

Global Innovation Index 2023

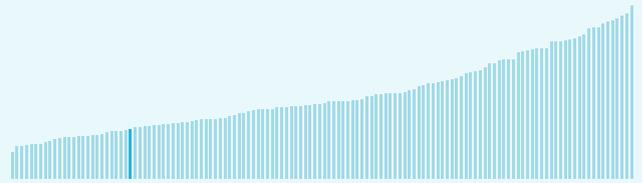


The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

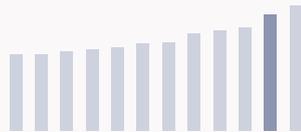
Consisting of **roughly 80 indicators**, grouped into innovation inputs and outputs, the GII **aims to capture the multi-dimensional facets of innovation.**

Madagascar ranking in the Global Innovation Index 2023

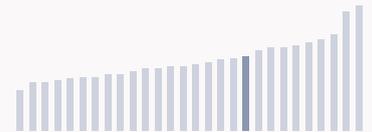
> Madagascar ranks **107th** among the 132 economies featured in the GII 2023.



> Madagascar ranks **2nd** among the 12 low-income group economies.



> Madagascar ranks **10th** among the 28 economies in Sub-Saharan Africa.



> Madagascar GII Ranking (2020-2023)

The table shows the rankings of Madagascar 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 Madagascar in the GII 2023 is between ranks 101 and 120.

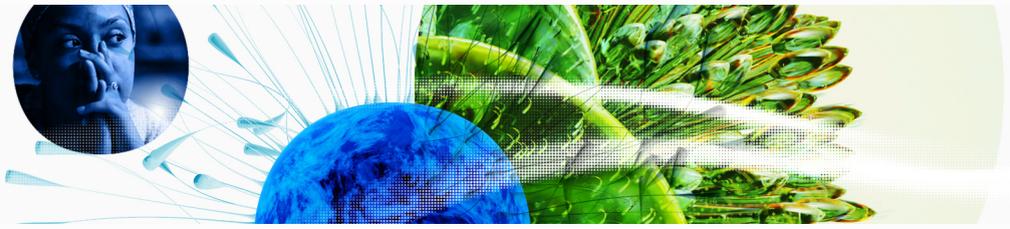
	GII Position	Innovation Inputs	Innovation Outputs
2020	115th	125th	100th
2021	110th	127th	78th
2022	106th	125th	85th
2023	107th	125th	82nd

Madagascar performs better in innovation outputs than innovation inputs in 2023.

This year Madagascar ranks 125th in innovation inputs. This position is the same as last year.

Madagascar ranks 82nd in innovation outputs. This position is higher than last year.

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→ Expected vs. observed innovation performance

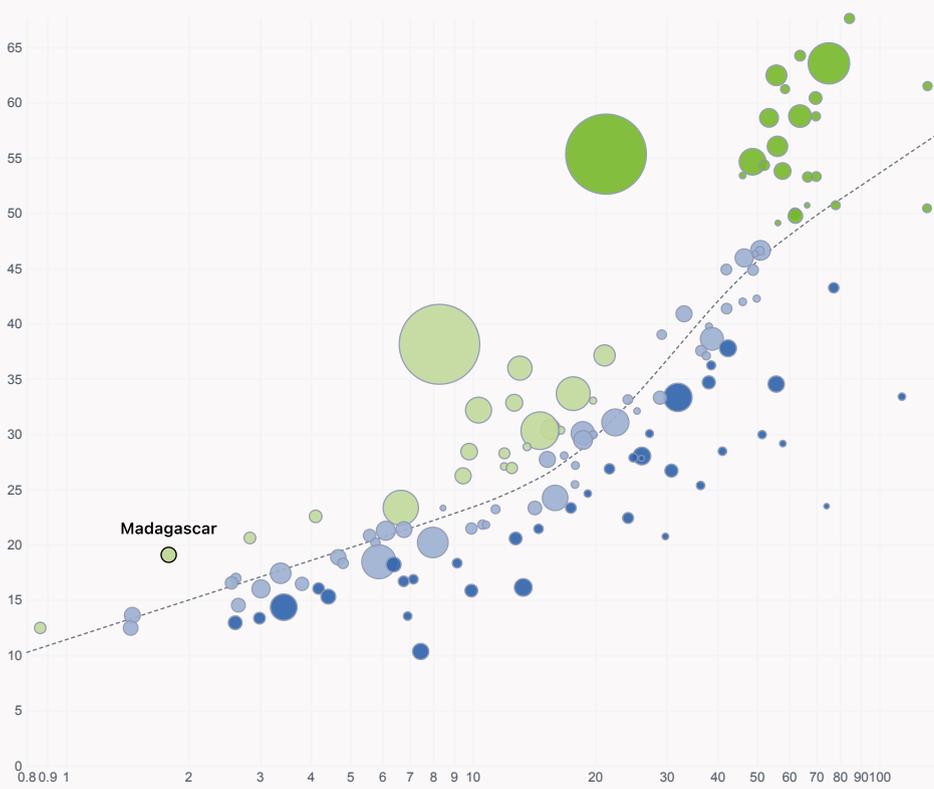
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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



