GLOBAL INNOVATION INDEX 2020

SOUTH AFRICA

60th South Africa ranks 60th among the 131 economies featured in the GII 2020.

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 South Africa 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 South Africa in the GII 2020 is between ranks 59 and 65.

Rankings of South Africa (2018–2020)

	GII	Innovation inputs	Innovation outputs
2020	60	49	68
2019	63	51	68
2018	58	48	65

- South Africa performs better in innovation inputs than innovation outputs in 2020.
- This year South Africa ranks 49th in innovation inputs, higher than last year and lower compared to 2018.
- As for innovation outputs, South Africa ranks 68th. This position is the same as last year and lower compared to 2018.

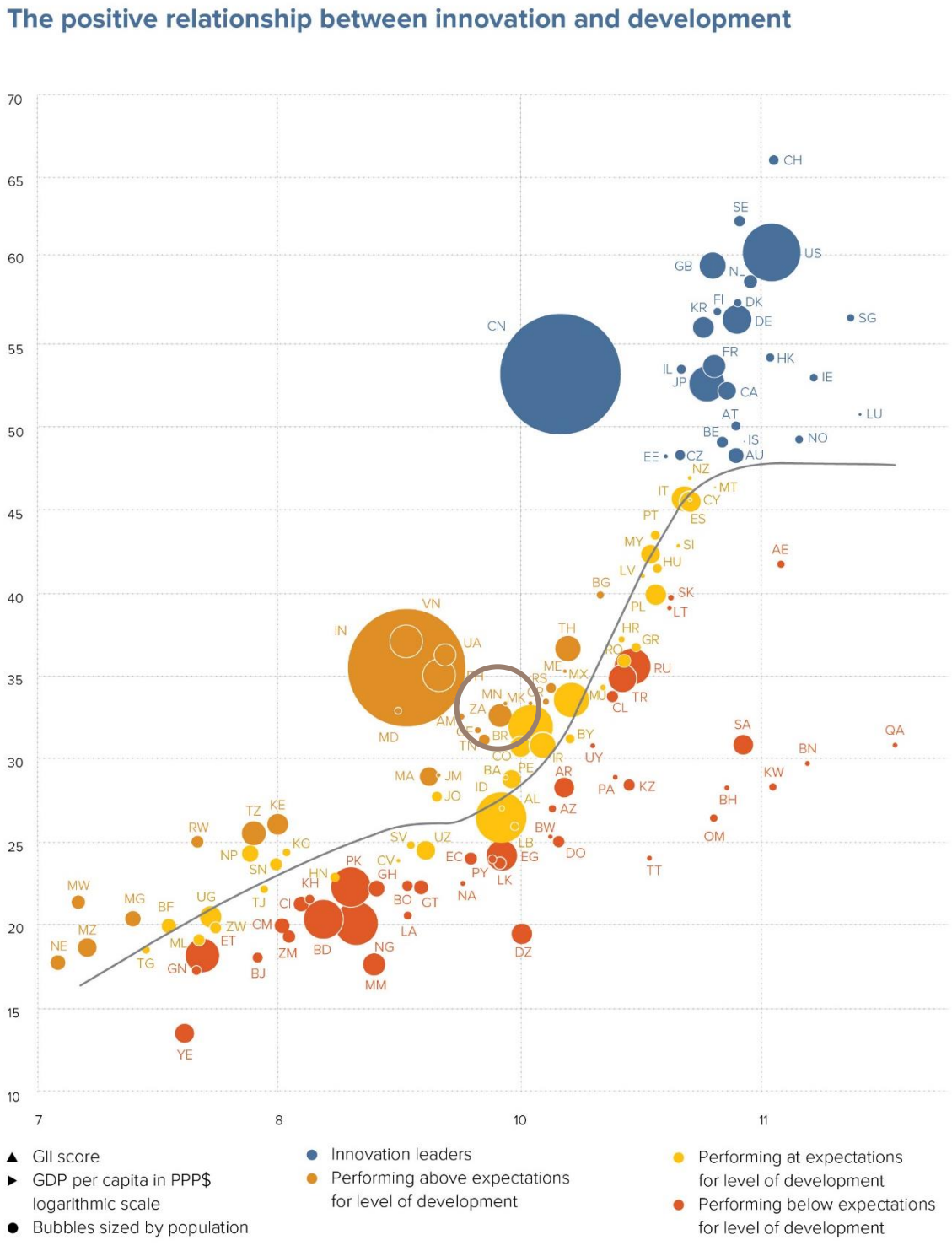
14th South Africa ranks 14th among the 37 upper middle-income group economies.

