Global Innovation Index 2022

SOUTH AFRICA

61st South Africa ranks 61st 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 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 2022 is between ranks 60 and 64.

Rankings for South Africa (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	60	49	68
2021	61	55	68
2022	61	69	61

- South Africa performs better in innovation outputs than innovation inputs in 2022.
- This year South Africa ranks 69th in innovation inputs, lower than both 2021 and 2020.
- As for innovation outputs, South Africa ranks 61st. This position is higher than both 2021 and 2020.

14th South Africa ranks 14th among the 36 upper-middle-income group economies.

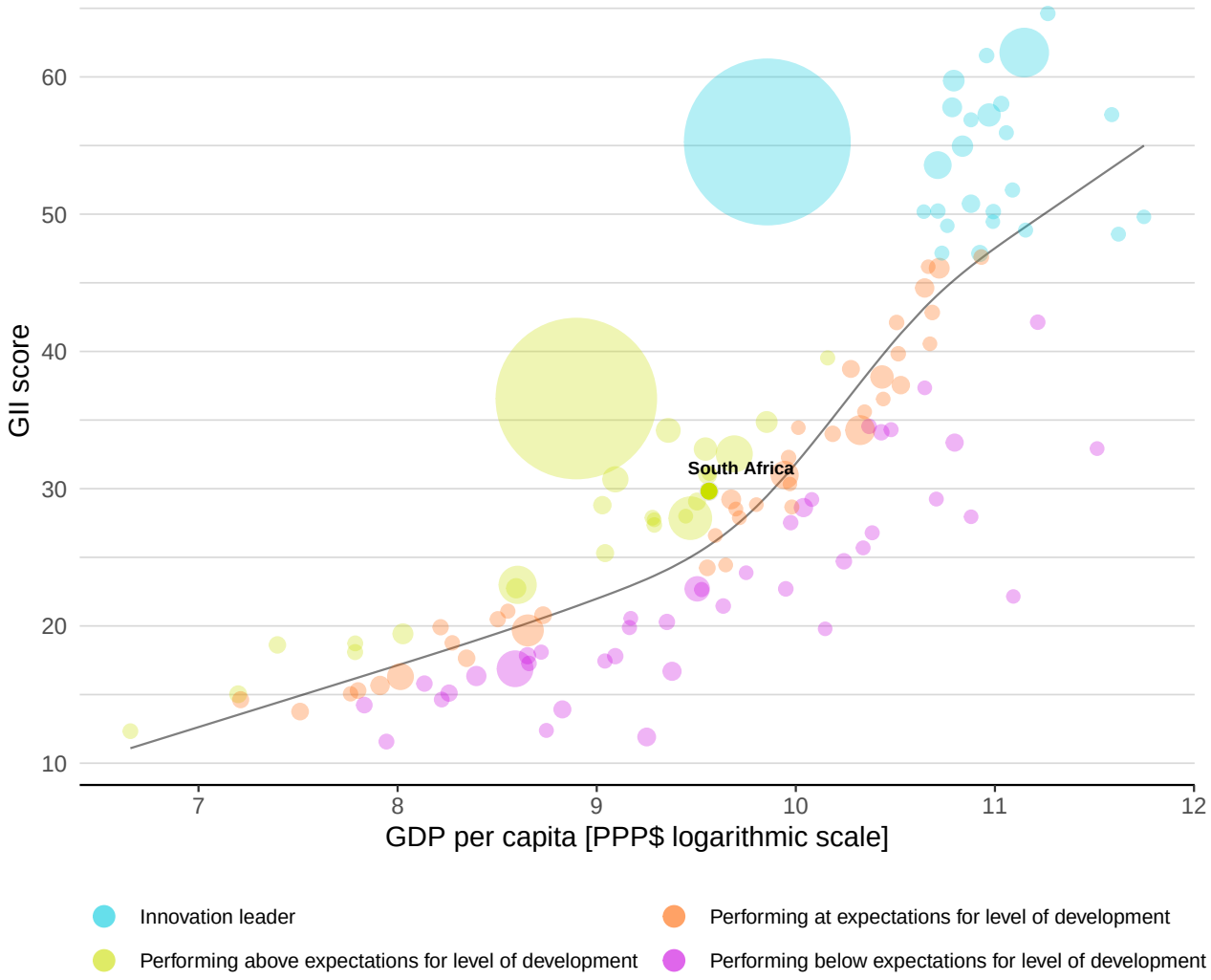
2nd South Africa ranks 2nd among the 27 economies in Sub-Saharan Africa.

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, South Africa's performance is above expectations for its level of development.

