

Global Innovation Index 2023

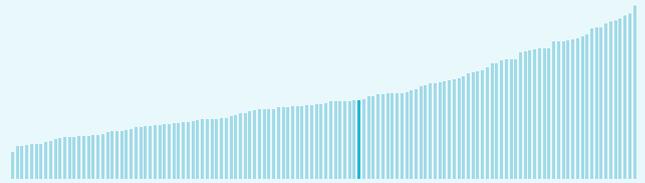


The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

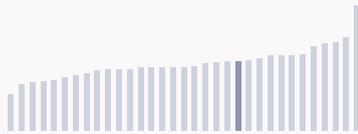
Consisting of **roughly 80 indicators**, grouped into innovation inputs and outputs, the GII **aims to capture the multi-dimensional facets of innovation.**

South Africa ranking in the Global Innovation Index 2023

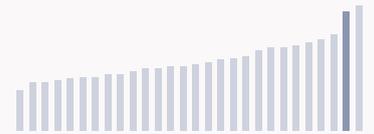
> South Africa ranks **59th** among the 132 economies featured in the GII 2023.



> South Africa ranks **12th** among the 33 upper-middle-income group economies.



> South Africa ranks **2nd** among the 28 economies in Sub-Saharan Africa.



> South Africa GII Ranking (2020-2023)

The table shows the rankings of South Africa over the past four years. 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 2023 is between ranks 57 and 65.

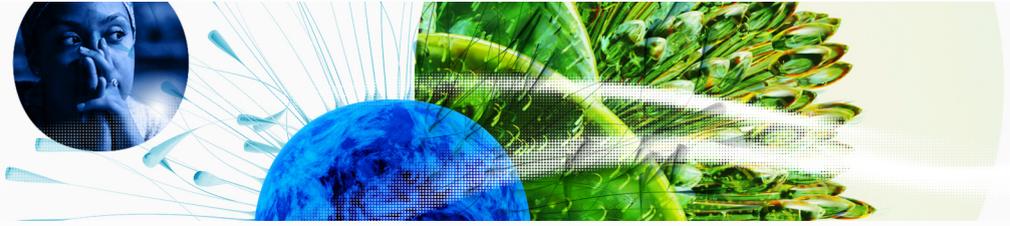
	GII Position	Innovation Inputs	Innovation Outputs
2020	60th	49th	68th
2021	61st	55th	68th
2022	61st	69th	61st
2023	59th	71st	57th

South Africa performs better in innovation outputs than innovation inputs in 2023.

This year South Africa ranks 71st in innovation inputs. This position is lower than last year.

South Africa ranks 57th in innovation outputs. This position is higher than last year.

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→ Expected vs. observed innovation performance

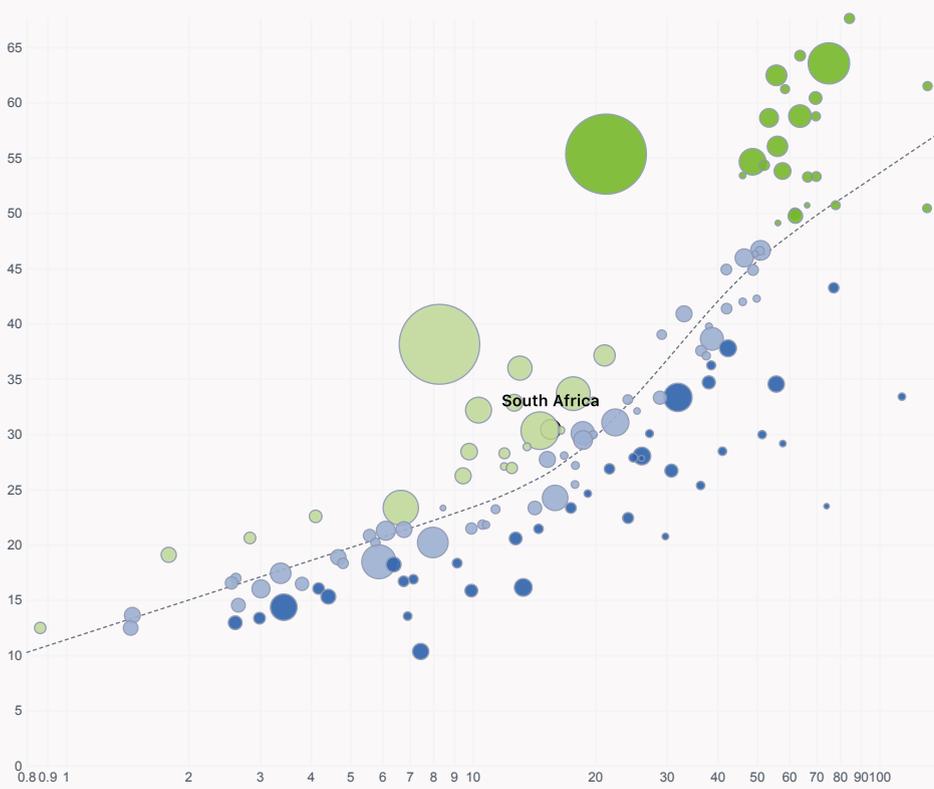
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected and those below are performing below expectations.



> Relative to GDP, South Africa is performing above expectations for its level of development.

> Innovation overperformers relative to their economic development

↑ **GII Score**



- Innovation leader
- Performing above expectations for level of development
- Performing at expectations for level of development
- Performing below expectations for level of development

Size legend (Population)



→ GDP per capita, PPP logarithmic scale (thousands of \$)

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→ Effectively translating innovation investments into innovation outputs

