

GLOBAL INNOVATION INDEX 2019

GHANA

106th

Ghana ranks 106th among the 129 economies featured in the GII 2019.

The Global Innovation Index (GII) is a ranking of world economies based on 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 the GII model influence year-on-year comparisons of the GII ranks. The confidence interval for Ghana's ranking in the GII 2019 is between 97 and 108.

Ghana's Rankings, 2018 - 2019

	GII	Innovation Inputs	Innovation Outputs
2019	106	109	97
2018	107	108	102

- Ghana performs better in Innovation Outputs than Inputs in 2019.
- This year Ghana ranks 109th in Innovation Inputs, worse than last year.
- As for Innovation Outputs, Ghana ranks 97th. This position is better than last year.

19th

Ghana ranks 19th among the 26 lower middle-income economies.

11th

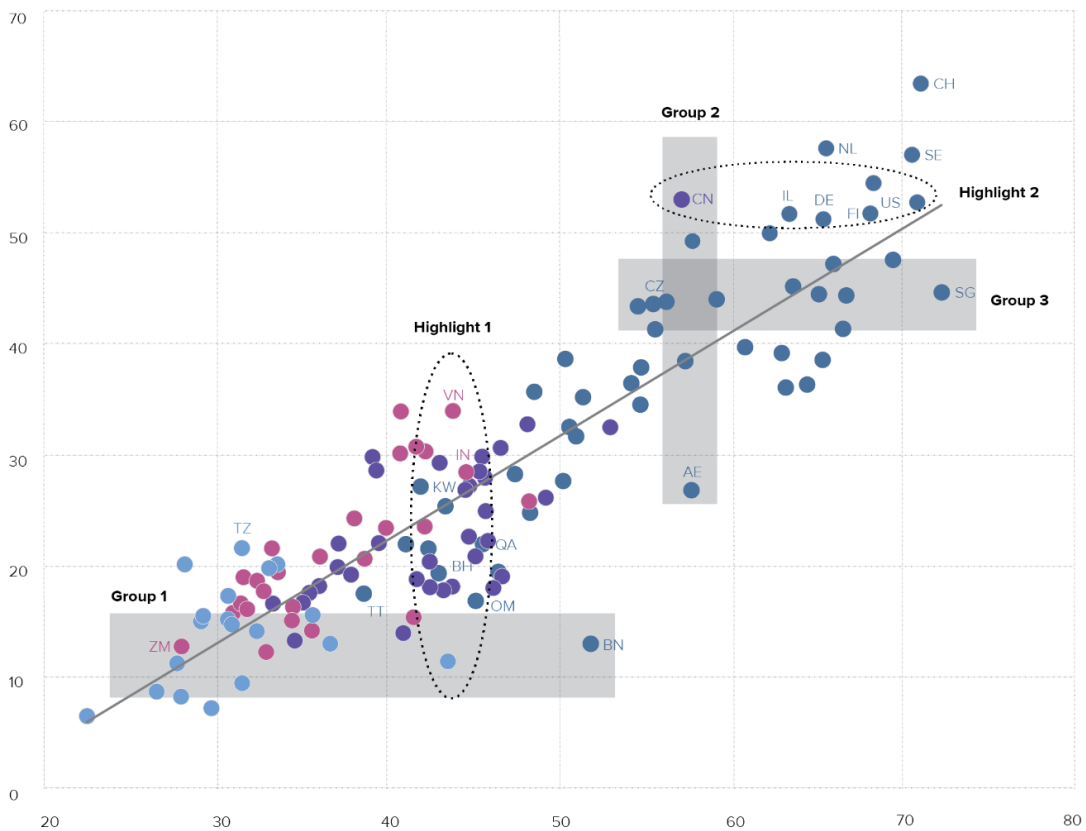
Ghana ranks 11th among the 26 economies in Sub-Saharan Africa.

EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs, indicating which economies best translate innovation inputs into innovation outputs. Economies appearing above the line are effectively translating their costly innovation investments into more and higher-quality outputs. In contrast, those below the line are not effectively translating innovation inputs into outputs.

