Global Innovation Index 2021

SOUTH AFRICA

61st South Africa ranks 61st 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 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 2021 is between ranks 60 and 64.

Rankings for South Africa (2019–2021)

	GII	Innovation inputs	Innovation outputs
2021	61	55	68
2020	60	49	68
2019	63	51	68

- South Africa performs better in innovation inputs than innovation outputs in 2021.
- This year South Africa ranks 55th in innovation inputs, lower than both 2020 and 2019.
- As for innovation outputs, South Africa ranks 68th. This position is the same as both 2020 and 2019.

14th South Africa ranks 14th among the 34 upper middle-income group economies.

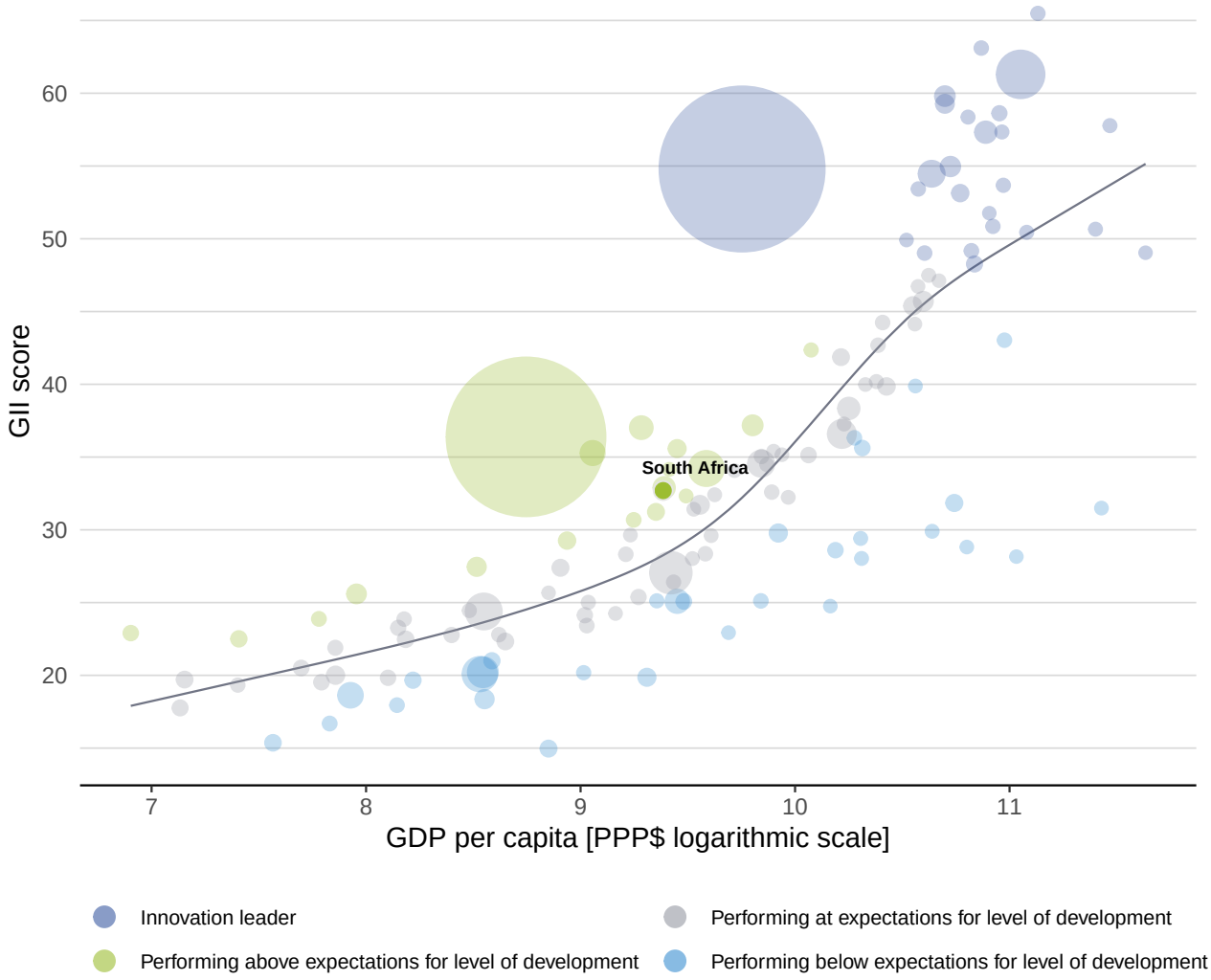
2nd South Africa ranks 2nd among the 27 economies in Sub-Saharan Africa.