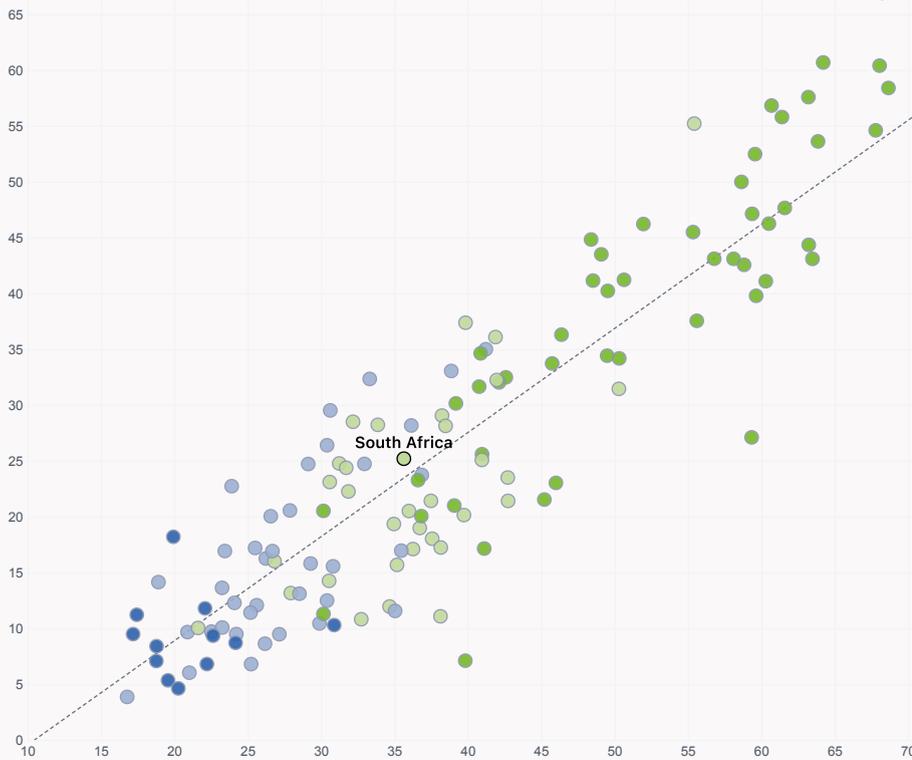
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.



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

> Relationship between innovation inputs and outputs

↑ Output score



● High income
● Upper middle
● Lower middle
● Low income

Fitted line

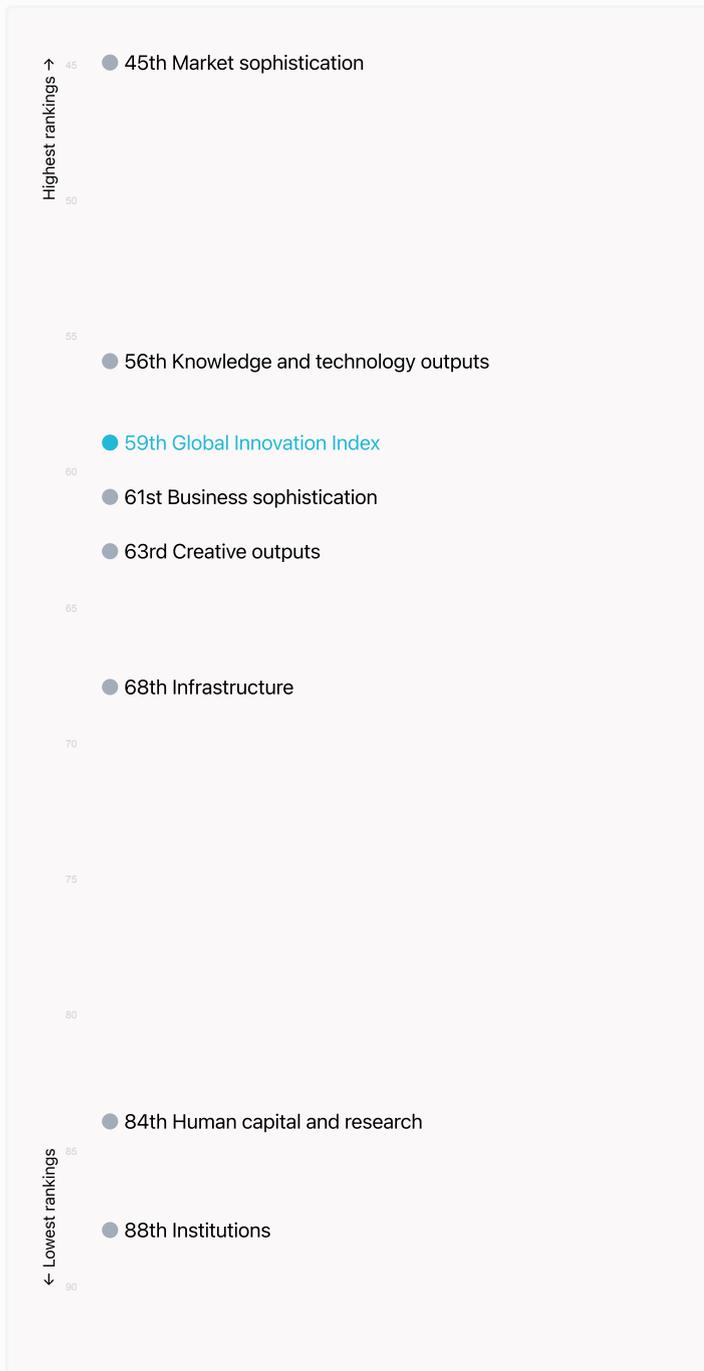
→ Input score

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→ Overview of South Africa's rankings in the seven areas of the GII in 2023

The chart shows the ranking for each of the seven areas that the GII comprises. The strongest areas for South Africa are those that rank above the GII (shown in blue) and the weakest are those that rank below.



> Highest rankings



South Africa ranks highest in Market sophistication (45th) and Knowledge and technology outputs (56th).

> Lowest rankings



South Africa ranks lowest in Institutions (88th), Human capital and research (84th) and Infrastructure (68th).

 The full WIPO Intellectual Property Statistics profile for South Africa can be found on [this link](#).

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→ Benchmark of South Africa against other country groupings for each of the seven areas of the GII Index

The charts show the relative position of South Africa (blue bar) against other country groupings (grey bars), for each of the seven areas of the GII Index.

> Upper-Middle-Income economies

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

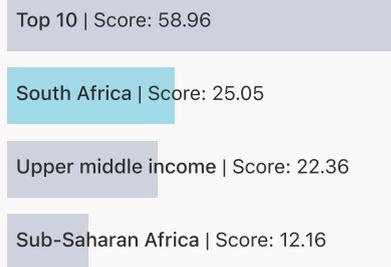


> Sub-Saharan Africa

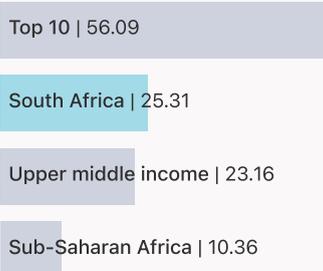
South Africa performs above the regional average in all the pillars.