The positive relationship between innovation and development

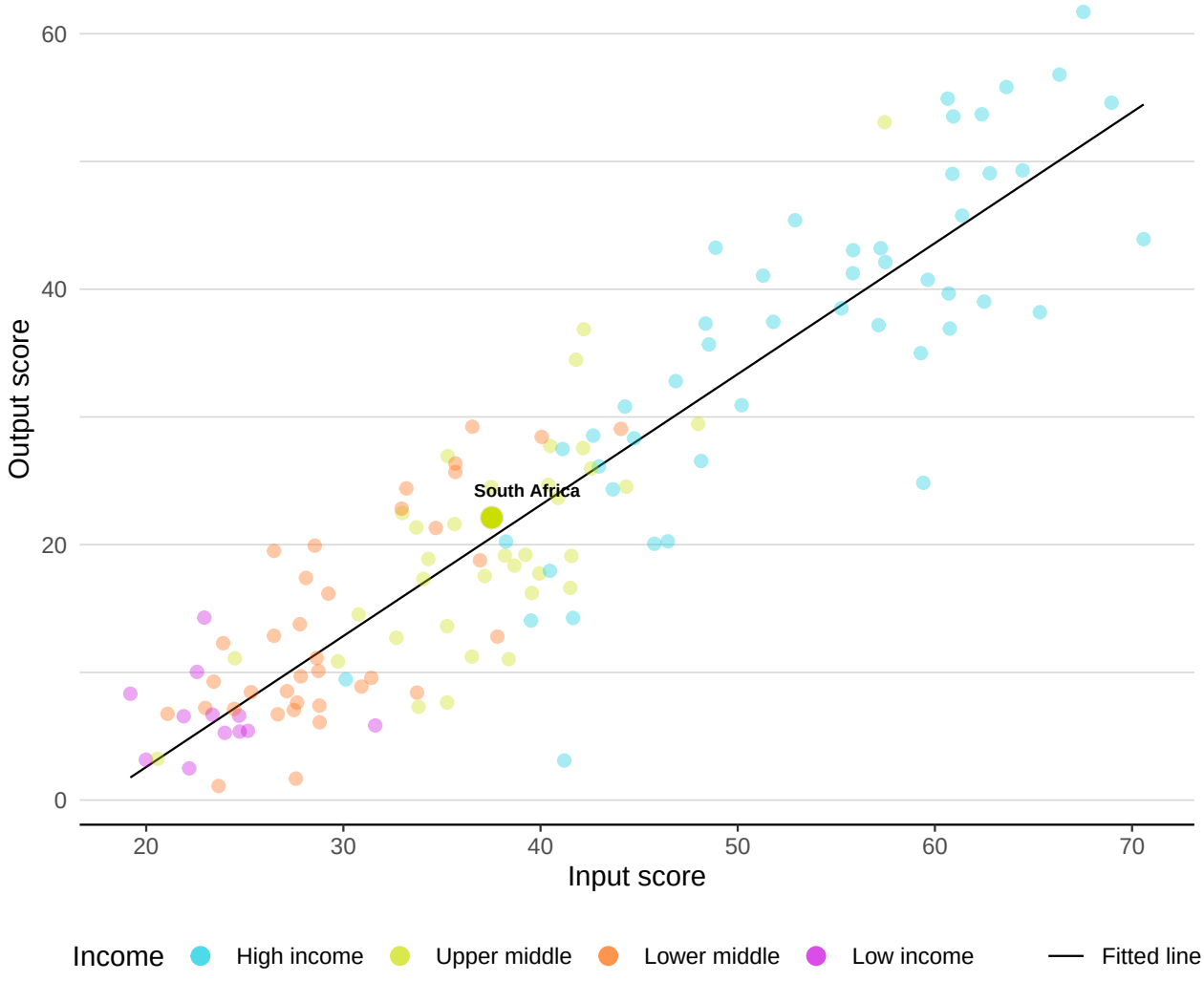


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

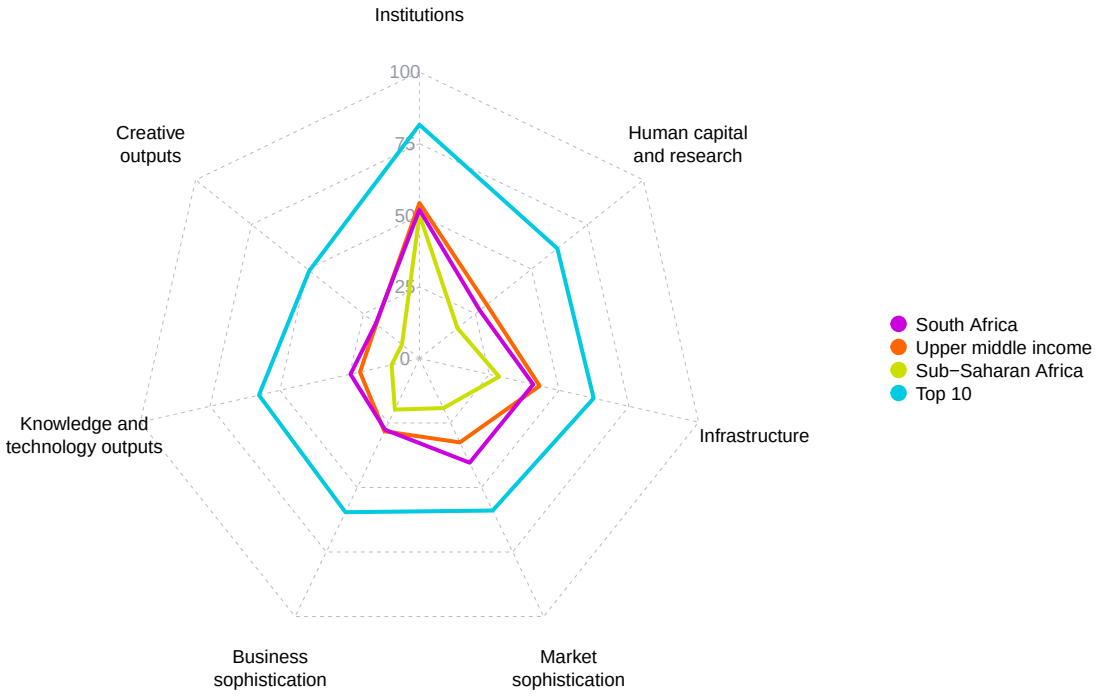
South Africa produces more innovation outputs relative to its level of innovation investments.

Innovation input to output performance



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

The seven GII pillar scores for South Africa



Upper-middle-income group economies

South Africa performs above the upper-middle-income group average in three pillars, namely: Market sophistication; Knowledge and technology outputs; and, Creative outputs.

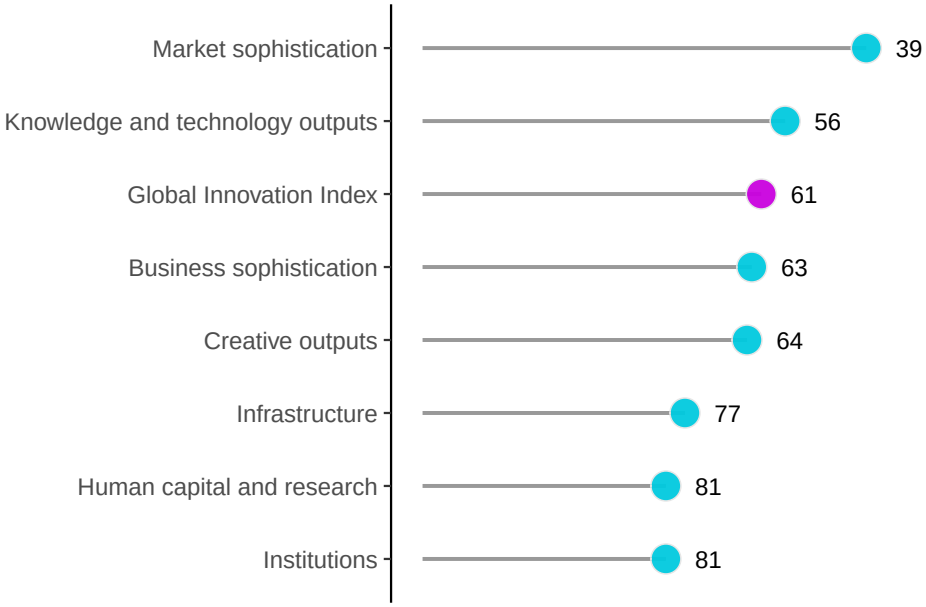
Sub-Saharan Africa

South Africa performs above the regional average in all GII pillars.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

South Africa performs best in Market sophistication and its weakest performance is in Institutions and Human capital and research.

The seven GII pillar ranks for South Africa



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

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

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

INNOVATION STRENGTHS AND WEAKNESSES

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

Strengths and weaknesses for South Africa

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
1.2.3	Cost of redundancy dismissal	24	1.3.1	Policies for doing business	111
2.1.1	Expenditure on education, % GDP	17	1.3.2	Entrepreneurship policies and culture	60
4.1.2	Domestic credit to private sector, % GDP	23	2.1.5	Pupil-teacher ratio, secondary	106
4.2.1	Market capitalization, % GDP	1	2.2.2	Graduates in science and engineering, %	84
4.3.3	Domestic market scale, bn PPP$	31	2.3.3	Global corporate R&D investors, top 3, mn USD	38
5.3.1	Intellectual property payments, % total trade	19	3.2.3	Gross capital formation, % GDP	122
6.1.5	Citable documents H-index	31	3.3.1	GDP/unit of energy use	120
6.2.2	New businesses/th pop. 15–64	9	5.1.2	Firms offering formal training, %	96
6.2.3	Software spending, % GDP	27	6.3.4	ICT services exports, % total trade	97
7.1.3	Global brand value, top 5,000, % GDP	26	7.2.2	National feature films/mn pop. 15–69	66