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

Innovation input/output performance by income group, 2019



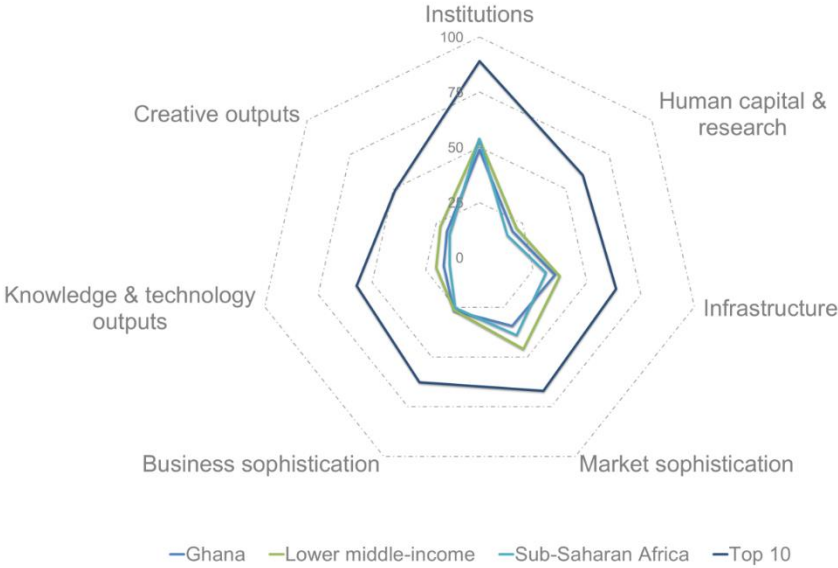
- ▲ Output score
- ▶ Input score
- High income
- Upper-middle income
- Lower-middle income
- Low income
- Fitted values

AE United Arab Emirates	CZ Czech Republic	NL Netherlands	TZ United Republic of Tanzania
BH Bahrain	DE Germany	OM Oman	US United States of America
BN Brunei Darussalam	FI Finland	QA Qatar	VN Viet Nam
CH Switzerland	IL Israel	SE Sweden	ZM Zambia
CN China	IN India	SG Singapore	
	KW Kuwait	TT Trinidad and Tobago	

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2019.

BENCHMARKING GHANA TO OTHER LOWER MIDDLE-INCOME ECONOMIES AND THE SUB-SAHARAN AFRICA REGION

Ghana’s scores in the seven GII pillars



Lower middle-income economies

Ghana has high scores in 1 out of the 7 GII pillars: Business sophistication, which is above the average of the lower middle-income group.

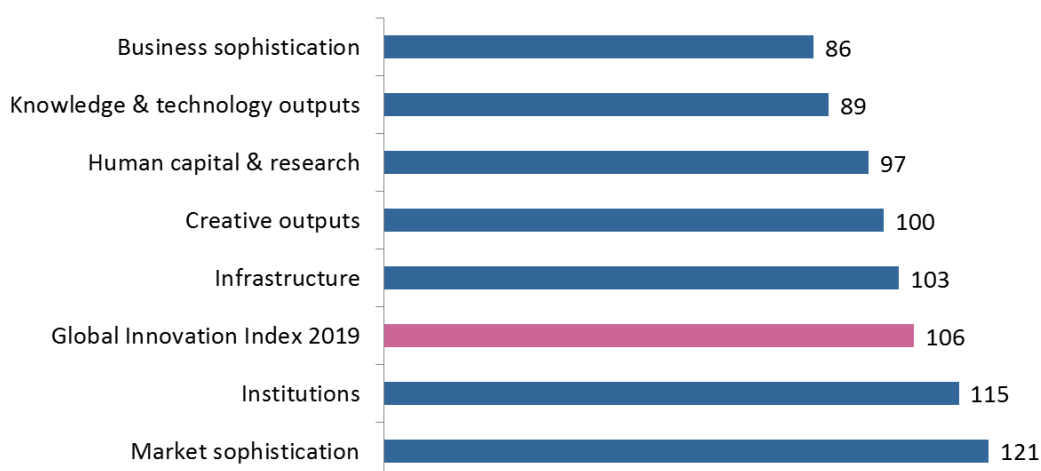
Sub-Saharan Africa Region

Compared to other economies in Sub-Saharan Africa, Ghana performs above average in 5 out of the 7 GII pillars: Human capital & research, Infrastructure, Business sophistication, Knowledge & technology outputs, and Creative outputs.