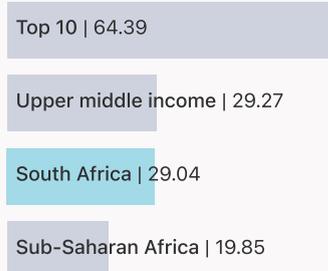
Knowledge and technology outputs



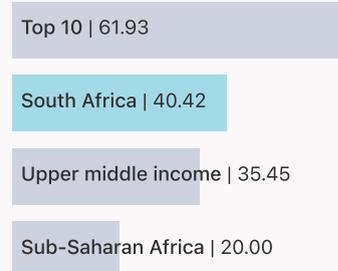
Creative outputs



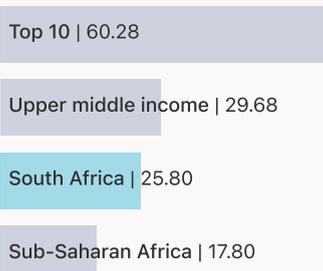
Business sophistication



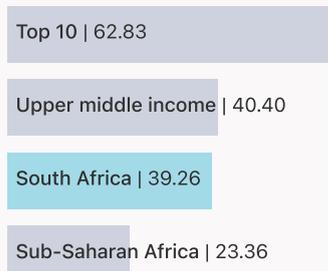
Market sophistication



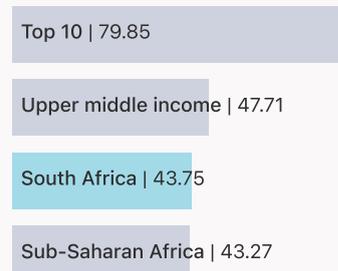
Human capital and research



Infrastructure



Institutions



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→ Innovation strengths and weaknesses in South Africa

The table below gives an overview of the indicator strengths and weaknesses of South Africa in the GII 2023.



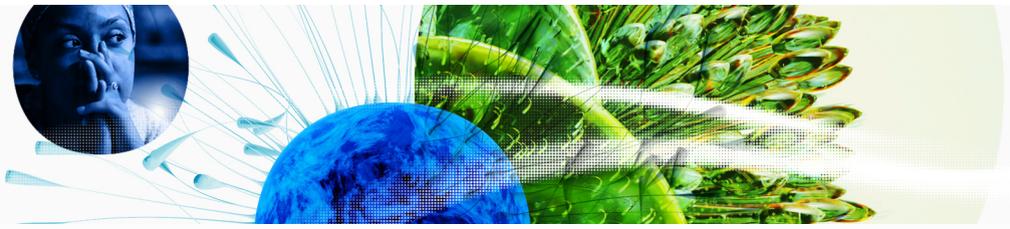
> South Africa's main innovation strengths are **Market capitalization, % GDP (rank 1)**, **Expenditure on education, % GDP (rank 11)** and **Logistics performance (rank 18)**.

Strengths

Weaknesses

Rank	Code	Indicator name	Rank	Code	Indicator name
1	4.2.1	Market capitalization, % GDP	125	3.2.3	Gross capital formation, % GDP
11	2.1.1	Expenditure on education, % GDP	115	2.1.5	Pupil-teacher ratio, secondary
18	3.2.2	Logistics performance	108	3.3.1	GDP/unit of energy use
20	2.1.2	Government funding/pupil, secondary, % GDP/cap	100	1.3.1	Policies for doing business
22	7.1.3	Global brand value, top 5,000	96	1.1.1	Operational stability for businesses
22	4.1.2	Domestic credit to private sector, % GDP	95	5.1.2	Firms offering formal training, %
22	5.3.3	ICT services imports, % total trade	91	2.2.2	Graduates in science and engineering, %
25	1.2.3	Cost of redundancy dismissal	77	1.3.2	Entrepreneurship policies and culture
27	5.3.1	Intellectual property payments, % total trade	65	7.2.2	National feature films/mn pop. 15-69
28	6.2.3	Software spending, % GDP	40	2.3.3	Global corporate R&D investors, top 3, mn US\$

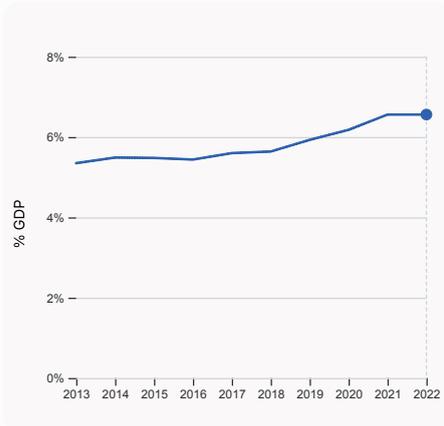
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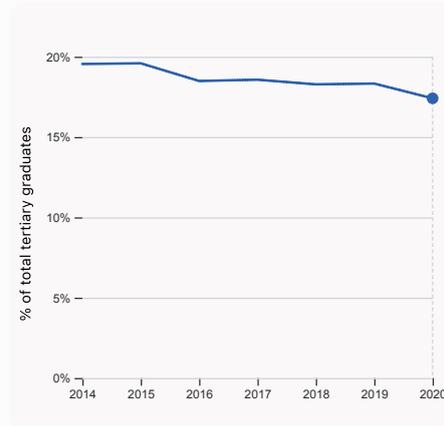
→ South Africa's innovation system

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

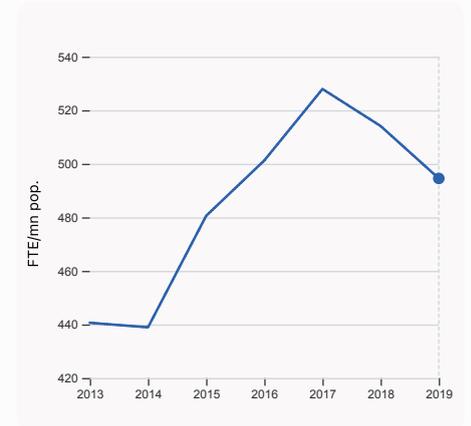
> Innovation inputs in South Africa



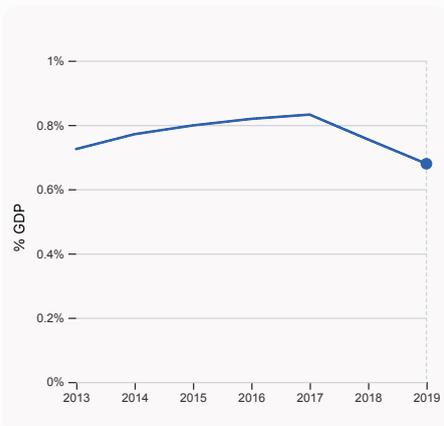
2.1.1 Expenditure on education, % GDP was equal to 6.56% GDP in 2022, with no change from the year prior – and equivalent to an indicator rank of 11.



