Global Innovation Index 2021

GHANA

112th Ghana ranks 112th among the 132 economies featured in the GII 2021.

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 2021 is between ranks 102 and 112.

Rankings for Ghana (2019–2021)

	GII	Innovation inputs	Innovation outputs
2021	112	114	103
2020	108	113	93
2019	106	109	97

- Ghana performs better in innovation outputs than innovation inputs in 2021.
- This year Ghana ranks 114th in innovation inputs, lower than both 2020 and 2019.
- As for innovation outputs, Ghana ranks 103rd. This position is lower than both 2020 and 2019.

23rd Ghana ranks 23rd among the 34 lower middle-income group economies.

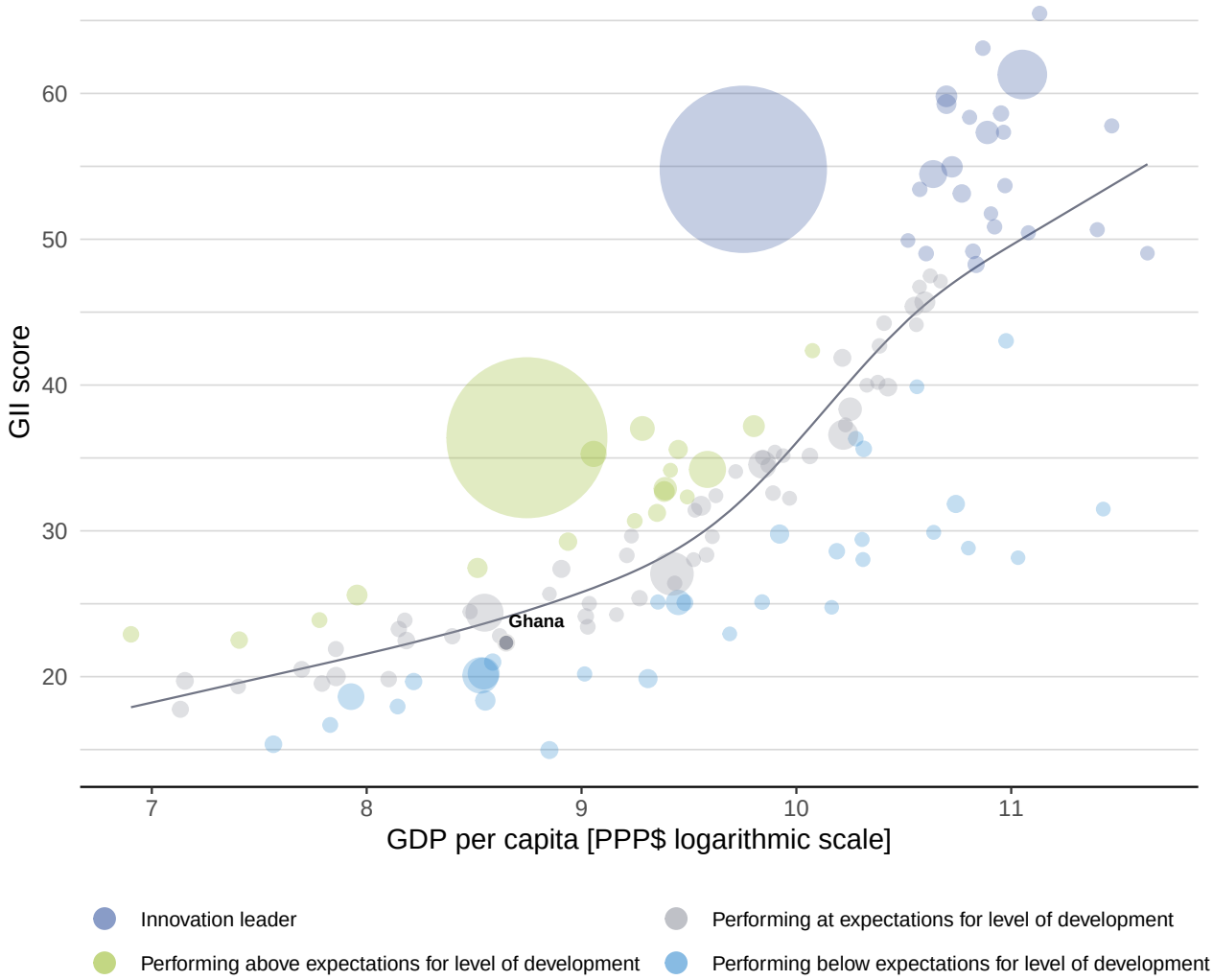
12th Ghana ranks 12th among the 27 economies in Sub-Saharan Africa.

