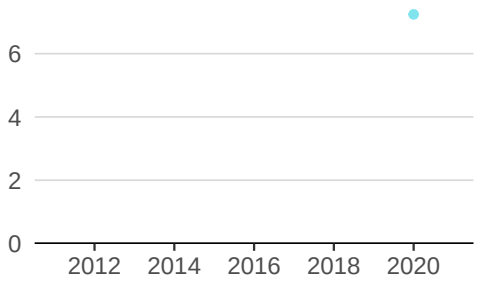
2.2.2 Graduates in science and engineering was equal to 15.2% of tert. grads in 2020–down by 7 percentage points from the year prior–and equivalent to an indicator rank of 96.



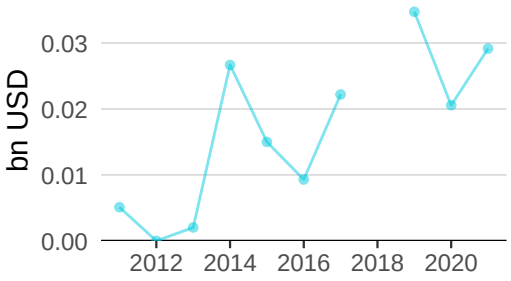
2.3.1 Researchers was equal to 89.1 FTE/mn pop. in 2015 and equivalent to an indicator rank of 91.



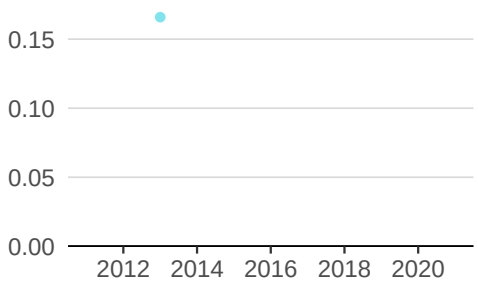
2.3.4 QS university ranking was equal to 0.0 in 2021–effectively unchanged from the year prior–and equivalent to an indicator rank of 72.



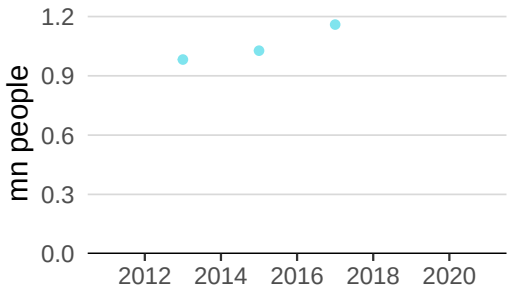
3.1.1 ICT access was equal to 7.2 in 2020 and equivalent to an indicator rank of 93.



4.2.4 Venture capital received was equal to 0.0 bn USD in 2021–up by 42 percentage points from the year prior–and equivalent to an indicator rank of 61.