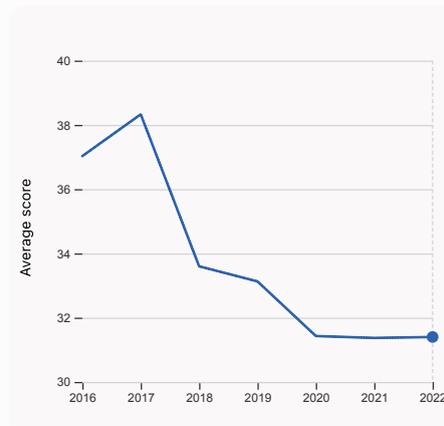
2.2.2 Graduates in science and engineering, % was equal to 17.41% of total tertiary graduates in 2020, down by 0.92 percentage points from the year prior – and equivalent to an indicator rank of 91.



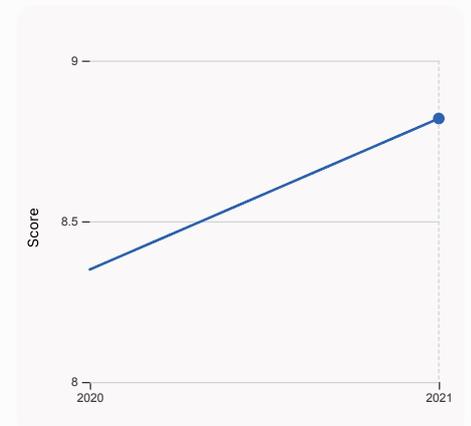
2.3.1 Researchers, FTE/mn pop. was equal to 494.55 FTE/mn pop. in 2019, down by 3.81% from the year prior – and equivalent to an indicator rank of 71.



2.3.2 Gross expenditure on R&D, % GDP was equal to 0.679% GDP in 2019, down by 0.076 percentage points from the year prior – and equivalent to an indicator rank of 53.

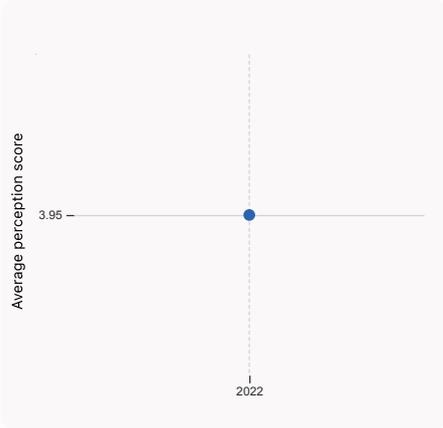


2.3.4 QS university ranking, top 3 was equal to an average score of 31.4 for the top 3 universities in 2022, up by 0.096% from the year prior – and equivalent to an indicator rank of 41.

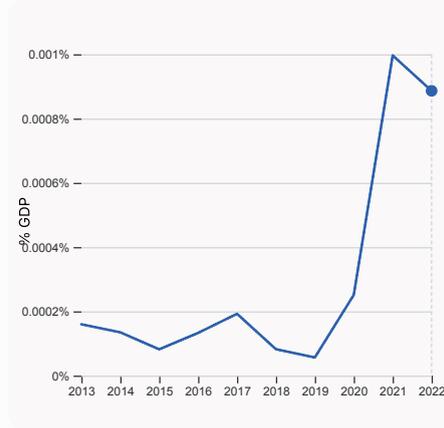


3.1.1 ICT access was equal to a score of 8.82 in 2021, up by 5.63% from the year prior – and equivalent to an indicator rank of 67.

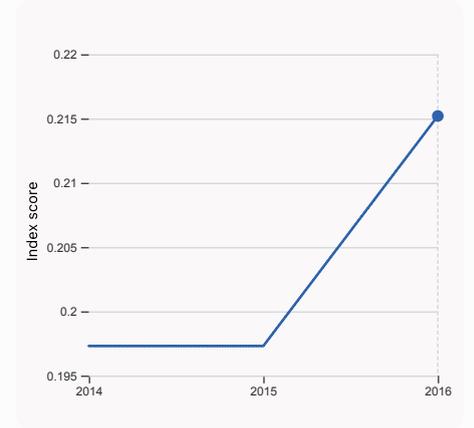
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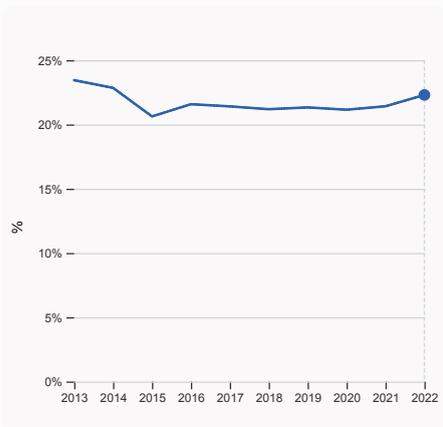
4.1.1 Finance for startups and scaleups was equal to an average perception score of 3.95 in 2022, equivalent to an indicator rank of 60.



4.2.4 VC received, value, % GDP was equal to 0.00089% GDP in 2022, down by 0.00011 percentage points from the year prior – and equivalent to an indicator rank of 55.



4.3.2 Domestic industry diversification was equal to an index score of 0.215 in 2016, up by 9.069% from the year prior – and equivalent to an indicator rank of 70.

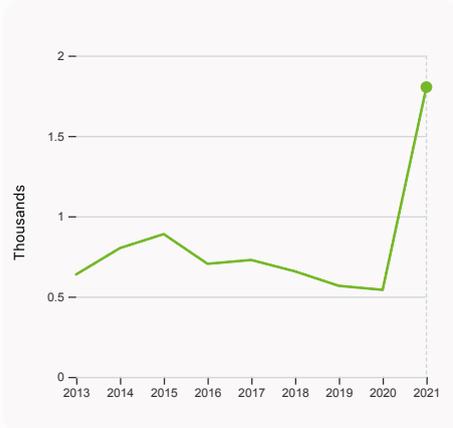


5.1.1 Knowledge-intensive employment, % was equal to 22.3% in 2022, up by 0.88 percentage points from the year prior – and equivalent to an indicator rank of 67.