2nd South Africa ranks 2nd among the 26 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, South Africa is performing above expectations for its level of development.

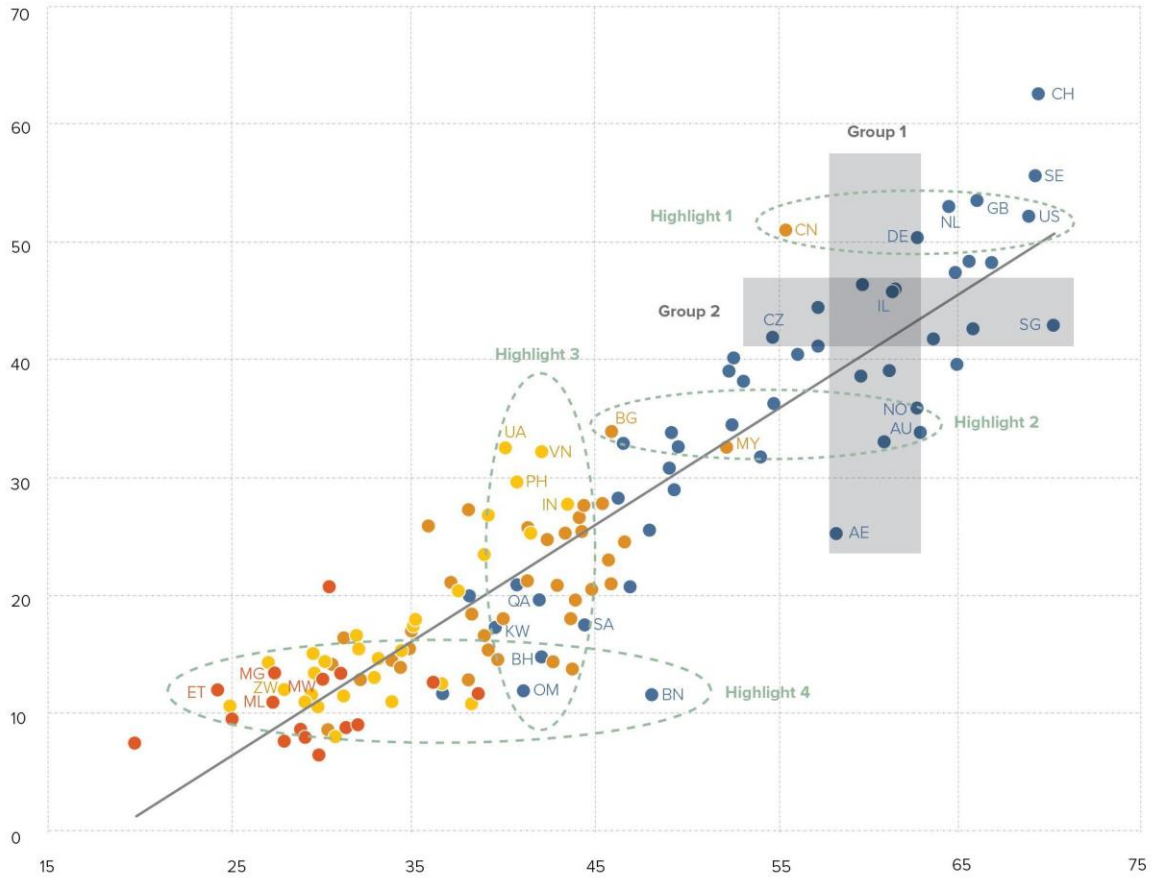


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

South Africa produces less innovation outputs relative to its level of innovation investments.