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

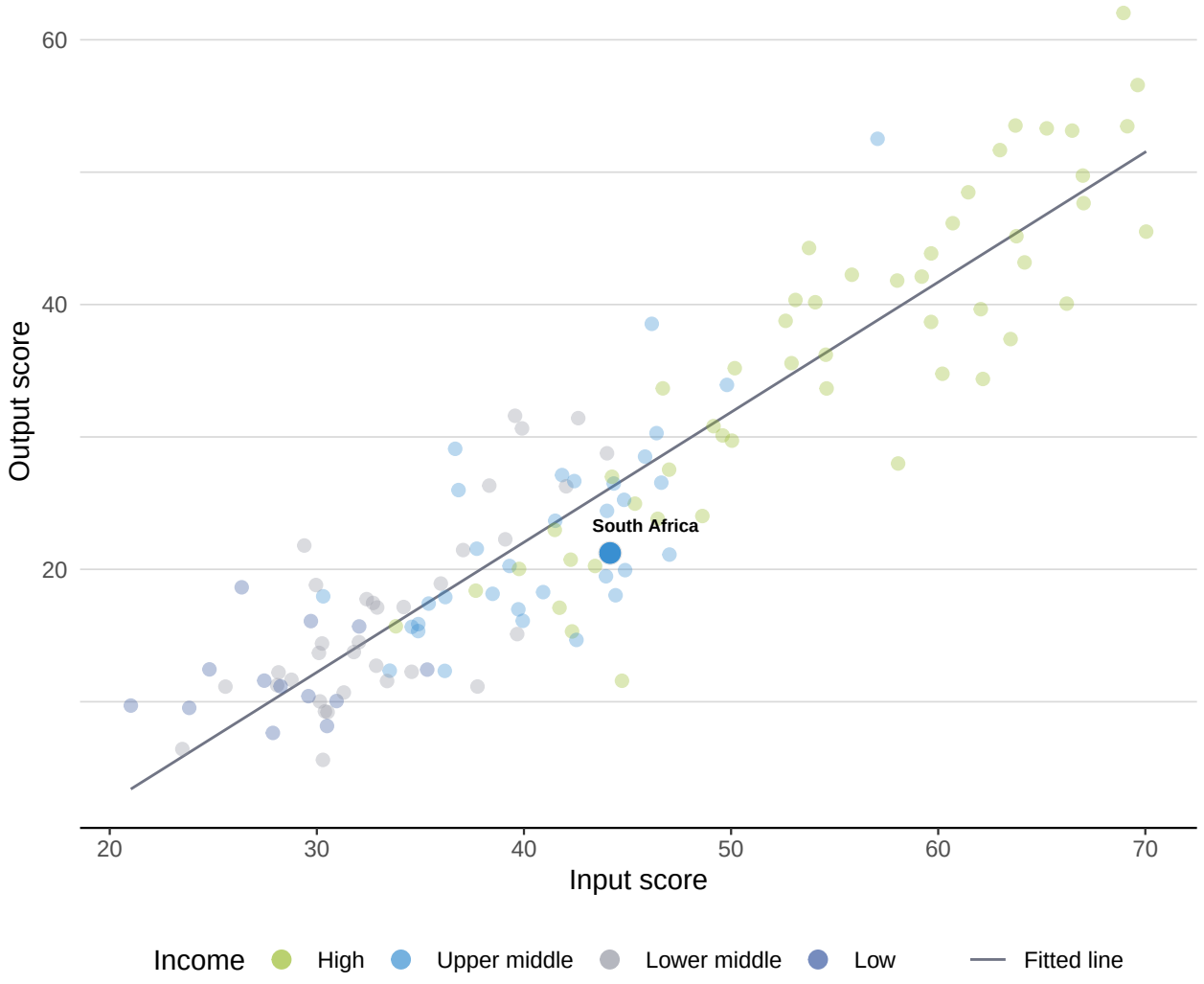


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

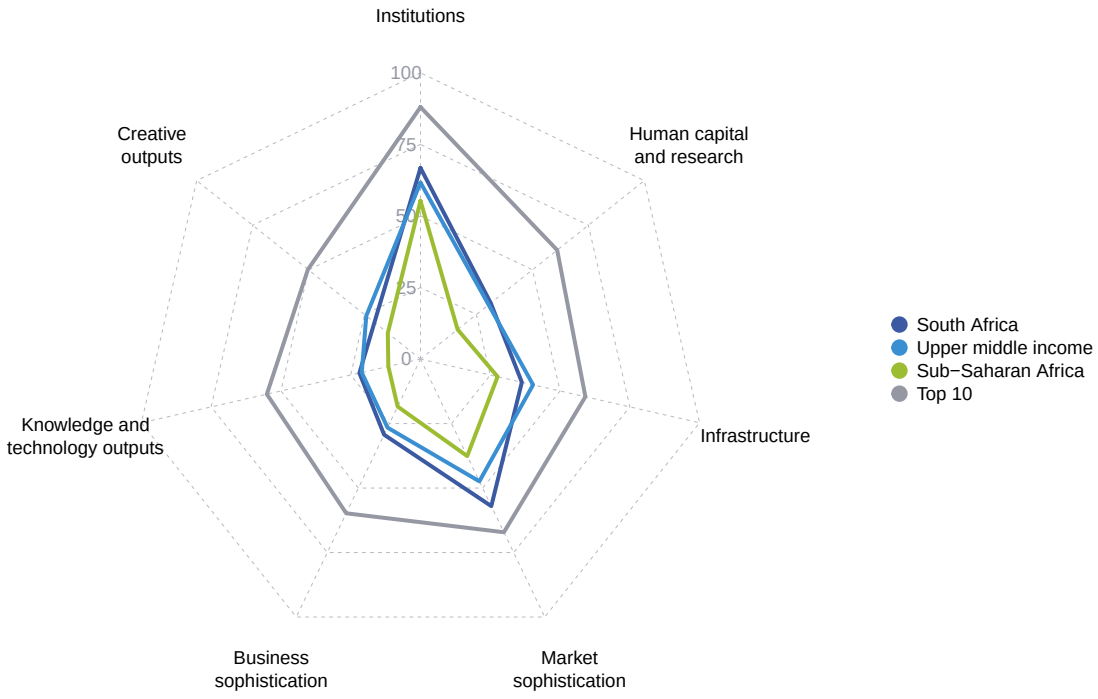
South Africa produces less innovation outputs relative to its level of innovation investments.

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 five pillars, namely: Institutions; Human capital and research; Market sophistication; Business sophistication; and, Knowledge and technology outputs.