GII 2022 rank

South Africa

61

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
61	69	Upper middle	SSA	60.0	861.9	14,239

		Score/ Value	Rank	
Institutions		**51.9**	**81**	
1.1	**Political environment**	59.0	66	
1.1.1	Political and operational stability*	61.8	87	
1.1.2	Government effectiveness*	56.2	55	
1.2	**Regulatory environment**	72.0	44	
1.2.1	Regulatory quality*	50.0	63	
1.2.2	Rule of law*	43.1	68	
1.2.3	Cost of redundancy dismissal	9.3	24	● ◆
1.3	**Business environment**	24.8	119	○ ◇
1.3.1	Policies for doing business†	32.6	111	○
1.3.2	Entrepreneurship policies and culture*	17.1	60	○
Human capital and research		**26.9**	**81**	
2.1	**Education**	50.0	68	
2.1.1	Expenditure on education, % GDP	6.2	17	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.0	26	
2.1.3	School life expectancy, years	13.6	74	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	25.1	106	○ ◇
2.2	**Tertiary education**	17.6	96	○ ◇
2.2.1	Tertiary enrolment, % gross	23.9	92	◇
2.2.2	Graduates in science and engineering, %	18.3	84	○
2.2.3	Tertiary inbound mobility, %	3.5	65	
2.3	**Research and development (R&D)**	13.2	50	
2.3.1	Researchers, FTE/mn pop.	484.3	70	
2.3.2	Gross expenditure on R&D, % GDP	0.6	54	
2.3.3	Global corporate R&D investors, top 3, mn USD	0.0	38	○ ◇
2.3.4	QS university ranking, top 3*	31.4	39	
Infrastructure		**40.7**	**77**	
3.1	**Information and communication technologies (ICTs)**	72.5	67	
3.1.1	ICT access*	83.5	74	
3.1.2	ICT use*	56.9	83	
3.1.3	Government's online service*	74.7	55	
3.1.4	E-participation*	75.0	57	
3.2	**General infrastructure**	31.4	59	
3.2.1	Electricity output, GWh/mn pop.	3,956.5	54	
3.2.2	Logistics performance*	61.9	32	◆
3.2.3	Gross capital formation, % GDP	13.5	122	○ ◇
3.3	**Ecological sustainability**	18.3	104	○ ◇
3.3.1	GDP/unit of energy use	5.1	120	○ ◇
3.3.2	Environmental performance*	37.2	84	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.3	65	
Market sophistication		**40.4**	**39**	
4.1	**Credit**	31.4	48	
4.1.1	Finance for startups and scaleups*	35.6	48	
4.1.2	Domestic credit to private sector, % GDP	107.9	23	● ◆
4.1.3	Loans from microfinance institutions, % GDP	1.3	23	
4.2	**Investment**	31.7	25	● ◆
4.2.1	Market capitalization, % GDP	266.5	1	● ◆
4.2.2	Venture capital investors, deals/bn PPP$ GDP	0.1	36	
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	0.0	40	
4.2.4	Venture capital received, value, % GDP	0.0	59	
4.3	**Trade, diversification, and market scale**	58.1	61	
4.3.1	Applied tariff rate, weighted avg., %	4.4	88	
4.3.2	Domestic industry diversification	83.6	64	
4.3.3	Domestic market scale, bn PPP$	861.9	31	●