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

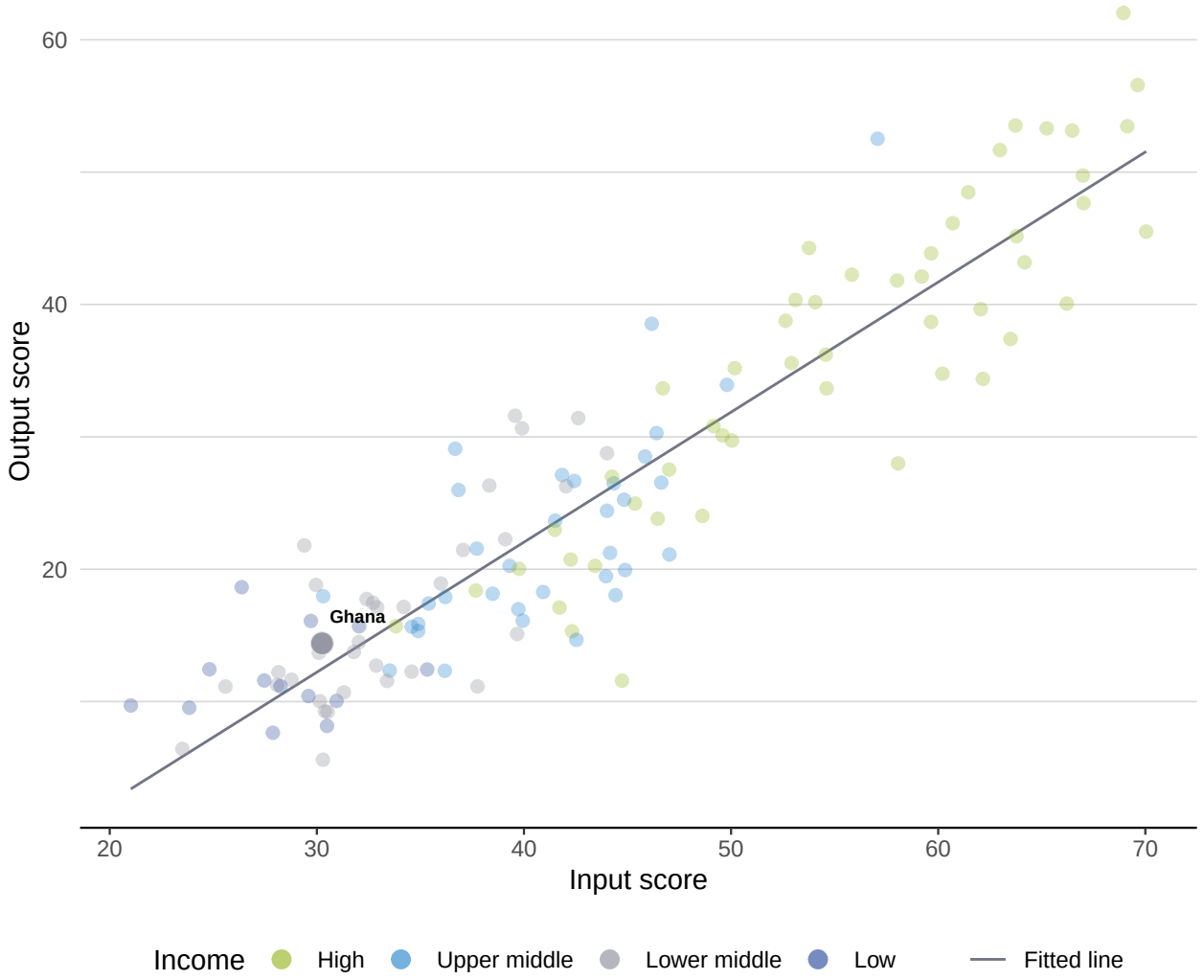


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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 Infrastructure.