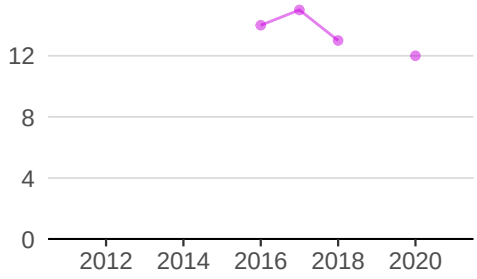


4.3.2 Domestic industry diversification was equal to 0.2 in 2013 and equivalent to an indicator rank of 58.

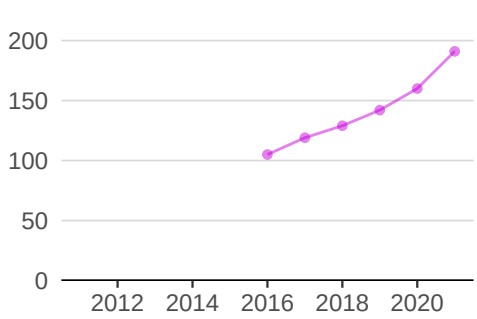


5.1.1 Knowledge-intensive employment was equal to 1.2 mn people in 2017 and equivalent to an indicator rank of 108.

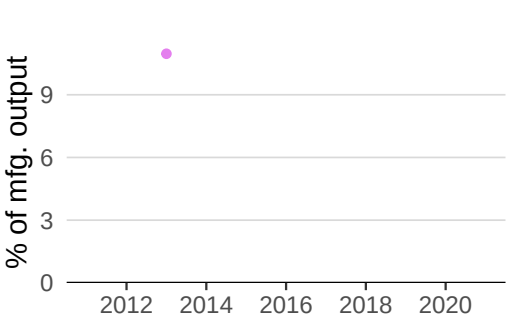
Innovation outputs



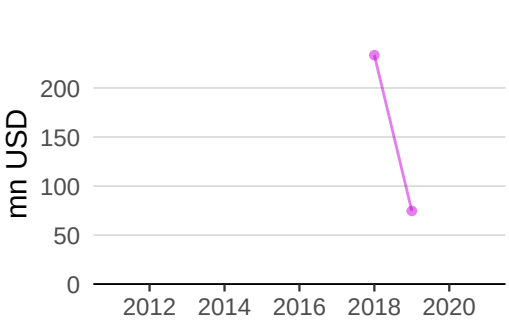
6.1.1 Patents by origin was equal to 12.0 in 2020 and equivalent to an indicator rank of 119.



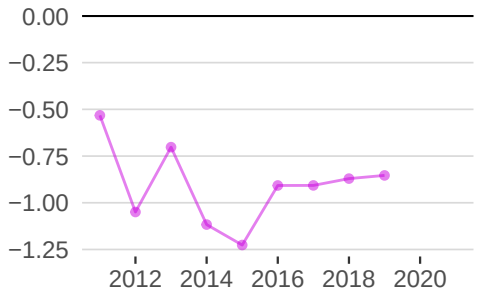
6.1.5 Citable documents H-index was equal to 191.0 in 2021–up by 19 percentage points from the year prior–and equivalent to an indicator rank of 83.



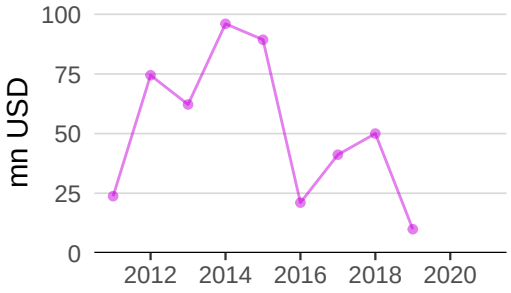
6.2.5 High-tech manufacturing was equal to 11.0% of mfg. output in 2013 and equivalent to an indicator rank of 86.



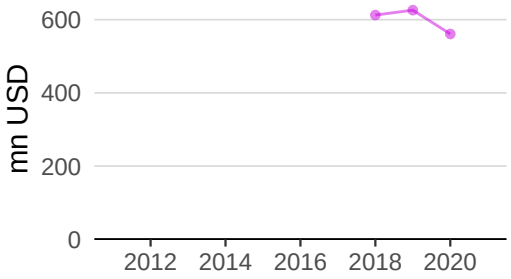
6.3.1 Intellectual property receipts was equal to 74.7 mn USD in 2019–down by 68 percentage points from the year prior–and equivalent to an indicator rank of 26.



6.3.2 Production and export complexity was equal to -0.9 in 2019–up by 2 percentage points from the year prior–and equivalent to an indicator rank of 98.



6.3.3 High-tech exports was equal to 9.9 mn USD in 2019–down by 80 percentage points from the year prior–and equivalent to an indicator rank of 126.



7.2.1 Cultural and creative services exports was equal to 560.9 mn USD in 2020–down by 10 percentage points from the year prior–and equivalent to an indicator rank of 7.