		Score/ Value	Rank	
Business sophistication		**27.6**	**63**	
5.1	**Knowledge workers**	25.0	78	
5.1.1	Knowledge-intensive employment, %	21.4	72	
5.1.2	Firms offering formal training, %	7.9	96	○ ◇
5.1.3	GERD performed by business, % GDP	0.3	48	
5.1.4	GERD financed by business, %	41.5	41	
5.1.5	Females employed w/advanced degrees, %	10.0	74	
5.2	**Innovation linkages**	26.1	51	
5.2.1	University-industry R&D collaboration†	49.3	49	
5.2.2	State of cluster development and depth†	45.6	76	
5.2.3	GERD financed by abroad, % GDP	0.1	40	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	35	◆
5.2.5	Patent families/bn PPP$ GDP	0.2	42	
5.3	**Knowledge absorption**	31.8	58	
5.3.1	Intellectual property payments, % total trade	1.6	19	● ◆
5.3.2	High-tech imports, % total trade	9.6	46	
5.3.3	ICT services imports, % total trade	1.2	77	
5.3.4	FDI net inflows, % GDP	1.2	94	
5.3.5	Research talent, % in businesses	18.6	55	
Knowledge and technology outputs		**24.7**	**56**	
6.1	**Knowledge creation**	17.7	52	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	72	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	44	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	20.6	45	
6.1.5	Citable documents H-index	31.2	31	● ◆
6.2	**Knowledge impact**	36.3	35	
6.2.1	Labor productivity growth, %	1.7	43	
6.2.2	New businesses/th pop. 15–64	12.5	9	● ◆
6.2.3	Software spending, % GDP	0.3	27	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.4	62	
6.2.5	High-tech manufacturing, %	20.9	62	
6.3	**Knowledge diffusion**	20.1	73	
6.3.1	Intellectual property receipts, % total trade	0.1	55	
6.3.2	Production and export complexity	42.3	59	
6.3.3	High-tech exports, % total trade	2.2	57	
6.3.4	ICT services exports, % total trade	0.6	97	○
Creative outputs		**19.5**	**64**	
7.1	**Intangible assets**	34.3	52	
7.1.1	Intangible asset intensity, top 15, %	63.6	37	
7.1.2	Trademarks by origin/bn PPP$ GDP	27.9	79	
7.1.3	Global brand value, top 5,000, % GDP	84.8	26	● ◆
7.1.4	Industrial designs by origin/bn PPP$ GDP	1.2	62	
7.2	**Creative goods and services**	5.5	99	○
7.2.1	Cultural and creative services exports, % total trade	0.2	75	
7.2.2	National feature films/mn pop. 15–69	0.6	66	○
7.2.3	Entertainment and media market/th pop. 15–69	6.6	41	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.8	51	
7.3	**Online creativity**	4.1	65	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.9	65	
7.3.2	Country-code TLDs/th pop. 15–69	9.3	41	
7.3.3	GitHub commit pushes received/mn pop. 15–69	2.8	74	
7.3.4	Mobile app creation/bn PPP$ GDP	1.3	75	

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 South Africa.

Missing data for South Africa

Code	Indicator name	Economy year	Model year	Source
2.1.4	PISA scales in reading, maths and science	n/a	2018	OECD, PISA
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2020	World Intellectual Property Organization
7.2.4	Printing and other media, % manufacturing	n/a	2019	United Nations Industrial Development Organization

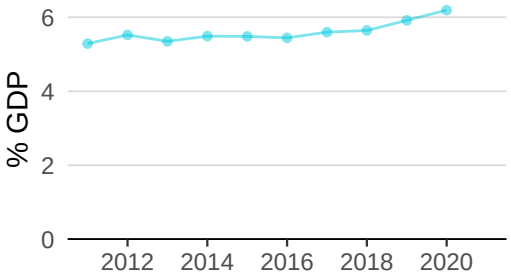
Outdated data for South Africa

Code	Indicator name	Economy year	Model year	Source
2.2.2	Graduates in science and engineering, %	2019	2020	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2019	2020	UNESCO Institute for Statistics
2.3.2	Gross expenditure on R&D, % GDP	2019	2020	UNESCO Institute for Statistics
5.1.3	GERD performed by business, % GDP	2017	2020	UNESCO Institute for Statistics
5.1.4	GERD financed by business, %	2017	2019	UNESCO Institute for Statistics
5.2.3	GERD financed by abroad, % GDP	2017	2019	UNESCO Institute for Statistics
5.3.5	Research talent, % in businesses	2017	2020	UNESCO Institute for Statistics

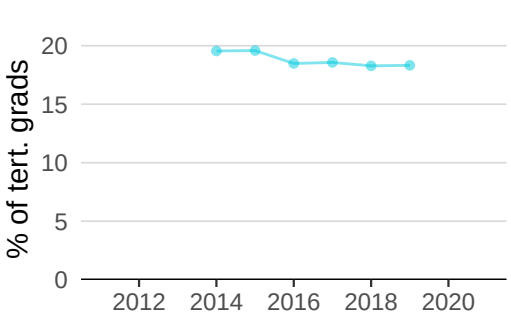
SOUTH AFRICA'S INNOVATION SYSTEM

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

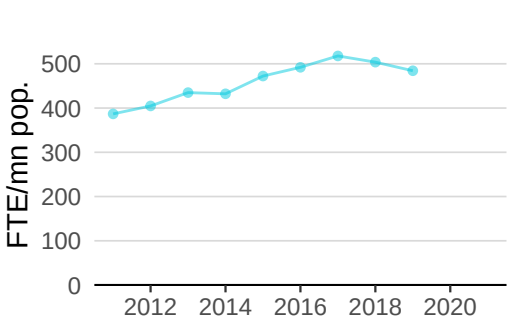
Innovation inputs



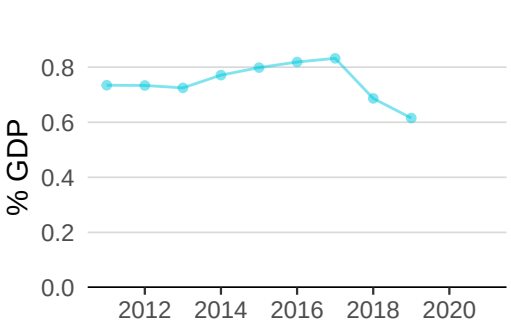
2.1.1 Expenditure on education was equal to 6.2% GDP in 2020–up by 5 percentage points from the year prior–and equivalent to an indicator rank of 17.