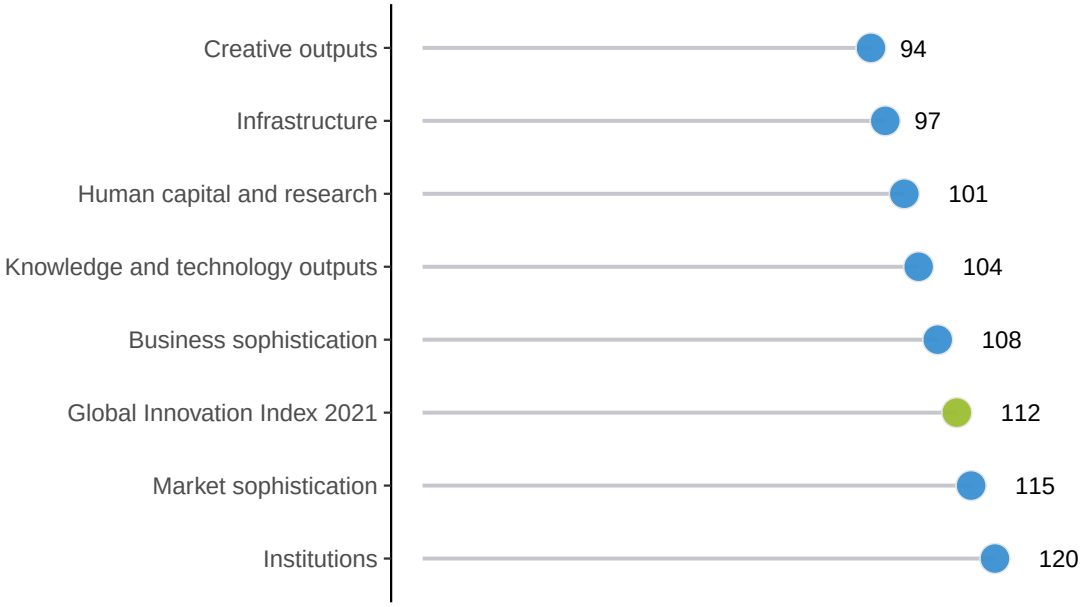
Sub-Saharan Africa

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

OVERVIEW OF RANKINGS IN THE SEVEN GII 2021 AREAS

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

The seven GII pillar ranks for Ghana



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

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Ghana in the GII 2021.

Strengths and weaknesses for Ghana

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
3.3.1	GDP/unit of energy use	36	1.2	Regulatory environment	128
4.1.3	Microfinance gross loans, % GDP	32	1.2.3	Cost of redudancy dismissal	127
5.1.2	Firms offering formal training, %	29	1.3.2	Ease of resolving insolvency	127
5.2.1	University-industry R&D collaboration	45	2.3.3	Global corporate R&D investors, top 3, mn US$	41
5.2.2	State of cluster development and depth	42	2.3.4	QS university ranking, top 3	74
5.2.3	GERD financed by abroad, % GDP	35	3.3.2	Environmental performance	125
5.3.4	FDI net inflows, % GDP	19	5.1.4	GERD financed by business, %	100
6.2.1	Labor productivity growth, %	11	5.2.5	Patent families/bn PPP$ GDP	100
7.1.3	Industrial designs by origin/bn PPP$ GDP	24	5.3.2	High-tech imports, % total trade	126
7.2.4	Printing and other media, % manufacturing	25	6.1.2	PCT patents by origin/bn PPP$ GDP	98
			6.2.3	Software spending, % GDP	122

Ghana

GII 2021 rank
112

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
103	114	Lower middle	SSF	31.1	175.6	5,707	108

		Score/ Value	Rank	
Institutions		**46.2**	**120**	
1.1	**Political environment**	**52.7**	**87**	
1.1.1	Political and operational stability*	66.1	74	
1.1.2	Government effectiveness*	46.0	88	
1.2	**Regulatory environment**	**30.8**	**128**	○ ◇
1.2.1	Regulatory quality*	40.6	78	◆
1.2.2	Rule of law*	48.0	61	◆
1.2.3	Cost of redundancy dismissal	49.8	127	○ ◇
1.3	**Business environment**	**55.2**	**118**	
1.3.1	Ease of starting a business*	85.0	89	
1.3.2	Ease of resolving insolvency*	25.4	127	○
Human capital and research		**18.9**	**101**	
2.1	**Education**	**41.2**	**92**	
2.1.1	Expenditure on education, % GDP	4.0	68	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.3	52	
2.1.3	School life expectancy, years	11.9	93	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.2	73	
2.2	**Tertiary education**	**13.4**	**108**	
2.2.1	Tertiary enrolment, % gross	17.2	101	
2.2.2	Graduates in science and engineering, %	16.4	92	
2.2.3	Tertiary inbound mobility, %	1.4	84	
2.3	**Research and development (R&D)**	**2.1**	**93**	
2.3.1	Researchers, FTE/mn pop.	89.1	90	
2.3.2	Gross expenditure on R&D, % GDP	0.4	73	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**31.7**	**97**	
3.1	**Information and communication technologies (ICTs)**	**53.7**	**91**	
3.1.1	ICT access*	42.2	102	
3.1.2	ICT use*	46.0	90	
3.1.3	Government's online service*	63.5	80	
3.1.4	E-participation*	63.1	82	
3.2	**General infrastructure**	**19.2**	**114**	
3.2.1	Electricity output, GWh/mn pop.	411.9	111	
3.2.2	Logistics performance*	24.1	101	
3.2.3	Gross capital formation, % GDP	21.7	72	
3.3	**Ecological sustainability**	**22.1**	**86**	
3.3.1	GDP/unit of energy use	13.6	36	●
3.3.2	Environmental performance*	27.6	125	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	98	
Market sophistication		**36.7**	**115**	
4.1	**Credit**	**27.2**	**115**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	12.4	123	
4.1.3	Microfinance gross loans, % GDP	0.6	32	●
4.2	**Investment**	**18.4**	**119**	
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	8.5	70	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	75	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	48	
4.3	**Trade, diversification, and market scale**	**64.5**	**75**	
4.3.1	Applied tariff rate, weighted avg., %	10.0	118	
4.3.2	Domestic industry diversification	88.2	58	
4.3.3	Domestic market scale, bn PPP$	175.6	69	