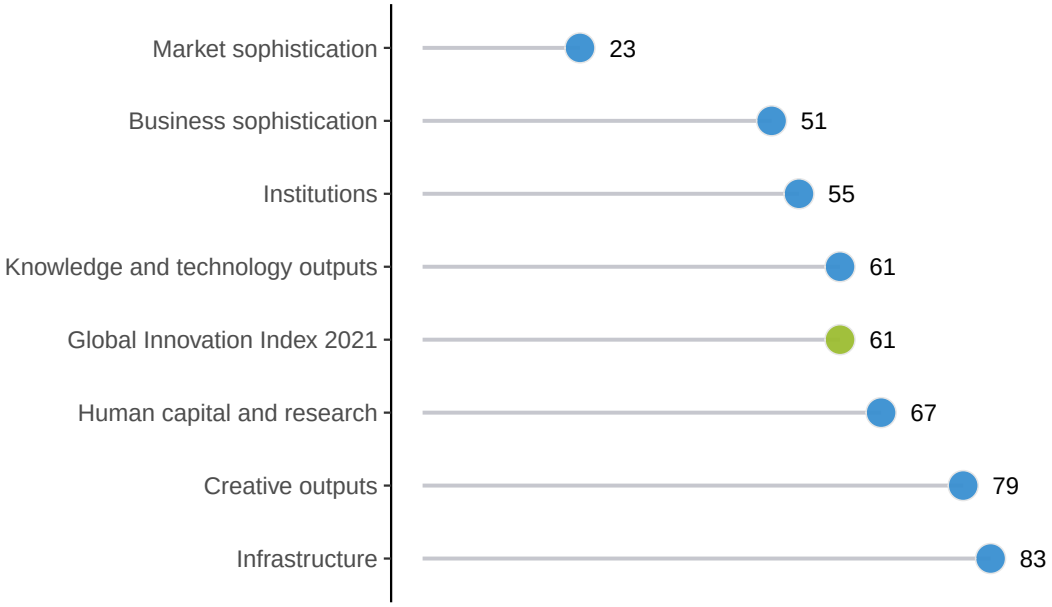
Sub-Saharan Africa

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

OVERVIEW OF RANKINGS IN THE SEVEN GII 2021 AREAS

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

The seven GII pillar ranks for South Africa



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 South Africa in the GII 2021.

Strengths and weaknesses for South Africa

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
1.2.3	Cost of redudancy dismissal	25	1.3.1	Ease of starting a business	107
2.1.1	Expenditure on education, % GDP	8	2.1.5	Pupil-teacher ratio, secondary	115
4.1.2	Domestic credit to private sector, % GDP	11	2.2	Tertiary education	98
4.2	Investment	18	2.2.2	Graduates in science and engineering, %	84
4.2.1	Ease of protecting minority investors	13	3.2.3	Gross capital formation, % GDP	119
4.2.2	Market capitalization, % GDP	1	3.3.1	GDP/unit of energy use	112
4.3.3	Domestic market scale, bn PPP$	32	4.1.3	Microfinance gross loans, % GDP	69
5.3.1	Intellectual property payments, % total trade	15	5.3.4	FDI net inflows, % GDP	105
6.1.5	Citable documents H-index	32	6.3.4	ICT services exports, % total trade	98
6.2.2	New businesses/th pop. 15–64	13	7.2.2	National feature films/mn pop. 15–69	96
6.2.3	Software spending, % GDP	24	7.3.4	Mobile app creation/bn PPP$ GDP	78
7.1.2	Global brand value, top 5,000, % GDP	23			

South Africa

GII 2021 rank

61

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
68	55	Upper middle	SSF	59.3	710.8	11,911	60