Top ranks are found in areas such as Political environment, Education, Ecological sustainability, and Innovation linkages where the country ranks in the top 80 worldwide.

OVERVIEW OF GHANA'S RANKINGS IN THE 7 GII AREAS

Ghana performs the best in Business sophistication and its weakest performance is in Market sophistication.



*The highest possible ranking in each pillar is 1.

GHANA'S INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of Ghana's strengths and weaknesses in the GII 2019.

Strengths		
Code	Indicator name	Rank
2.1.2	Government funding/pupil, secondary, % GDP/cap	21
3.3.1	GDP/unit of energy use	33
4.1.3	Microfinance gross loans, % GDP	24
5.2	Innovation linkages	38
5.2.1	University/industry research collaboration [†]	44
5.2.2	State of cluster development [†]	42
5.2.3	GERD financed by abroad, %	11
5.2.4	JV–strategic alliance deals/bn PPP\$ GDP	42
5.3.4	FDI net inflows, % GDP, 3-year average	25
6.2.1	Growth rate of PPP\$ GDP/worker, %, 3-year average	17
7.1.2	Industrial designs by origin/bn PPP\$ GDP	25

Weaknesses		
Code	Indicator name	Rank
1.2.3	Cost of redundancy dismissal, salary weeks	123
1.3.2	Ease of resolving insolvency*	128
2.3.3	Global R&D companies, top 3, in mn US\$	43
2.3.4	QS university ranking, average score top 3*	78
3.2	General infrastructure	125
3.2.3	Gross capital formation, % GDP	119
4.1.2	Domestic credit to private sector, % GDP	120
4.2	Investment	127
4.2.2	Market capitalization, % GDP	71
5.1.3	GERD performed by business, % GDP	91
5.1.4	GERD financed by business, %	97
6.1.2	PCT patents by origin/bn PPP\$ GDP	99
6.2.3	Computer software spending, % GDP	124

STRENGTHS

- GII strengths for Ghana are found in six of the seven GII pillars.
- Most of these strengths are in Business sophistication (86), where Ghana's strengths are sub-pillar Innovation linkages (38) and five indicators: University-industry research collaboration (44), State of cluster development (42), R&D financed by abroad (11), Joint Ventures - strategic alliance deals (42), and FDI inflows (25).
- The other five GII pillars present one GII strength each for Ghana. These are indicators:
 - Government funding per pupil (21) in Human capital & research (97);
 - GDP per unit of energy use (33) in Infrastructure (103);
 - Microfinance gross loans (24) in Market sophistication (121);
 - Labor productivity growth (17) in Knowledge & technology outputs (89); and
 - Industrial designs by origin (25) in Creative outputs (100).

WEAKNESSES

- Ghana's weaknesses in the GII are found in six of the seven GII pillars.
- In Institutions (115), Ghana's weaknesses are indicators Cost of redundancy dismissal (123) and Ease of resolving insolvency (128).
- In Human capital & research (97), relative weaknesses are two important indicators: Global R&D companies (43) and Quality of universities (78).
- In Infrastructure (103), sub-pillar General infrastructure (125) and one of its indicators - Gross capital formation (119) - are GII weaknesses for the country.
- In Market sophistication (121), Ghana's relative weaknesses are sub-pillar Investment (127) and two indicators: Domestic credit to private sector (120) and Market capitalization (71).
- In Business sophistication (86), two indicators – R&D performed by business (91) and R&D financed by business (97) – are Ghana's GII weaknesses.
- In Knowledge & technology outputs (89), Ghana has relative weaknesses in two indicators: PCT patents by origin (99) and Computer software spending (124).