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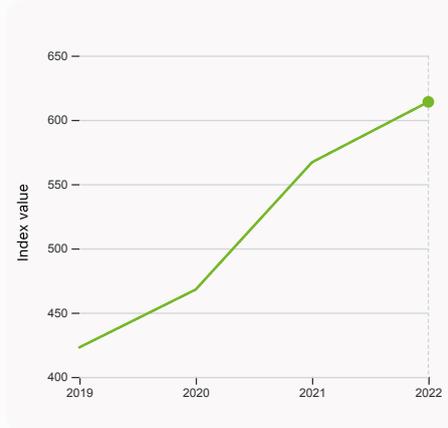


> Innovation outputs in South Africa



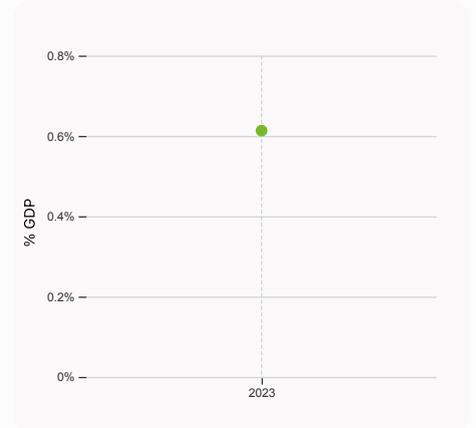
6.1.1 Patents by origin

was equal to 1.8 Thousands in 2021, up by 232.84% from the year prior – and equivalent to an indicator rank of 34.



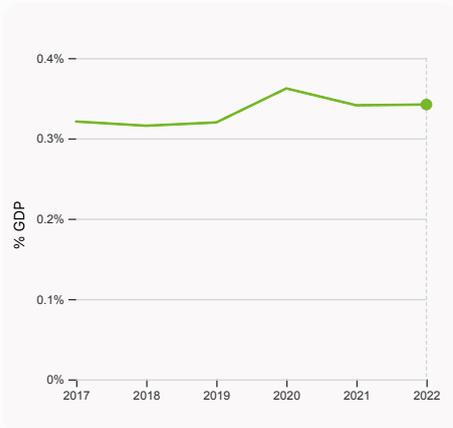
6.1.5 Citable documents H-index

was equal to an index value of 614 in 2022, up by 8.29% from the year prior – and equivalent to an indicator rank of 31.



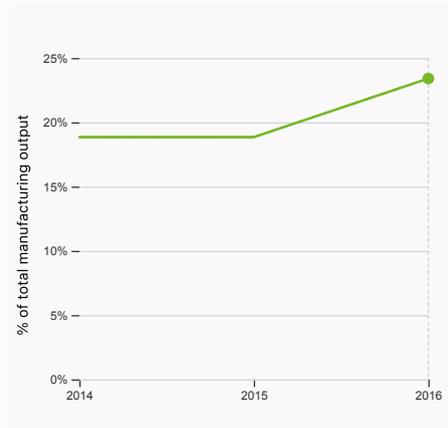
6.2.2 Unicorn valuation, % GDP

was equal to 0.613 % GDP in 2023 – and equivalent to an indicator rank of 37.



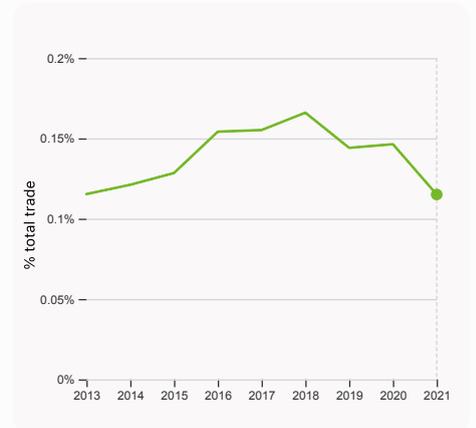
6.2.3 Software spending, % GDP

was equal to 0.342% GDP in 2022, up by 0.00094 percentage points from the year prior – and equivalent to an indicator rank of 28.



6.2.4 High-tech manufacturing, %

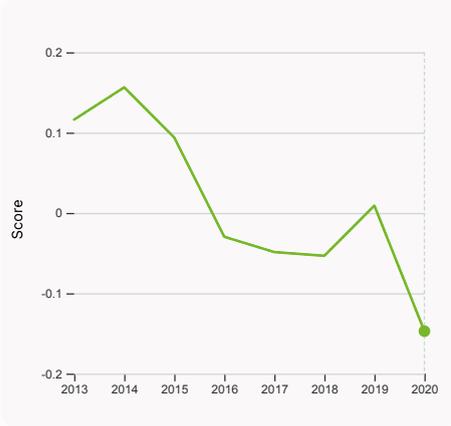
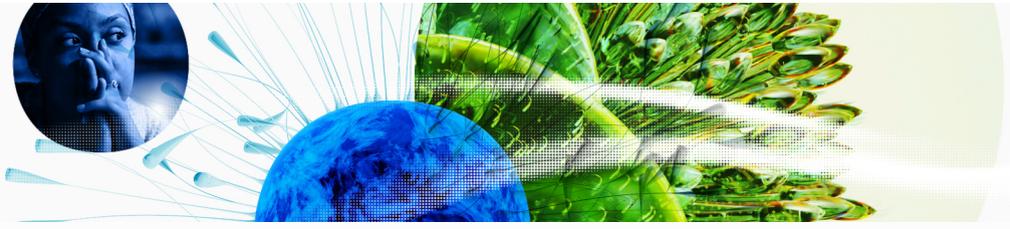
was equal to 23.41% of total manufacturing output in 2016, up by 4.56 percentage points from the year prior – and equivalent to an indicator rank of 56.



6.3.1 Intellectual property receipts, % total trade

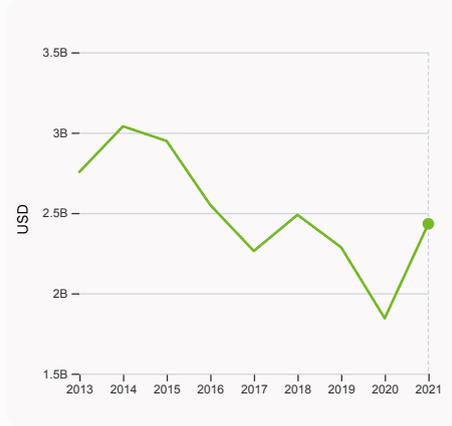
was equal to 0.115% total trade in 2021, down by 0.031 percentage points from the year prior – and equivalent to an indicator rank of 49.