Innovation input to output performance, 2020



▲ Output score
► Input score

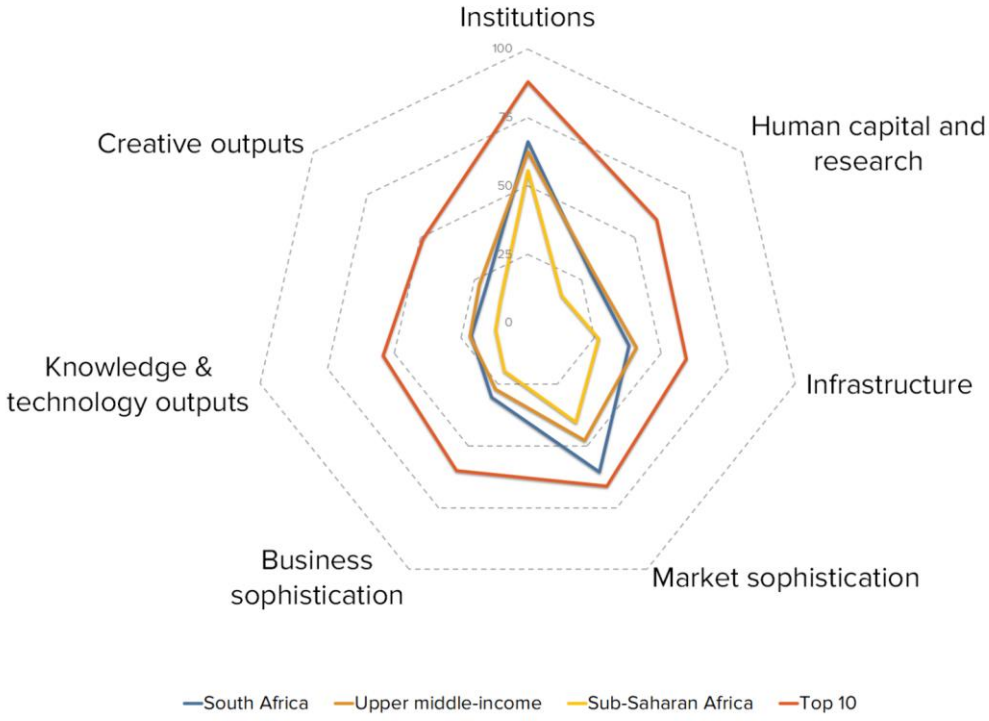
● High income group
● Upper middle-income group
● Lower middle-income group
● Low income group

— Fitted values

AU	Australia	IN	India	NL	Netherlands	CH	Switzerland
BH	Bahrain	IL	Israel	NO	Norway	UA	Ukraine
BN	Brunei Darussalam	KW	Kuwait	OM	Oman	AE	United Arab Emirates
BG	Bulgaria	MG	Madagascar	PH	Philippines	GB	United Kingdom
CN	China	MW	Malawi	QA	Qatar	US	United States of America
CZ	Czech Republic	ML	Mali	SA	Saudi Arabia	VN	Viet Nam
ET	Ethiopia	MY	Malaysia	SG	Singapore	ZW	Zimbabwe
DE	Germany			SE	Sweden		

BENCHMARKING SOUTH AFRICA AGAINST OTHER UPPER MIDDLE-INCOME ECONOMIES AND SUB-SAHARAN AFRICA

South Africa's scores in the seven GII pillars



Upper middle-income group

South Africa has high scores in five out of the seven GII pillars: Institutions, Human capital & research, Market sophistication, Business sophistication and Knowledge & technology outputs, which are above average for the upper middle-income group.