> Relative to GDP, Madagascar 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

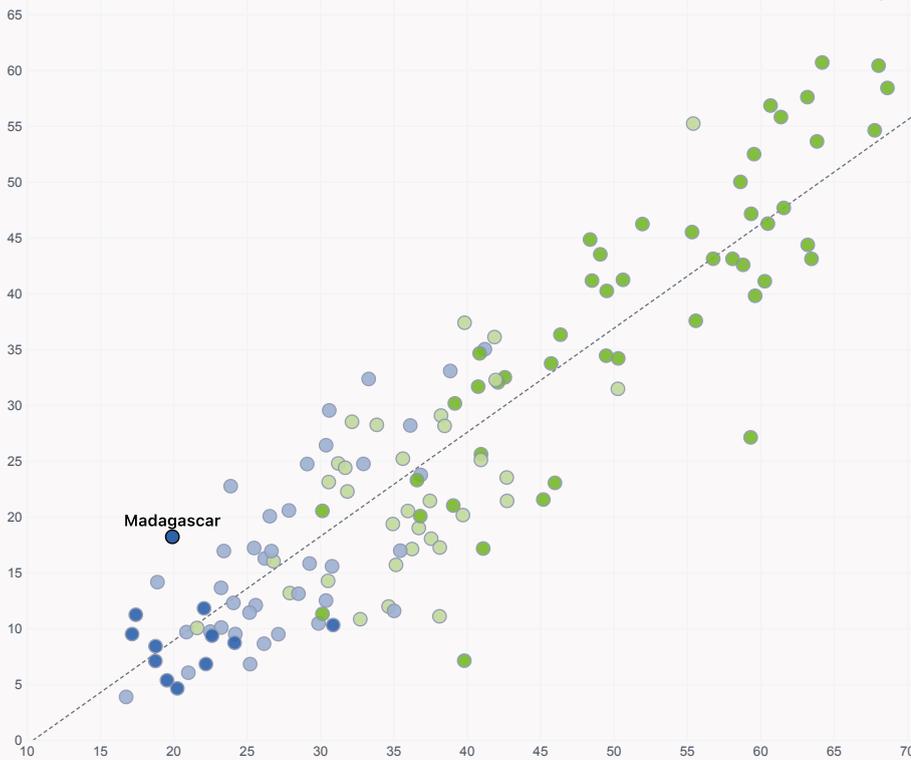
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.