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$	GDP per capita, PPP\$	GII 2018 rank
97	109	Lower middle	SSF	29.5	145.8	6,451.7	107
				Score/Value	Rank		
INSTITUTIONS				48.9	115		
1.1	Political environment		52.0	74			
1.1.1	Political and operational stability*.....		68.4	71			
1.1.2	Government effectiveness*.....		43.8	78			
1.2	Regulatory environment		40.2	121			
1.2.1	Regulatory quality*.....		38.3	79			
1.2.2	Rule of law*.....		49.8	53	◆		
1.2.3	Cost of redundancy dismissal, salary weeks.....		49.8	123	○ ◇		
1.3	Business environment		54.6	117	◇		
1.3.1	Ease of starting a business*.....		84.3	83			
1.3.2	Ease of resolving insolvency*.....		24.9	128	○ ◇		
HUMAN CAPITAL & RESEARCH				19.2	97		
2.1	Education		43.6	75			
2.1.1	Expenditure on education, % GDP.....		4.5	62			
2.1.2	Government funding/pupil, secondary, % GDP/cap.Ⓞ		26.2	21	●		
2.1.3	School life expectancy, years.....		11.5	94			
2.1.4	PISA scales in reading, maths, & science.....		n/a	n/a			
2.1.5	Pupil-teacher ratio, secondary.....		16.0	72			
2.2	Tertiary education		11.8	107			
2.2.1	Tertiary enrolment, % gross.....		16.2	99			
2.2.2	Graduates in science & engineering, %.....		13.4	93	◇		
2.2.3	Tertiary inbound mobility, %.....		2.9	64			
2.3	Research & development (R&D)		2.1	93			
2.3.1	Researchers, FTE/mn pop.Ⓞ		38.4	96			
2.3.2	Gross expenditure on R&D, % GDP.Ⓞ		0.4	70			
2.3.3	Global R&D companies, avg. exp. top 3, mn US\$.....		0.0	43	○ ◇		
2.3.4	QS university ranking, average score top 3*.....		0.0	78	○ ◇		
INFRASTRUCTURE				35.0	103		
3.1	Information & communication technologies (ICTs)		54.5	86			
3.1.1	ICT access*.....		45.6	97			
3.1.2	ICT use*.....		40.0	89			
3.1.3	Government's online service*.....		69.4	70			
3.1.4	E-participation*.....		62.9	82			
3.2	General infrastructure		14.9	125	○ ◇		
3.2.1	Electricity output, kWh/mn pop.....		461.6	106			
3.2.2	Logistics performance*.....		23.5	99			
3.2.3	Gross capital formation, % GDP.....		13.8	119	○ ◇		
3.3	Ecological sustainability		35.7	75			
3.3.1	GDP/unit of energy use.....		11.8	33	●		
3.3.2	Environmental performance*.....		49.7	99			
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP..		0.3	102			
MARKET SOPHISTICATION				34.3	121		◇
4.1	Credit		25.8	104			
4.1.1	Ease of getting credit*.....		60.0	66			
4.1.2	Domestic credit to private sector, % GDP.....		13.9	120	○ ◇		
4.1.3	Microfinance gross loans, % GDP.....		0.8	24	●		
4.2	Investment		26.7	127	○ ◇		
4.2.1	Ease of protecting minority investors*.....		51.7	89			
4.2.2	Market capitalization, % GDP.Ⓞ		8.8	71	○		
4.2.3	Venture capital deals/bn PPP\$ GDP.....		0.0	64			
4.3	Trade, competition, & market scale		50.3	107			
4.3.1	Applied tariff rate, weighted avg., %.....		10.6	115	◇		
4.3.2	Intensity of local competition*.....		63.4	87			
4.3.3	Domestic market scale, bn PPP\$.....		145.8	70			
BUSINESS SOPHISTICATION				26.6	86		
5.1	Knowledge workers		20.7	108			