		Score/ Value	Rank	
Business sophistication		**17.8**	**108**	
5.1	**Knowledge workers**	**19.2**	**103**	
5.1.1	Knowledge-intensive employment, %	12.2	104	
5.1.2	Firms offering formal training, %	40.1	29	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.1	100	○ ◇
5.1.5	Females employed w/advanced degrees, %	3.5	99	
5.2	**Innovation linkages**	**21.9**	**60**	
5.2.1	University-industry R&D collaboration†	47.6	45	● ◆
5.2.2	State of cluster development and depth†	51.7	42	●
5.2.3	GERD financed by abroad, % GDP	0.1	35	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	69	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**12.2**	**[130]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	2.9	126	○ ◇
5.3.3	ICT services imports, % total trade	n/a	n/a	
5.3.4	FDI net inflows, % GDP	5.3	19	●
5.3.5	Research talent, % in businesses	1.0	80	
Knowledge and technology outputs		**11.9**	**104**	
6.1	**Knowledge creation**	**6.0**	**102**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	114	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	72	
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.6	73	
6.1.5	Citable documents H-index	8.9	83	
6.2	**Knowledge impact**	**21.2**	**97**	
6.2.1	Labor productivity growth, %	3.8	11	●
6.2.2	New businesses/th pop. 15–64	0.9	85	
6.2.3	Software spending, % GDP	0.0	122	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	124	
6.2.5	High-tech manufacturing, %	11.0	86	
6.3	**Knowledge diffusion**	**8.6**	**[101]**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	25.4	102	
6.3.3	High-tech exports, % total trade	0.0	125	
6.3.4	ICT services exports, % total trade	n/a	n/a	
Creative outputs		**16.9**	**94**	
7.1	**Intangible assets**	**25.8**	**85**	
7.1.1	Trademarks by origin/bn PPP$ GDP	5.3	120	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	5.0	24	●
7.1.4	ICTs and organizational model creation†	49.7	84	
7.2	**Creative goods and services**	**10.2**	**[78]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
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	25	●
7.2.5	Creative goods exports, % total trade	0.0	120	
7.3	**Online creativity**	**5.8**	**119**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.6	105	
7.3.2	Country-code TLDs/th pop. 15–69	0.1	121	
7.3.3	Wikipedia edits/mn pop. 15–69	20.7	120	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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 Appendix IV for details, including the year of the data, at http://globalinnovationindex.org. 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 data that are either missing or outdated for Ghana.

Missing data for Ghana

Code	Indicator name	Economy year	Model year	Source
2.1.4	PISA scales in reading, maths and science	n/a	2018	OECD Programme for International Student Assessment (PISA)
5.1.3	GERD performed by business, % GDP	n/a	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.3.1	Intellectual property payments, % total trade	n/a	2019	World Trade Organization
5.3.3	ICT services imports, % total trade	n/a	2019	World Trade Organization
6.3.1	Intellectual property receipts, % total trade	n/a	2019	World Trade Organization
6.3.4	ICT services exports, % total trade	n/a	2019	World Trade Organization
7.1.2	Global brand value, top 5,000, % GDP	n/a	2020	Brand Finance
7.2.1	Cultural and creative services exports, % total trade	n/a	2019	World Trade Organization
7.2.2	National feature films/mn pop. 15–69	n/a	2017	UNESCO Institute for Statistics
7.2.3	Entertainment and media market/th pop. 15–69	n/a	2020	PwC
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	2020	App Annie