		Score/ Value	Rank
Institutions		**66.8**	**55**
1.1	**Political environment**	**60.6**	**57**
1.1.1	Political and operational stability*	64.3	80
1.1.2	Government effectiveness*	58.8	51
1.2	**Regulatory environment**	**71.8**	**46**
1.2.1	Regulatory quality*	47.6	61
1.2.2	Rule of law*	44.7	66
1.2.3	Cost of redundancy dismissal	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 and research		**31.4**	**67**
2.1	**Education**	**51.9**	**62**
2.1.1	Expenditure on education, % GDP	6.5	8 ● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.9	26
2.1.3	School life expectancy, years	13.5	76
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary ◴	28.6	115 ○ ◇
2.2	**Tertiary education**	**18.6**	**98** ○ ◇
2.2.1	Tertiary enrolment, % gross	23.8	94 ◇
2.2.2	Graduates in science and engineering, %	18.3	84 ○
2.2.3	Tertiary inbound mobility, %	3.6	60
2.3	**Research and development (R&D)**	**23.7**	**43**
2.3.1	Researchers, FTE/mn pop. ◴	517.7	66
2.3.2	Gross expenditure on R&D, % GDP ◴	0.8	44
2.3.3	Global corporate R&D investors, top 3, mn US$	40.7	38 ◆
2.3.4	QS university ranking, top 3*	31.4	39
Infrastructure		**36.3**	**83**
3.1	**Information and communication technologies (ICTs)**	**63.6**	**74**
3.1.1	ICT access*	51.5	89
3.1.2	ICT use*	53.2	75
3.1.3	Government's online service*	74.7	55
3.1.4	E-participation*	75.0	57
3.2	**General infrastructure**	**25.0**	**82**
3.2.1	Electricity output, GWh/mn pop.	4,227.6	53
3.2.2	Logistics performance*	61.7	32 ◆
3.2.3	Gross capital formation, % GDP	13.2	119 ○ ◇
3.3	**Ecological sustainability**	**20.4**	**97** ◇
3.3.1	GDP/unit of energy use	5.6	112 ○ ◇
3.3.2	Environmental performance*	43.1	82
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.3	61
Market sophistication		**57.0**	**23 ● ◆**
4.1	**Credit**	**47.3**	**42**
4.1.1	Ease of getting credit*	60.0	74
4.1.2	Domestic credit to private sector, % GDP	139.5	11 ● ◆
4.1.3	Microfinance gross loans, % GDP	0.0	69 ○
4.2	**Investment**	**51.0**	**18 ● ◆**
4.2.1	Ease of protecting minority investors*	80.0	13 ● ◆
4.2.2	Market capitalization, % GDP	295.9	1 ● ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	37
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	44
4.3	**Trade, diversification, and market scale**	**72.7**	**52**
4.3.1	Applied tariff rate, weighted avg., %	5.4	92
4.3.2	Domestic industry diversification ◴	81.7	73
4.3.3	Domestic market scale, bn PPP$	710.8	32 ●

		Score/ Value	Rank
Business sophistication		**29.3**	**51**
5.1	**Knowledge workers**	**32.2**	**64**
5.1.1	Knowledge-intensive employment, %	24.5	61
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP ◴	0.3	47
5.1.4	GERD financed by business, % ◴	41.5	41
5.1.5	Females employed w/advanced degrees, %	11.1	65
5.2	**Innovation linkages**	**23.4**	**53**
5.2.1	University-industry R&D collaboration†	52.5	36
5.2.2	State of cluster development and depth†	49.1	52
5.2.3	GERD financed by abroad, % GDP ◴	0.1	43
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	36 ◆
5.2.5	Patent families/bn PPP$ GDP	0.2	41
5.3	**Knowledge absorption**	**32.3**	**51**
5.3.1	Intellectual property payments, % total trade	1.8	15 ● ◆
5.3.2	High-tech imports, % total trade	10.1	32
5.3.3	ICT services imports, % total trade	1.2	65
5.3.4	FDI net inflows, % GDP	1.1	105 ○
5.3.5	Research talent, % in businesses ◴	18.6	56
Knowledge and technology outputs		**21.9**	**61**
6.1	**Knowledge creation**	**20.5**	**52**
6.1.1	Patents by origin/bn PPP$ GDP	0.7	71
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	38
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	21.6	40
6.1.5	Citable documents H-index	30.1	32 ● ◆
6.2	**Knowledge impact**	**32.7**	**55**
6.2.1	Labor productivity growth, %	0.3	60
6.2.2	New businesses/th pop. 15–64 ◴	10.2	13 ● ◆
6.2.3	Software spending, % GDP	0.4	24 ● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.6	58
6.2.5	High-tech manufacturing, %	20.5	62
6.3	**Knowledge diffusion**	**12.5**	**81**
6.3.1	Intellectual property receipts, % total trade	0.1	55
6.3.2	Production and export complexity	43.3	63
6.3.3	High-tech exports, % total trade	2.2	54
6.3.4	ICT services exports, % total trade	0.6	98 ○
Creative outputs		**20.6**	**79**
7.1	**Intangible assets**	**32.2**	**60**
7.1.1	Trademarks by origin/bn PPP$ GDP	28.3	77
7.1.2	Global brand value, top 5,000, % GDP	88.3	23 ● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	62
7.1.4	ICTs and organizational model creation†	58.7	48
7.2	**Creative goods and services**	**6.5**	**97**
7.2.1	Cultural and creative services exports, % total trade	0.2	71
7.2.2	National feature films/mn pop. 15–69	0.6	96 ○
7.2.3	Entertainment and media market/th pop. 15–69	7.5	43
7.2.4	Printing and other media, % manufacturing	n/a	n/a
7.2.5	Creative goods exports, % total trade	0.8	55
7.3	**Online creativity**	**11.3**	**88**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	3.0	65
7.3.2	Country-code TLDs/th pop. 15–69	9.7	41
7.3.3	Wikipedia edits/mn pop. 15–69	34.2	94 ◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.6	78 ○