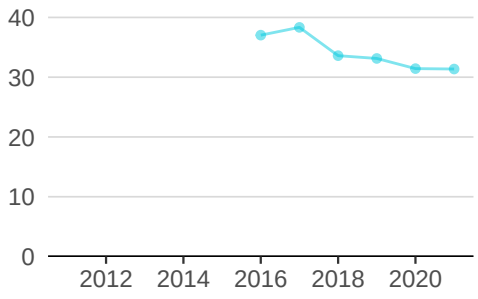
2.2.2 Graduates in science and engineering was equal to 18.3% of tert. grads in 2019–effectively unchanged from the year prior–and equivalent to an indicator rank of 84.



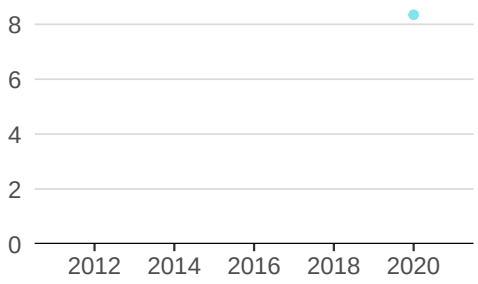
2.3.1 Researchers was equal to 484.3 FTE/mn pop. in 2019–down by 4 percentage points from the year prior–and equivalent to an indicator rank of 70.



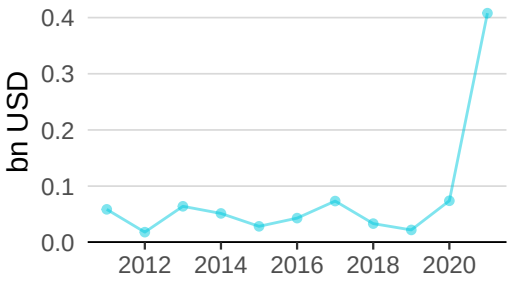
2.3.2 Gross expenditure on R&D was equal to 0.6% GDP in 2019–down by 10 percentage points from the year prior–and equivalent to an indicator rank of 54.



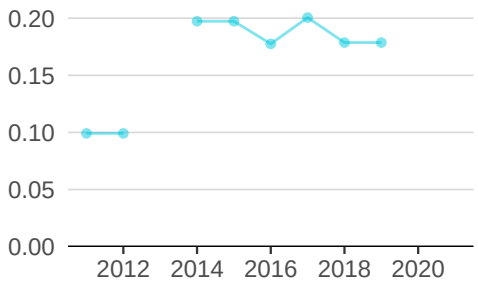
2.3.4 QS university ranking was equal to 31.4 in 2021–effectively unchanged from the year prior–and equivalent to an indicator rank of 39.



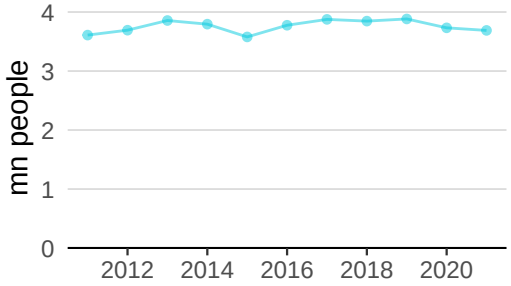
3.1.1 ICT access was equal to 8.3 in 2020 and equivalent to an indicator rank of 74.



4.2.4 Venture capital received was equal to 0.4 bn USD in 2021–up by 452 percentage points from the year prior–and equivalent to an indicator rank of 59.

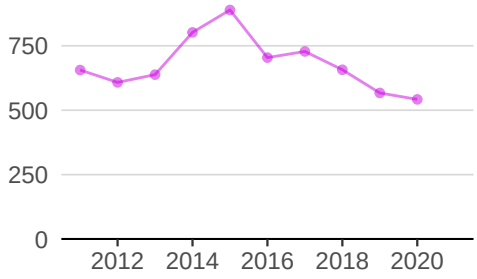


4.3.2 Domestic industry diversification was equal to 0.2 in 2019–effectively unchanged from the year prior–and equivalent to an indicator rank of 64.