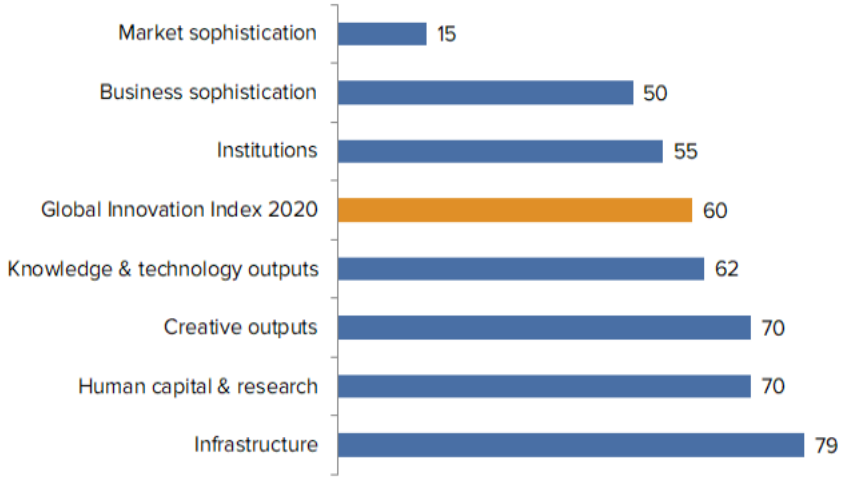
Conversely, South Africa scores below average for its income group in two pillars: Infrastructure and Creative outputs.

Sub-Saharan Africa

Compared to other economies in Sub-Saharan Africa, South Africa performs above average in all seven GII pillars.

OVERVIEW OF SOUTH AFRICA RANKINGS IN THE SEVEN GII AREAS

South Africa performs best in Market sophistication and its weakest performance is in Infrastructure.



*The highest possible ranking in each pillar is 1.

South Africa ranks 22nd worldwide in a new indicator to the GII, Global brand value, led by telecoms companies MTN and Vodacom, and followed by banks First National Bank, ABSA and Standard Bank.

In quality of innovation, South Africa ranks 38th globally, and 8th among middle-income economies, thanks to its great achievements in generating new technological innovations, its excellent higher education system and the high quality of its research. It also ranks 35th globally according to the quality of universities metric, with the University of Cape Town placing among the top 200 highest ranking universities in the world.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of South Africa in the GII 2020.

Strengths

Code	Indicator name	Rank
1.2.3	Cost of redundancy dismissal, salary weeks	25
2.1.1	Expenditure on education, % GDP	13
4	Market sophistication	15
4.1.2	Domestic credit to private sector, % GDP	9
4.2	Investment	14
4.2.1	Ease of protecting minority investors*	13
4.2.2	Market capitalization, % GDP	1
4.3.3	Domestic market scale, bn PPP$	30
5.2.1	University/industry research collaboration†	30
5.3.1	Intellectual property payments, % total trade	13
6.2.2	New businesses/th pop. 15–64	13
7.1.2	Global brand value, top 5000, % GDP	22

Weaknesses

Code	Indicator name	Rank
1.1.1	Political & operational stability*	92
1.3.1	Ease of starting a business*	107
2.1.5	Pupil-teacher ratio, secondary	115
2.2	Tertiary education	96
2.2.1	Tertiary enrolment, % gross	91
3.2.3	Gross capital formation, % GDP	112
3.3.1	GDP/unit of energy use	109
4.1.3	Microfinance gross loans, % GDP	69
5.3.4	FDI net inflows, % GDP	112
6.2.1	Growth rate of PPP$ GDP/worker, %	101
7.2.2	National feature films/mn pop. 15–69	98

STRENGTHS

GII strengths for South Africa are found in six of the seven GII pillars.