GHANA'S INNOVATION TOP PERFORMERS

2.3.3 Global corporate R&D investors

Firm	Industry	R&D	R&D Growth	R&D Intensity	Rank

No observations

Source: European Commission's Joint Research Centre (https://iri.jrc.ec.europa.eu/scoreboard/2021-eu-industrial-rd-investment-scoreboard).

2.3.4 QS university ranking

University	Score	Rank

No observations

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2022).

7.1.1 Intangible asset intensity, top 15

Firm	Rank

No observations

Source: Brand Finance (https://brandirectory.com/reports/gift-2021).

7.1.3 Global brand value, top 5,000

Brand	Industry	Rank

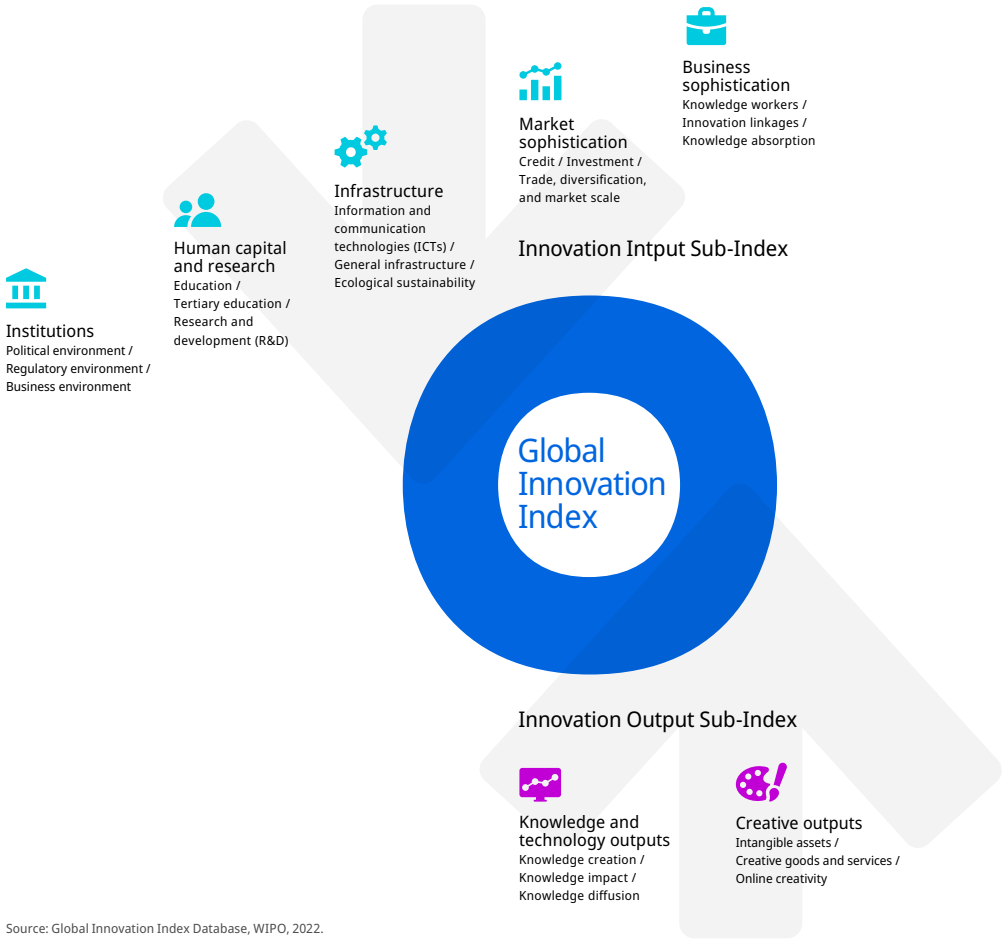
No observations

Source: Brand Finance (https://brandirectory.com).

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 Database, WIPO, 2022.

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.