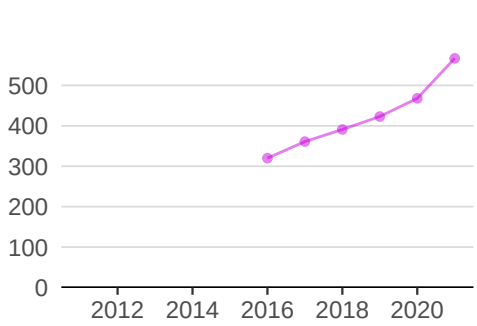


5.1.1 Knowledge-intensive employment was equal to 3.7 mn people in 2021–down by 1 percentage point from the year prior–and equivalent to an indicator rank of 72.

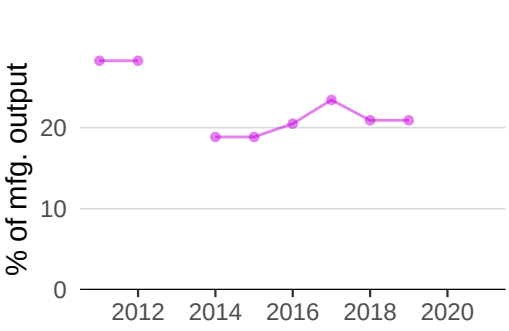
Innovation outputs



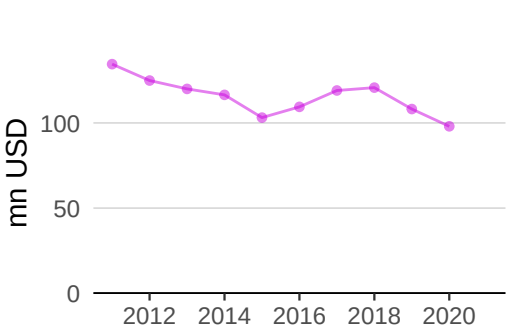
6.1.1 Patents by origin was equal to 542.0 in 2020–down by 4 percentage points from the year prior–and equivalent to an indicator rank of 72.



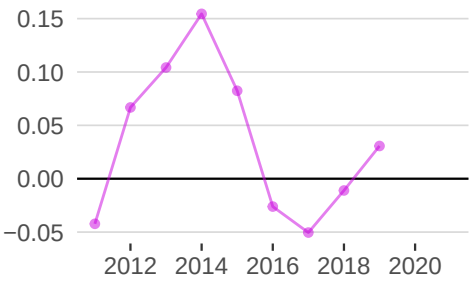
6.1.5 Citable documents H-index was equal to 567.0 in 2021–up by 21 percentage points from the year prior–and equivalent to an indicator rank of 31.



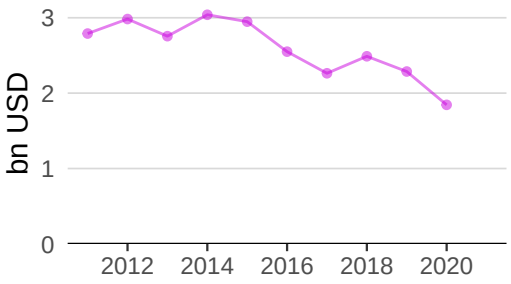
6.2.5 High-tech manufacturing was equal to 20.9% of mfg. output in 2019–effectively unchanged from the year prior–and equivalent to an indicator rank of 62.



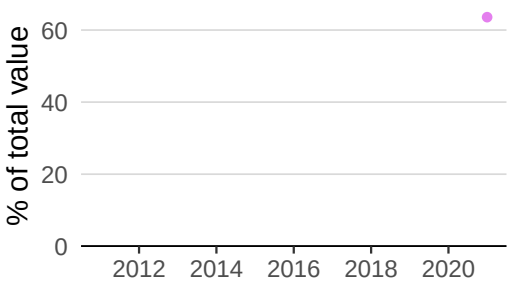
6.3.1 Intellectual property receipts was equal to 98.0 mn USD in 2020–down by 9 percentage points from the year prior–and equivalent to an indicator rank of 55.



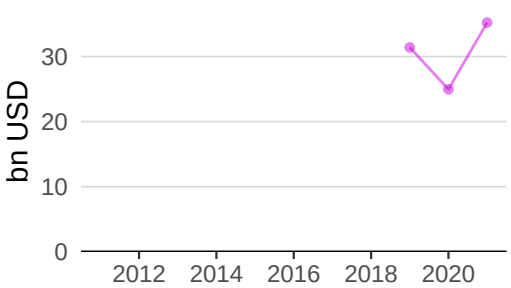
6.3.2 Production and export complexity was equal to 0.0 in 2019–up by 378 percentage points from the year prior–and equivalent to an indicator rank of 59.



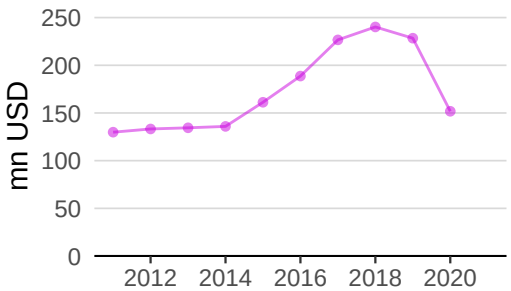
6.3.3 High-tech exports was equal to 1.8 bn USD in 2020–down by 19 percentage points from the year prior–and equivalent to an indicator rank of 57.