5.1.1	Knowledge-intensive employment, %.....		11.6	95			
5.1.2	Firms offering formal training, % firms.....		40.1	35			
5.1.3	GERD performed by business, % GDP.Ⓞ		0.0	91	○		
5.1.4	GERD financed by business, %.....		0.1	97	○ ◇		
5.1.5	Females employed w/advanced degrees, %.....		3.4	97			
5.2	Innovation linkages		36.1	38	● ◆		
5.2.1	University/industry research collaboration*.....		47.3	44	● ◆		
5.2.2	State of cluster development*.....		52.9	42	● ◆		
5.2.3	GERD financed by abroad, %.....		31.2	11	● ◆		
5.2.4	JV-strategic alliance deals/bn PPP\$ GDP.....		0.0	42	●		
5.2.5	Patent families 2+ offices/bn PPP\$ GDP.....		0.0	82			
5.3	Knowledge absorption		23.0	[112]			
5.3.1	Intellectual property payments, % total trade.....		n/a	n/a			
5.3.2	High-tech imports, % total trade.....		3.7	119			
5.3.3	ICT services imports, % total trade.....		n/a	n/a			
5.3.4	FDI net inflows, % GDP.....		6.1	25	●		
5.3.5	Research talent, % in business enterprise.....		1.0	77			
KNOWLEDGE & TECHNOLOGY OUTPUTS				16.6	89		
6.1	Knowledge creation		4.4	103			
6.1.1	Patents by origin/bn PPP\$ GDP.....		0.1	110			
6.1.2	PCT patents by origin/bn PPP\$ GDP.....		0.0	99	○ ◇		
6.1.3	Utility models by origin/bn PPP\$ GDP.....		0.1	58			
6.1.4	Scientific & technical articles/bn PPP\$ GDP.....		5.2	79			
6.1.5	Citable documents H-index.....		7.3	82			
6.2	Knowledge impact		33.2	81			
6.2.1	Growth rate of PPP\$ GDP/worker, %.....		3.6	17	●		
6.2.2	New businesses/th pop. 15-64.Ⓞ		0.9	73			
6.2.3	Computer software spending, % GDP.....		0.0	124	○ ◇		
6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP.....		0.5	119	◇		
6.2.5	High- & medium-high-tech manufactures, %.....		n/a	n/a			
6.3	Knowledge diffusion		12.3	[92]			
6.3.1	Intellectual property receipts, % total trade.....		n/a	n/a			
6.3.2	High-tech net exports, % total trade.....		0.2	97			
6.3.3	ICT services exports, % total trade.....		n/a	n/a			
6.3.4	FDI net outflows, % GDP.....		0.2	91			
CREATIVE OUTPUTS				18.9	[100]		
7.1	Intangible assets		35.0	96			
7.1.1	Trademarks by origin/bn PPP\$ GDP.....		6.9	110			
7.1.2	Industrial designs by origin/bn PPP\$ GDP.....		5.5	25	●		
7.1.3	ICTs & business model creation*.....		56.0	84			
7.1.4	ICTs & organizational model creation*.....		49.7	83			
7.2	Creative goods & services		5.1	[100]			
7.2.1	Cultural & 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 & Media market/th pop. 15-69.....		n/a	n/a			
7.2.4	Printing & other media, % manufacturing.Ⓞ		0.6	85			
7.2.5	Creative goods exports, % total trade.....		0.0	117			
7.3	Online creativity		0.3	[114]			
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69.....		0.6	102			
7.3.2	Country-code TLDs/th pop. 15-69.....		0.0	122			
7.3.3	Wikipedia edits/mn pop. 15-69.....		n/a	n/a			
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 II 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 missing or are outdated for Ghana.