- Institutions (55): the indicator Cost of redundancy dismissal (25) is a strength.
- Human capital & research (70): the indicator Expenditure on education (13) is a strength.
- Market sophistication (15): has strengths in the sub-pillar Investment (14) and in the indicators Domestic credit to private sector (9), Ease of protecting minority investors (13), Market capitalization (1) and Domestic market scale (30).
- Business sophistication (50): shows strengths in the indicators University/industry research collaboration (30) and Intellectual property payments (13).
- Knowledge & technology outputs (62): the indicator New businesses (13) is a strength.
- Creative outputs (70): the indicator Global brand value (22) is a strength.

WEAKNESSES

GII weaknesses for South Africa are found in all seven of the GII pillars.

- Institutions (55): exhibits weaknesses in the indicators Political and operational stability (92) and Ease of starting a business (107).
- Human capital & research (70): has weaknesses in the sub-pillar Tertiary education (96) and in the indicators Pupil–teacher ratio (115) and Tertiary enrolment (91).
- Infrastructure (79): displays weaknesses in the indicators Gross capital formation (112) and GDP per unit of energy use (109).
- Market sophistication (15): the indicator Microfinance gross loans (69) is a weakness.
- Business sophistication (50): the indicator FDI net inflows (112) is a weakness.
- Knowledge & technology outputs (62): the indicator Growth rate per worker (101) is a weakness.
- Creative outputs (70): the indicator National feature films (98) is a weakness.

SOUTH AFRICA

GII 2020 rank

60

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
68	49	Upper middle	SSF	58.6	809.0	12,007.5	63