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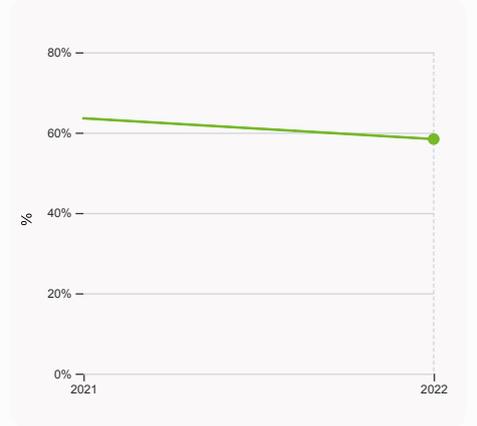
6.3.2 Production and export complexity

was equal to a score of -0.147 in 2020, down by 1701.5% from the year prior – and equivalent to an indicator rank of 69.



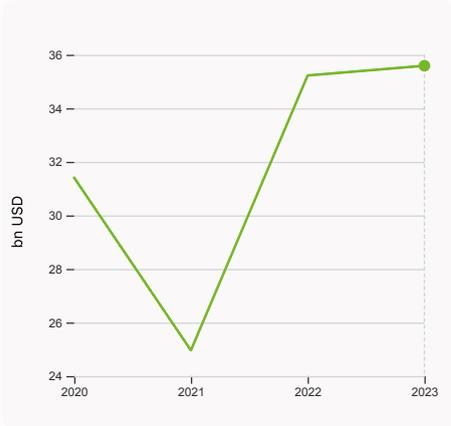
6.3.3 High-tech exports

was equal to 2,432,581,192 USD in 2021, up by 31.89% from the year prior – and equivalent to an indicator rank of 59.



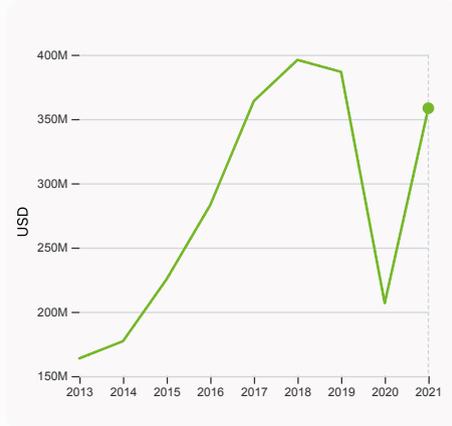
7.1.1 Intangible asset intensity, top 15, %

was equal to 58.4% in 2022, down by 5.17 percentage points from the year prior – and equivalent to an indicator rank of 40.



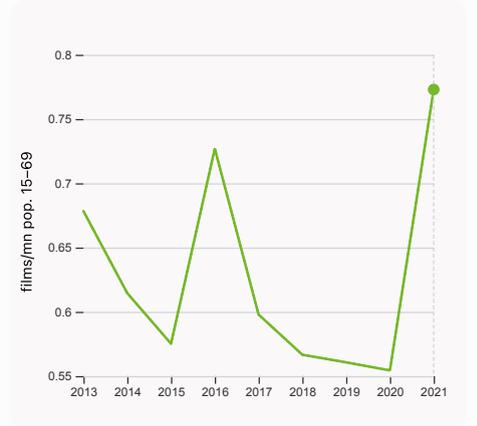
7.1.3 Global brand value, top 5,000

was equal to 35.591 bn USD in 2023, up by 1.031% from the year prior – and equivalent to an indicator rank of 22.



7.2.1 Cultural and creative services exports

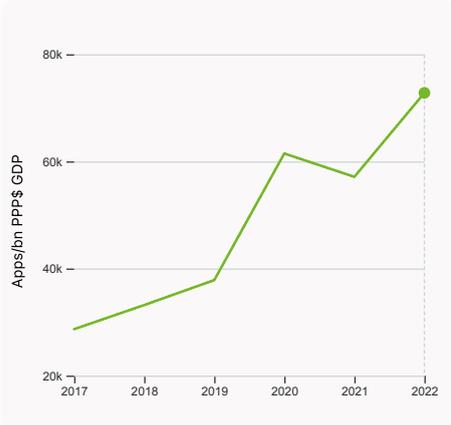
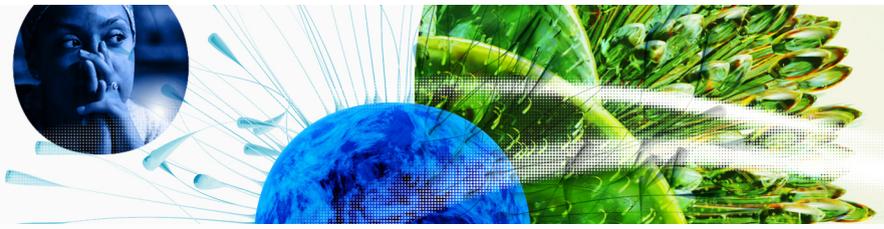
was equal to 358,436,000 USD in 2021, up by 73.31% from the year prior – and equivalent to an indicator rank of 66.



7.2.2 National feature films/mn pop. 15-69

was equal to 0.773 films/mn pop. 15-69 in 2021, up by 39.41% from the year prior – and equivalent to an indicator rank of 65.

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7.3.4 Mobile app creation/bn PPP\$ GDP

was equal to 72,797.58 Apps/bn PPP\$ GDP in 2022, up by 27.44% from the year prior – and equivalent to an indicator rank of 78.

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→ South Africa's innovation top performers

> 2.3.4 QS university ranking of South Africa's top universities

Rank	University	Score
237	UNIVERSITY OF CAPE TOWN	39.40
412	UNIVERSITY OF JOHANNESBURG	27.70
428	UNIVERSITY OF WITWATERSRAND	27.10

Source: QS Quacquarelli Symonds Ltd (<https://www.topuniversities.com/university-rankings/world-university-rankings/2023>).

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".