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

> Relationship between innovation inputs and outputs

↑ Output score



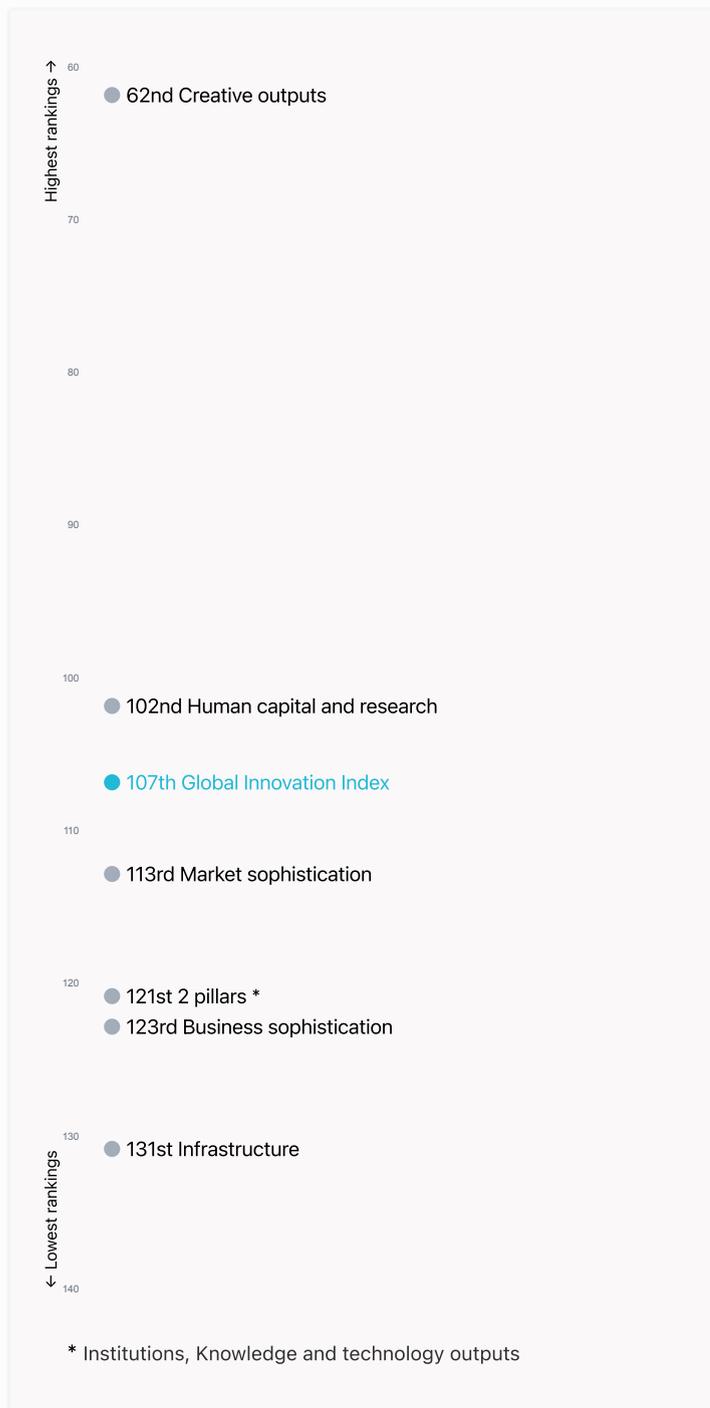
→Input score

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→ Overview of Madagascar'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 Madagascar are those that rank above the GII (shown in blue) and the weakest are those that rank below.



> Highest rankings

Madagascar ranks highest in Creative outputs (62nd) and Human capital and research (102nd).

> Lowest rankings

Madagascar ranks lowest in Infrastructure (131st), Business sophistication (123rd) and Institutions, Knowledge and technology outputs (121st).

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

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

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

> Low-Income economies

Madagascar performs above the low-income group average in Creative outputs, Market sophistication, Human capital and research.

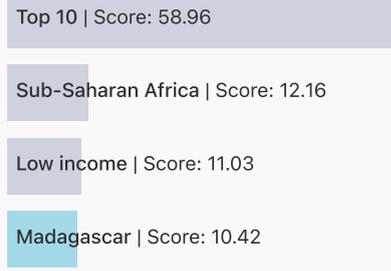


> Sub-Saharan Africa

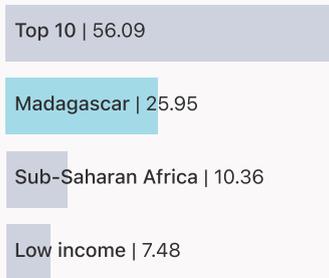
Madagascar performs below the regional average in Knowledge and technology outputs, Business sophistication, Market sophistication, Infrastructure, Institutions.