Outdated data for Ghana

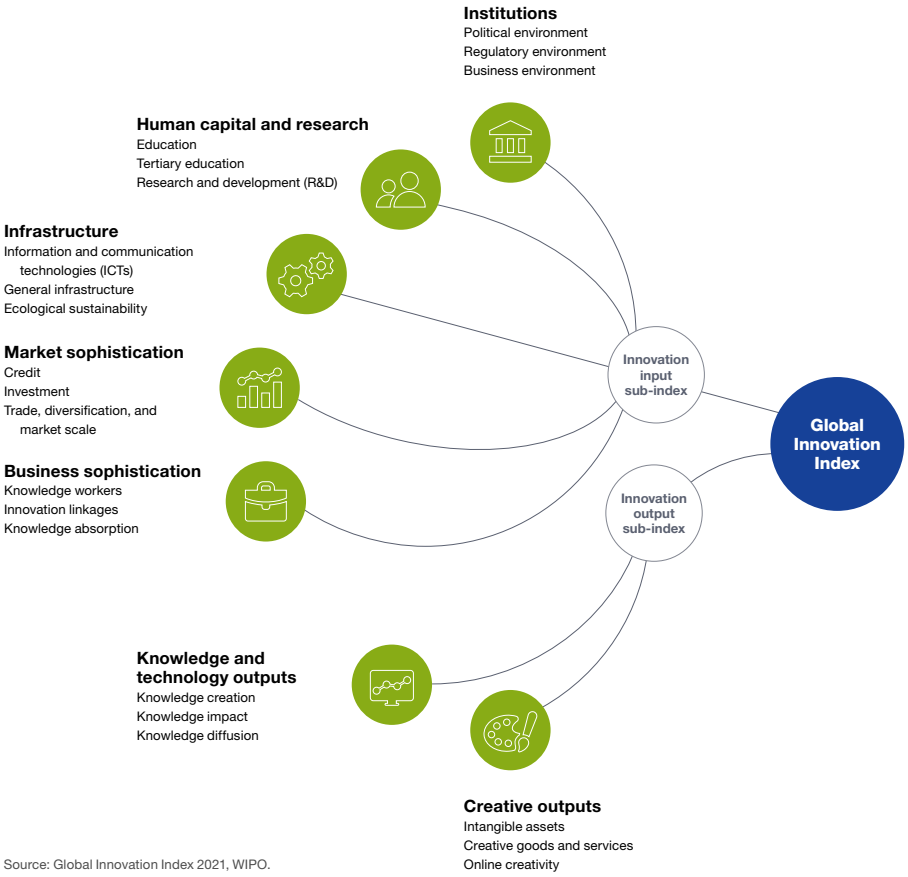
Code	Indicator name	Economy year	Model year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	2014	2017	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2015	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators

Code	Indicator name	Economy year	Model year	Source
2.3.2	Gross expenditure on R&D, % GDP	2010	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
4.2.2	Market capitalization, % GDP	2011	2019	World Federation of Exchanges
4.3.2	Domestic industry diversification	2015	2018	United Nations Industrial Development Organization
5.1.1	Knowledge-intensive employment, %	2017	2019	International Labour Organization
5.1.2	Firms offering formal training, %	2013	2019	World Bank
5.1.4	GERD financed by business, %	2010	2018	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.5	Females employed w/advanced degrees, %	2017	2019	International Labour Organization
5.2.3	GERD financed by abroad, % GDP	2010	2018	UNESCO Institute for Statistics
5.3.5	Research talent, % in businesses	2010	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
6.1.1	Patents by origin/bn PPP$ GDP	2018	2019	World Intellectual Property Organization
6.1.3	Utility models by origin/bn PPP$ GDP	2018	2019	World Intellectual Property Organization
6.2.2	New businesses/th pop. 15–64	2012	2018	World Bank
6.2.5	High-tech manufacturing, %	2015	2018	United Nations Industrial Development Organization
7.1.1	Trademarks by origin/bn PPP$ GDP	2018	2019	World Intellectual Property Organization
7.1.3	Industrial designs by origin/bn PPP$ GDP	2018	2019	World Intellectual Property Organization
7.2.4	Printing and other media, % manufacturing	2013	2018	United Nations Industrial Development Organization

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 2021, WIPO.

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.