> 6.2.2 Top Unicorn Companies in South Africa

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	PROMASIDOR HOLDINGS	Consumer & retail	Bryanston	2
2	CELL C	Mobile & telecommunications	Midrand	1

Source: CBInsights, Tracker – The Complete List of Unicorn Companies: <https://www.cbinsights.com/research-unicorn-companies>

> 7.1.1 Top 15 intangible-asset intensive companies in South Africa

Rank	Firm	Intensity, %
1	NASPERS LTD	28.47
2	CAPITEC BANK HOLDINGS LTD	79.21
3	FIRSTRAND LTD	40.87

Source: Brand Finance (<https://brandirectory.com/reports/gift-2022>).

Note: Brand Finance only provides within economy ranks.

> 7.1.3 Top 5,000 companies in South Africa with highest global brand value

Rank	Brand	Industry	Brand Value, mn USD
1	MTN	Telecoms	4,375.1
2	VODACOM	Telecoms	2,344.9
3	STANDARD BANK	Banking	1,747.7

Source: Brand Finance (<https://brandirectory.com>).

Note: Rank corresponds to within economy ranks.

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GII 2023 rank

59

South Africa

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
57	71	Upper middle	SSA	59.9	949.8	15,555.9
Score / Value Rank				Score / Value Rank		
Institutions 43.7 88				Business sophistication 29.0 61		
1.1 Institutional environment 37.6 84				5.1 Knowledge workers 20.4 97		
1.1.1 Operational stability for businesses* 38.9 96 ○				5.1.1 Knowledge-intensive employment, % 22.3 67		
1.1.2 Government effectiveness* 36.3 72				5.1.2 Firms offering formal training, % 7.9 95 ○ ◇		
1.2 Regulatory environment 69.6 45				5.1.3 GERD performed by business, % GDP 0.2 52		
1.2.1 Regulatory quality* 40.2 75				5.1.4 GERD financed by business, % 27.1 61		
1.2.2 Rule of law* 43.5 58				5.1.5 Females employed w/advanced degrees, % 10.0 75		
1.2.3 Cost of redundancy dismissal 9.3 25 ● ◆				5.2 Innovation linkages 28.1 45		
1.3 Business environment 24.1 113 ○				5.2.1 University-industry R&D collaboration+ 58.7 36 ◆		
1.3.1 Policies for doing business* 35.3 100 ○				5.2.2 State of cluster development+ 48.0 48		
1.3.2 Entrepreneurship policies and culture* 12.8 77 ○ ◇				5.2.3 GERD financed by abroad, % GDP 0.1 39		
Human capital and research 25.8 84				5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP 0.0 31 ◆		
2.1 Education 49.9 69				5.2.5 Patent families/bn PPP\$ GDP 0.2 42		
2.1.1 Expenditure on education, % GDP 6.6 11 ● ◆				5.3 Knowledge absorption 38.6 49		
2.1.2 Government funding/pupil, secondary, % GDP/cap 25.1 20 ● ◆				5.3.1 Intellectual property payments, % total trade 1.3 27 ● ◆		
2.1.3 School life expectancy, years 13.4 79				5.3.2 High-tech imports, % total trade 9.2 49		
2.1.4 PISA scales in reading, maths and science n/a n/a				5.3.3 ICT services imports, % total trade 2.7 22 ● ◆		
2.1.5 Pupil-teacher ratio, secondary 27.2 115 ○ ◇				5.3.4 FDI net inflows, % GDP 4.0 31		
2.2 Tertiary education 15.3 102 ○ ◇				5.3.5 Research talent, % in businesses 11.4 59		
2.2.1 Tertiary enrolment, % gross 24.2 95 ◇				Knowledge and technology outputs 25.0 56		
2.2.2 Graduates in science and engineering, % 17.4 91 ○				6.1 Knowledge creation 23.5 45		
2.2.3 Tertiary inbound mobility, % 3.0 65				6.1.1 Patents by origin/bn PPP\$ GDP 2.1 34		
2.3 Research and development (R&D) 12.2 53				6.1.2 PCT patents by origin/bn PPP\$ GDP 0.2 40		
2.3.1 Researchers, FTE/mn pop. 494.5 71				6.1.3 Utility models by origin/bn PPP\$ GDP n/a n/a		
2.3.2 Gross expenditure on R&D, % GDP 0.7 53				6.1.4 Scientific and technical articles/bn PPP\$ GDP n/a n/a		
2.3.3 Global corporate R&D investors, top 3, mn US\$ 0.0 40 ○ ◇				6.1.5 Citable documents H-index 31.8 31 ◆		
2.3.4 QS university ranking, top 3* 31.8 41				6.2 Knowledge impact 31.9 49		
Infrastructure 39.3 68				6.2.1 Labor productivity growth, % 1.3 55		
3.1 Information and communication technologies (ICTs) 68.8 70				6.2.2 Unicorn valuation, % GDP 0.6 37		
3.1.1 ICT access* 82.3 67				6.2.3 Software spending, % GDP 0.3 28 ● ◆		
3.1.2 ICT use* 62.6 88				6.2.4 High-tech manufacturing, % 23.4 56		
3.1.3 Government's online service* 72.2 55				6.3 Knowledge diffusion 19.8 75		
3.1.4 E-participation* 58.1 61				6.3.1 Intellectual property receipts, % total trade 0.1 49		
3.2 General infrastructure 32.1 49				6.3.2 Production and export complexity 49.4 69		
3.2.1 Electricity output, GWh/mn pop. 3,987.7 55				6.3.3 High-tech exports, % total trade 2.1 59		
3.2.2 Logistics performance* 72.7 18 ● ◆				6.3.4 ICT services exports, % total trade 0.7 95		
3.2.3 Gross capital formation, % GDP 13.8 125 ○ ◇				6.3.5 ISO 9001 quality/bn PPP\$ GDP 4.4 59		
3.3 Ecological sustainability 16.9 100 ○ ◇				Creative outputs 25.3 63		
3.3.1 GDP/unit of energy use 5.9 108 ○ ◇				7.1 Intangible assets 37.4 51		
3.3.2 Environmental performance* 31.0 86				7.1.1 Intangible asset intensity, top 15, % 58.4 40		
3.3.3 ISO 14001 environment/bn PPP\$ GDP 1.2 60				7.1.2 Trademarks by origin/bn PPP\$ GDP 29.7 78		
Market sophistication 40.4 45				7.1.3 Global brand value, top 5,000 8.4 22 ● ◆		
4.1 Credit 30.9 64				7.1.4 Industrial designs by origin/bn PPP\$ GDP 0.8 75		
4.1.1 Finance for startups and scaleups+ 36.8 60				7.2 Creative goods and services 6.7 77		
4.1.2 Domestic credit to private sector, % GDP 111.2 22 ● ◆				7.2.1 Cultural and creative services exports, % total trade 0.3 66		
4.1.3 Loans from microfinance institutions, % GDP 1.2 24				7.2.2 National feature films/mn pop. 15-69 0.8 65 ○		
4.2 Investment 32.6 22 ● ◆				7.2.3 Entertainment and media market/th pop. 15-69 8.2 37		
4.2.1 Market capitalization, % GDP 265.8 1 ● ◆				7.2.4 Creative goods exports, % total trade 0.7 55		
4.2.2 Venture capital (VC) investors, deals/bn PPP\$ GDP 0.1 40				7.3 Online creativity 19.7 67		
4.2.3 VC recipients, deals/bn PPP\$ GDP 0.1 41				7.3.1 Generic top-level domains (TLDs)/th pop. 15-69 3.4 65		
4.2.4 VC received, value, % GDP 0.0 55				7.3.2 Country-code TLDs/th pop. 15-69 10.0 41		
4.3 Trade, diversification, and market scale 57.7 68				7.3.3 GitHub commits/mn pop. 15-69 4.5 73		
4.3.1 Applied tariff rate, weighted avg., % 4.4 88				7.3.4 Mobile app creation/bn PPP\$ GDP 61.0 78		
4.3.2 Domestic industry diversification 81.2 70						
4.3.3 Domestic market scale, bn PPP\$ 949.8 32						