7.1.1 Intangible asset intensity was equal to 63.6% of total value in 2021 and equivalent to an indicator rank of 37.



7.1.3 Global brand value was equal to 35.2 bn USD in 2021–up by 41 percentage points from the year prior–and equivalent to an indicator rank of 26.



7.2.1 Cultural and creative services exports was equal to 151.8 mn USD in 2020–down by 34 percentage points from the year prior–and equivalent to an indicator rank of 75.

SOUTH AFRICA'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
UNIVERSITY OF CAPE TOWN	40.3	226=
UNIVERSITY OF THE WITWATERSRAND	27.1	424=
UNIVERSITY OF JOHANNESBURG	26.7	434=

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2022).
Note: QS Quacquarelli Symonds Ltd annually assesses over 1,200 universities across the globe and scores them between [0,100]. Ranks can represent a single value "x", a tie "x=" or a range "x-y".

7.1.1 Intangible asset intensity, top 15

Firm	Rank
NASPERS	1
FIRSTRAND	2
CAPITEC BANK	3

Source: Brand Finance (https://brandirectory.com/reports/gift-2021).
Note: Brand Finance only provides within economy ranks.

7.1.3 Global brand value, top 5,000

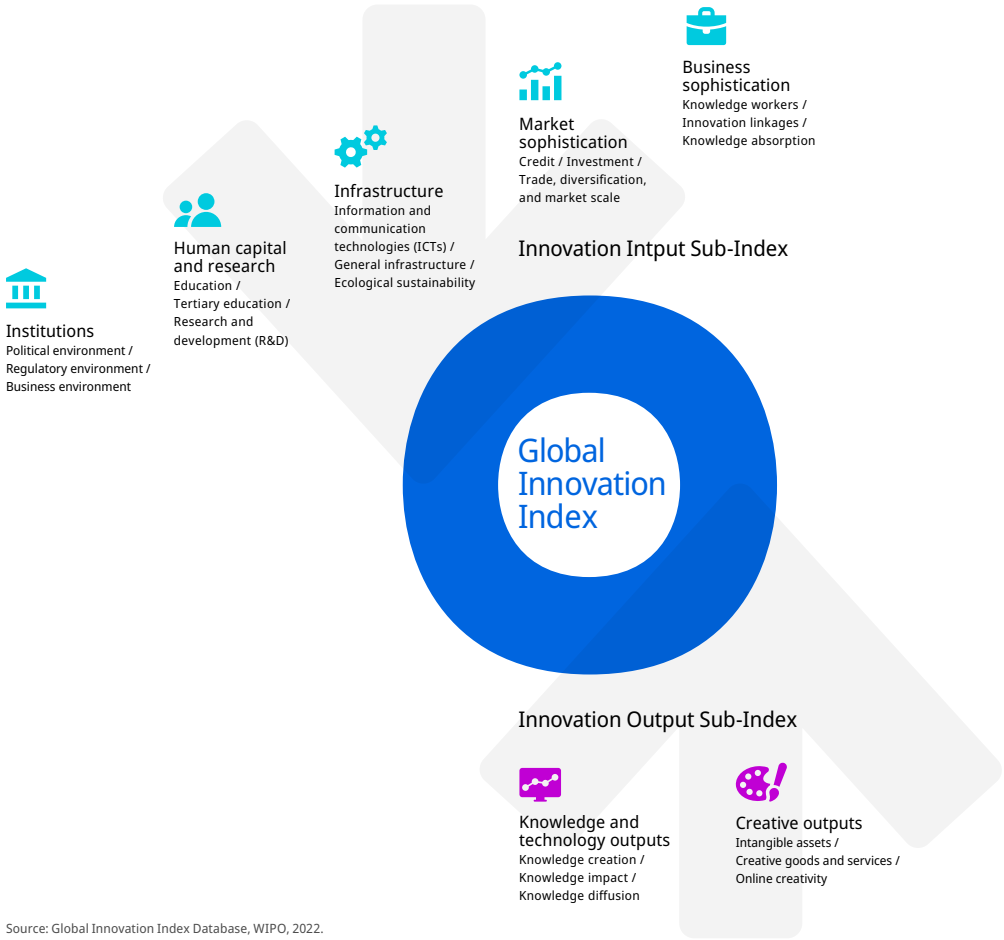
Brand	Industry	Rank
MTN	Telecoms	1
VODACOM	Telecoms	2
STANDARD BANK	Banking	3

Source: Brand Finance (https://brandirectory.com).
Note: Rank corresponds to within economy ranks.

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.