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 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 Programme for International Student Assessment (PISA)
5.1.2	Firms offering formal training, %	n/a	2019	World Bank
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2019	World Intellectual Property Organization
7.2.4	Printing and other media, % manufacturing	n/a	2018	United Nations Industrial Development Organization

Outdated data for South Africa

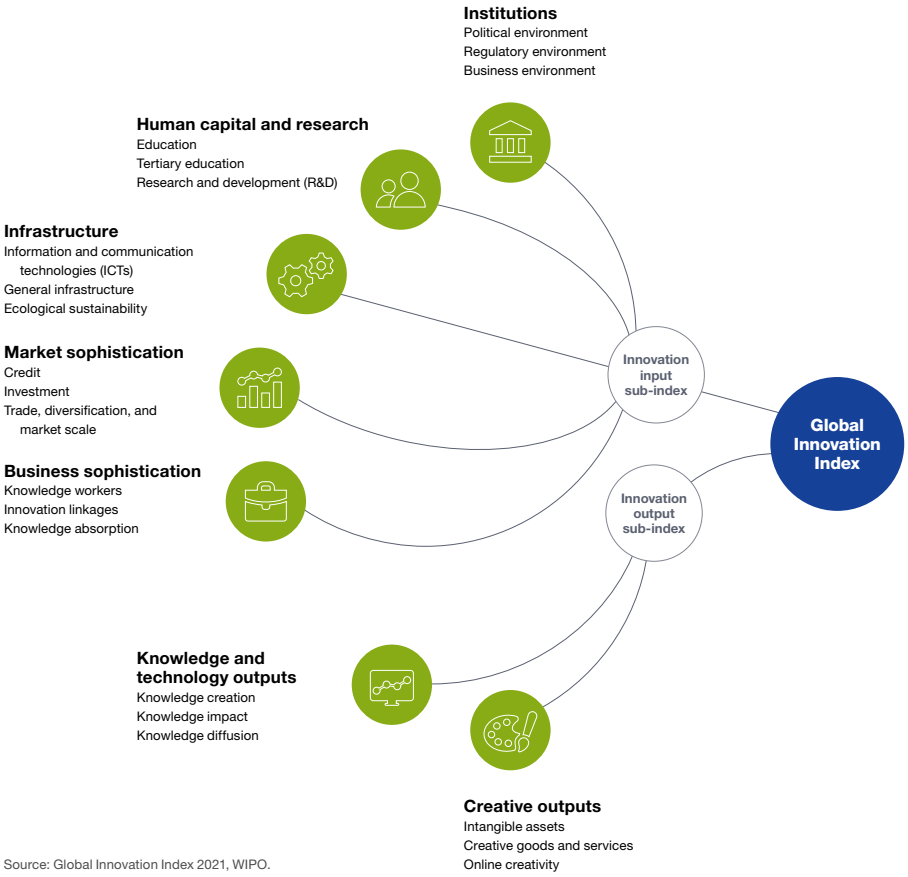
Code	Indicator name	Economy year	Model year	Source
2.1.5	Pupil-teacher ratio, secondary	2018	2019	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2017	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2017	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
4.3.2	Domestic industry diversification	2017	2018	United Nations Industrial Development Organization
5.1.3	GERD performed by business, % GDP	2017	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.4	GERD financed by business, %	2017	2018	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.2.3	GERD financed by abroad, % GDP	2017	2018	UNESCO Institute for Statistics

Code	Indicator name	Economy year	Model year	Source
5.3.5	Research talent, % in businesses	2017	2019	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 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.