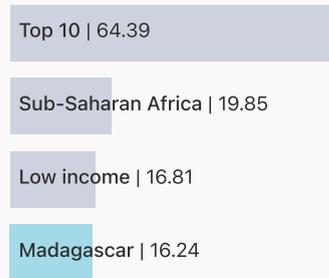
Knowledge and technology outputs



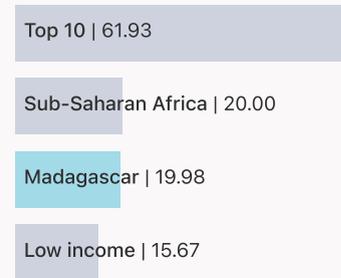
Creative outputs



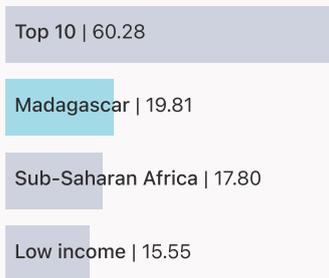
Business sophistication



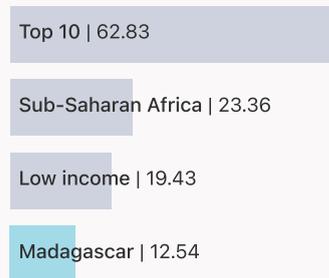
Market sophistication



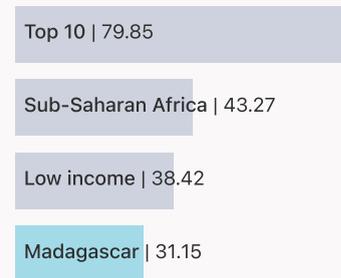
Human capital and research



Infrastructure



Institutions





→ Innovation strengths and weaknesses in Madagascar

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



> Madagascar's main innovation strengths are **Industrial designs by origin/bn PPP\$ GDP** (rank 15), **Graduates in science and engineering, %** (rank 22) and **Loans from microfinance institutions, % GDP** (rank 28).

Strengths

Weaknesses

Rank	Code	Indicator name	Rank	Code	Indicator name
15	7.1.4	Industrial designs by origin/bn PPP\$ GDP	125	3.2.1	Electricity output, GWh/mn pop.
22	2.2.2	Graduates in science and engineering, %	124	7.3.4	Mobile app creation/bn PPP\$ GDP
28	4.1.3	Loans from microfinance institutions, % GDP	124	2.2.1	Tertiary enrolment, % gross
33	7.1.2	Trademarks by origin/bn PPP\$ GDP	112	2.3.2	Gross expenditure on R&D, % GDP
36	6.3.4	ICT services exports, % total trade	106	3.2.2	Logistics performance
37	5.3.3	ICT services imports, % total trade	95	5.2.5	Patent families/bn PPP\$ GDP
52	5.3.4	FDI net inflows, % GDP	71	2.3.4	QS university ranking, top 3
58	1.2.3	Cost of redundancy dismissal	48	6.2.2	Unicorn valuation, % GDP
67	6.3.1	Intellectual property receipts, % total trade	40	2.3.3	Global corporate R&D investors, top 3, mn US\$
76	5.2.4	Joint venture/strategic alliance deals/bn PPP\$ GDP			

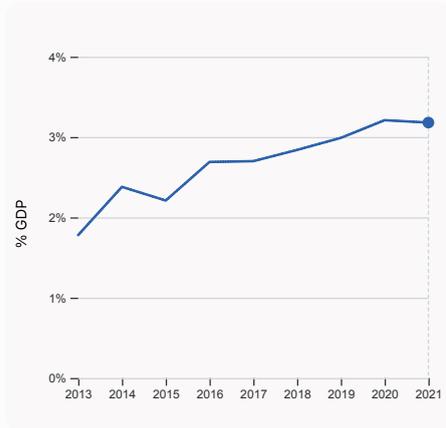
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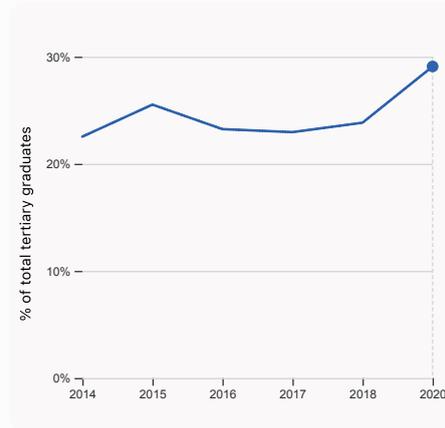
→ Madagascar's innovation system