Missing data

Code	Indicator name	Country year	Model year	Source
2.1.4	PISA scales in reading, maths & science	n/a	2015	OECD Programme for International Student Assessment (PISA)
5.3.1	Intellectual property payments, % total trade	n/a	2017	World Trade Organization
5.3.3	ICT services imports, % total trade	n/a	2017	World Trade Organization
6.2.5	High- & medium-high-tech manufactures, %	n/a	2016	United Nations Industrial Development Organization
6.3.1	Intellectual property receipts, % total trade	n/a	2017	World Trade Organization
6.3.3	ICT services exports, % total trade	n/a	2017	World Trade Organization
7.2.1	Cultural & creative services exports, % total trade	n/a	2017	World Trade Organization
7.2.2	National feature films/mn pop. 15–69	n/a	2017	UNESCO Institute for Statistics
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	2017	PwC
7.3.3	Wikipedia edits/mn pop. 15–69	n/a	2017	Wikimedia Foundation
7.3.4	Mobile app creation/bn PPP\$ GDP	n/a	2018	App Annie

Outdated data

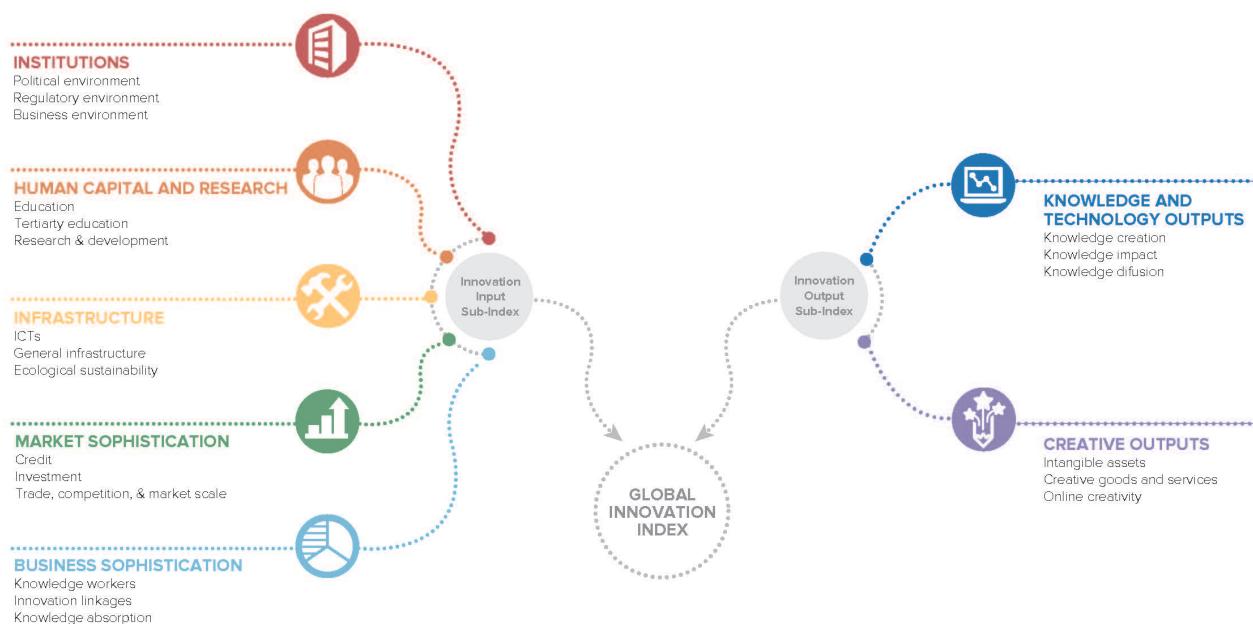
Code	Indicator name	Country year	Model year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	2014	2015	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2010	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2010	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
4.2.2	Market capitalization, % GDP	2011	2017	World Federation of Exchanges
5.1.1	Knowledge-intensive employment, %	2015	2017	Source: International Labour Organization
5.1.3	GERD performed by business, % GDP	2010	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.4	GERD financed by business, %	2010	2016	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.5	Females employed w/advanced degrees, %	2015	2017	International Labour Organization
5.2.3	GERD financed by abroad, %	2010	2016	UNESCO Institute for Statistics
5.3.5	Research talent, % in business enterprise	2010	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
6.2.2	New businesses/th pop. 15–64	2012	2016	World Bank
7.2.4	Printing & other media, % manufacturing	2003	2016	United Nations Industrial Development Organization
7.2.5	Creative goods exports, % total trade	2016	2017	United Nations, COMTRADE

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations. In 2019, the GII presents its 12th edition devoted to the theme **Creating Healthy Lives—The Future of Medical Innovation**.

Recognizing that innovation is a key driver of economic development, the GII aims to provide a rich innovation ranking and 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 countries that incorporate the GII into their innovation agendas.

Framework of the Global Innovation Index 2019



The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that includes 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 containing three sub-pillars.