		Score/Value	Rank	
INSTITUTIONS		**66.2**	**55**	
1.1	**Political environment**	**59.3**	**62**	
1.1.1	Political and operational stability*	62.5	92	○
1.1.2	Government effectiveness*	57.7	50	
1.2	**Regulatory environment**	**71.3**	**43**	
1.2.1	Regulatory quality*	46.3	61	
1.2.2	Rule of law*	44.0	67	
1.2.3	Cost of redundancy dismissal, salary weeks	9.3	25	●
1.3	**Business environment**	**67.9**	**75**	
1.3.1	Ease of starting a business*	81.2	107	○
1.3.2	Ease of resolving insolvency*	54.6	63	
HUMAN CAPITAL & RESEARCH		**29.4**	**70**	
2.1	**Education**	**44.4**	**71**	
2.1.1	Expenditure on education, % GDP	6.2	13	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.4	42	
2.1.3	School life expectancy, years	13.8	72	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary, ◷	27.6	115	○ ◇
2.2	**Tertiary education**	**19.7**	**96**	○
2.2.1	Tertiary enrolment, % gross	22.4	91	○ ◇
2.2.2	Graduates in science & engineering, %	18.6	77	
2.2.3	Tertiary inbound mobility, %	4.1	58	
2.3	**Research & development (R&D)**	**24.2**	**42**	
2.3.1	Researchers, FTE/mn pop., ◷	492.0	69	
2.3.2	Gross expenditure on R&D, % GDP, ◷	0.8	45	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	41.4	36	◆
2.3.4	QS university ranking, average score top 3*	33.1	35	
INFRASTRUCTURE		**37.9**	**79**	
3.1	**Information & communication technologies (ICTs)**	**66.5**	**67**	
3.1.1	ICT access*	52.1	87	
3.1.2	ICT use*	45.6	83	
3.1.3	Government's online service*	83.3	37	
3.1.4	E-participation*	84.8	39	
3.2	**General infrastructure**	**26.4**	**70**	
3.2.1	Electricity output, kWh/mn pop	4,419.2	48	
3.2.2	Logistics performance*	61.3	32	◆
3.2.3	Gross capital formation, % GDP	17.6	112	○
3.3	**Ecological sustainability**	**20.8**	**96**	◇
3.3.1	GDP/unit of energy use	5.2	109	○ ◇
3.3.2	Environmental performance*	43.1	82	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.1	59	
MARKET SOPHISTICATION		**60.5**	**15**	● ◆
4.1	**Credit**	**50.6**	**32**	◆
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP, ◷	147.5	9	● ◆
4.1.3	Microfinance gross loans, % GDP	0.0	69	○
4.2	**Investment**	**62.0**	**14**	● ◆
4.2.1	Ease of protecting minority investors*	80.0	13	● ◆
4.2.2	Market capitalization, % GDP	302.7	1	● ◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	43	
4.3	**Trade, competition, and market scale**	**69.0**	**35**	
4.3.1	Applied tariff rate, weighted avg., %	4.3	81	
4.3.2	Intensity of local competition+	71.2	48	
4.3.3	Domestic market scale, bn PPP$	809.0	30	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**30.3**	**50**	
5.1	**Knowledge workers**	**30.9**	**61**	
5.1.1	Knowledge-intensive employment, %	23.4	65	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP, ◷	0.3	44	
5.1.4	GERD financed by business, %, ◷	39.4	46	
5.1.5	Females employed w/advanced degrees, %	10.5	64	
5.2	**Innovation linkages**	**25.9**	**43**	◆
5.2.1	University/industry research collaboration+	54.7	30	● ◆
5.2.2	State of cluster development+	55.1	34	◆
5.2.3	GERD financed by abroad, % GDP, ◷	0.1	39	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	40	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	42	
5.3	**Knowledge absorption**	**34.0**	**45**	
5.3.1	Intellectual property payments, % total trade	2.0	13	● ◆
5.3.2	High-tech imports, % total trade	9.6	38	
5.3.3	ICT services imports, % total trade	1.2	63	
5.3.4	FDI net inflows, % GDP	0.9	112	○ ◇
5.3.5	Research talent, % in business enterprise, ◷	17.3	59	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**21.2**	**62**	
6.1	**Knowledge creation**	**20.4**	**49**	
6.1.1	Patents by origin/bn PPP$ GDP	0.8	70	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	39	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	11.6	46	
6.1.5	Citable documents H-index	29.5	32	◆
6.2	**Knowledge impact**	**23.3**	**66**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.4	101	○
6.2.2	New businesses/th pop. 15-64, ◷	10.2	13	● ◆
6.2.3	Computer software spending, % GDP	0.0	48	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.1	61	
6.2.5	High- and medium-high-tech manufacturing, %	20.5	55	
6.3	**Knowledge diffusion**	**19.9**	**78**	
6.3.1	Intellectual property receipts, % total trade	0.1	52	
6.3.2	High-tech net exports, % total trade	2.0	54	
6.3.3	ICT services exports, % total trade	0.6	95	
6.3.4	FDI net outflows, % GDP	1.6	42	
CREATIVE OUTPUTS		**19.8**	**70**	
7.1	**Intangible assets**	**30.1**	**52**	
7.1.1	Trademarks by origin/bn PPP$ GDP	28.6	79	
7.1.2	Global brand value, top 5,000, % GDP	87.5	22	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.2	61	
7.1.4	ICTs & organizational model creation+	58.7	48	
7.2	**Creative goods and services**	**7.3**	**92**	
7.2.1	Cultural & creative services exports, % total trade	0.2	68	
7.2.2	National feature films/mn pop. 15-69	0.6	98	○
7.2.3	Entertainment & Media market/th pop. 15-69	7.8	41	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.8	52	
7.3	**Online creativity**	**11.7**	**78**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	3.0	63	
7.3.2	Country-code TLDs/th pop. 15-69	9.6	41	
7.3.3	Wikipedia edits/mn pop. 15-69	37.3	84	
7.3.4	Mobile app creation/bn PPP$ GDP	0.3	74	

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 either missing or outdated for South Africa.