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/gii-ranking>. 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.



> South Africa has missing data for two indicators and outdated data for eight indicators.

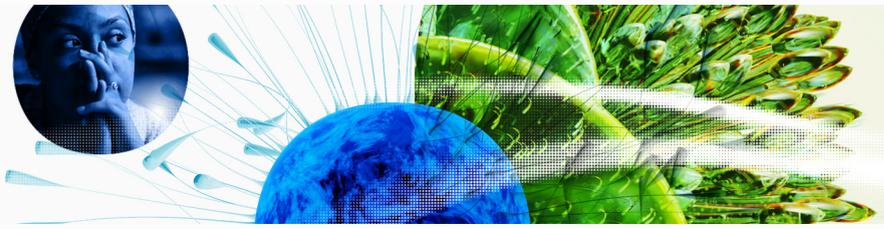
> Missing data for South Africa

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	2021	World Intellectual Property Organization; International Monetary Fund

> Outdated data for South Africa

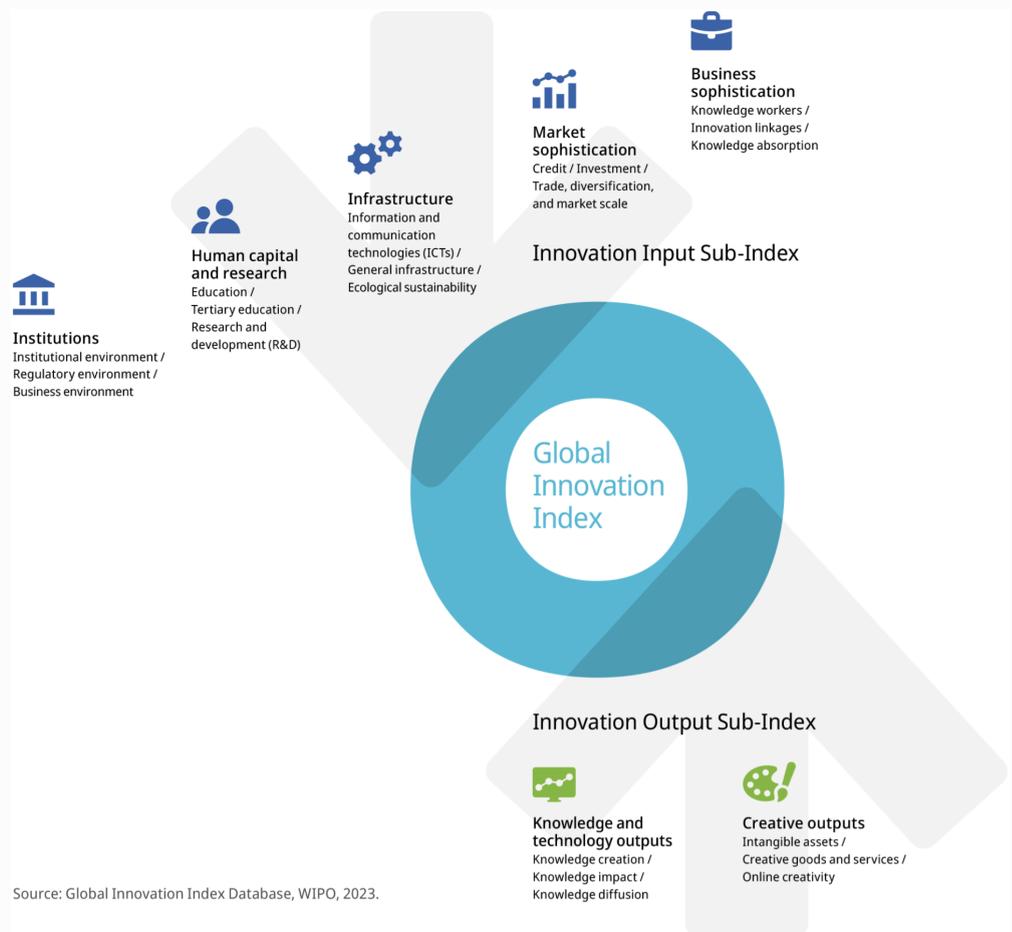
Code	Indicator name	Economy Year	Model Year	Source
2.3.1	Researchers, FTE/mn pop.	2019	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
2.3.2	Gross expenditure on R&D, % GDP	2019	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
4.3.2	Domestic industry diversification	2016	2020	United Nations Industrial Development Organization
5.1.3	GERD performed by business, % GDP	2019	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.1.4	GERD financed by business, %	2019	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.2.3	GERD financed by abroad, % GDP	2019	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.3.5	Research talent, % in businesses	2019	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
6.2.4	High-tech manufacturing, %	2016	2020	United Nations Industrial Development Organization

Global Innovation Index 2023



→ 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.



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.