Missing data

Code	Indicator name	Country year	Model year	Source
2.1.4	PISA scales in reading, maths & science	n/a	2018	OECD Programme for International Student Assessment (PISA)
5.1.2	Firms offering formal training, %	n/a	2018	World Bank
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2018	World Intellectual Property Organization
7.2.4	Printing & other media, % manufacturing	n/a	2017	United Nations Industrial Development Organization

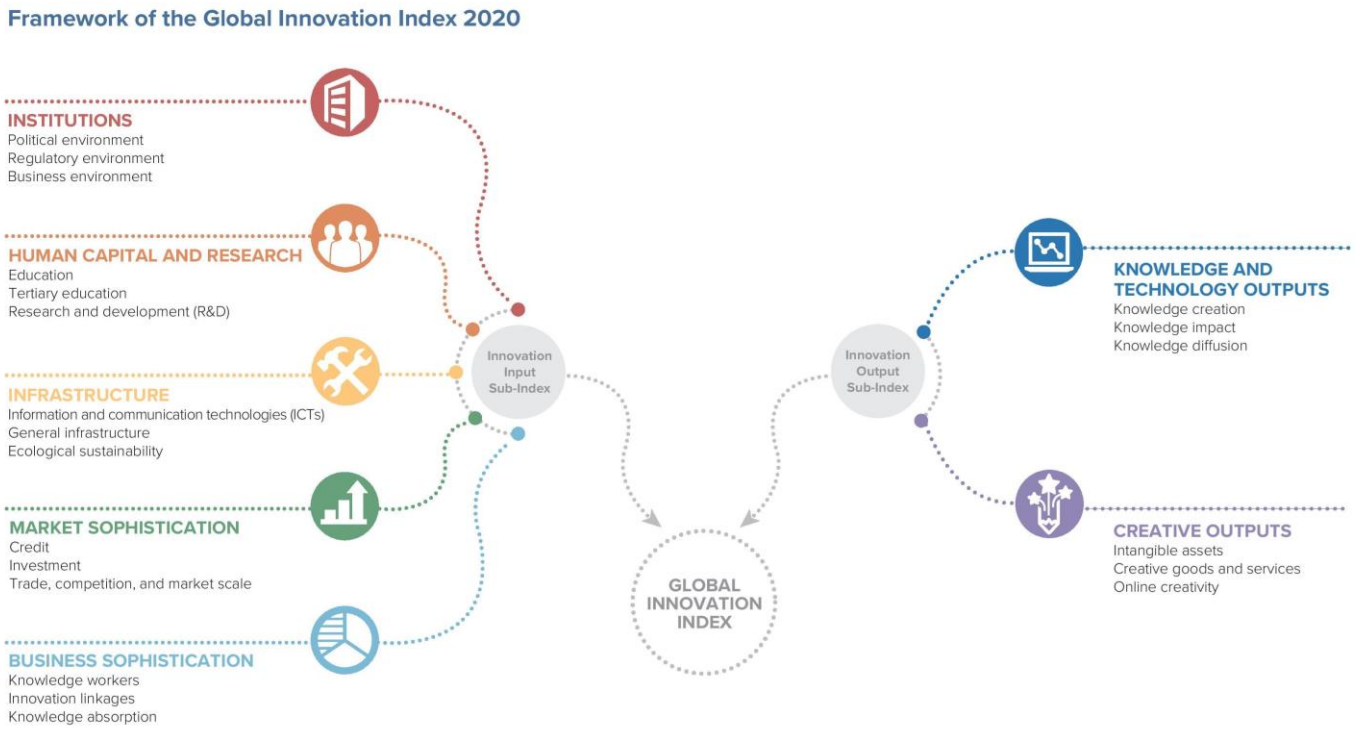
Outdated data

Code	Indicator name	Country year	Model year	Source
2.1.5	Pupil-teacher ratio, secondary	2017	2018	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2016	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2016	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
4.1.2	Domestic credit to private sector, % GDP	2017	2018	International Monetary Fund
5.1.3	GERD performed by business, % GDP	2016	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
5.1.4	GERD financed by business, %	2016	2017	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
5.2.3	GERD financed by abroad, % GDP	2016	2017	UNESCO Institute for Statistics
5.3.5	Research talent, % in business enterprise	2016	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
6.2.2	New businesses/th pop. 15–64	2016	2018	World Bank

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 2020, the GII presents its 13th edition devoted to the theme *Who Will Finance Innovation?*

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.