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

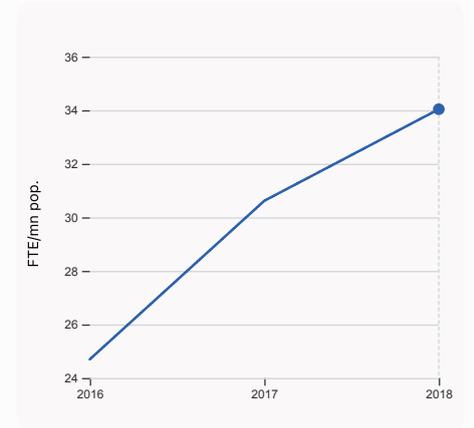
> Innovation inputs in Madagascar



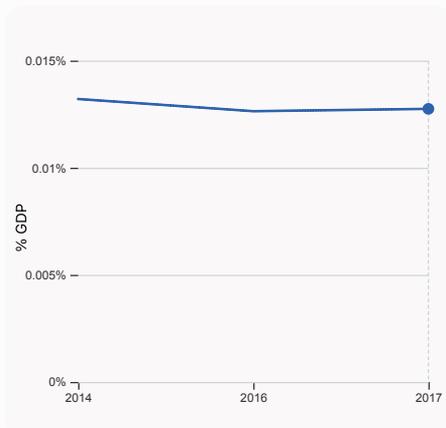
2.1.1 Expenditure on education, % GDP
was equal to 3.18% GDP in 2021, down by 0.03 percentage points from the year prior – and equivalent to an indicator rank of 101.



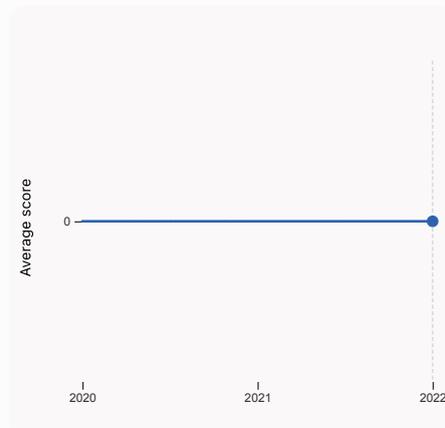
2.2.2 Graduates in science and engineering, %
was equal to 29.09% of total tertiary graduates in 2020, up by 5.25 percentage points from the year prior – and equivalent to an indicator rank of 22.



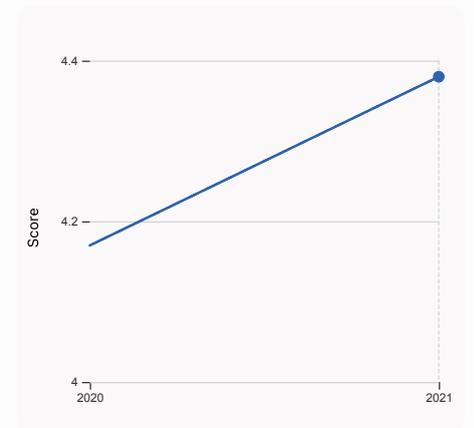
2.3.1 Researchers, FTE/mn pop.
was equal to 34.04 FTE/mn pop. in 2018, up by 11.17% from the year prior – and equivalent to an indicator rank of 98.



2.3.2 Gross expenditure on R&D, % GDP
was equal to 0.013% GDP in 2017, up by 0.00011 percentage points from the year prior – and equivalent to an indicator rank of 112.

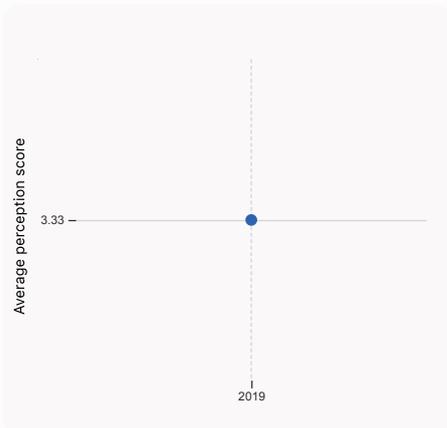


2.3.4 QS university ranking, top 3
was equal to an average score of 0 for the top 3 universities in 2022, equivalent to an indicator rank of 71.

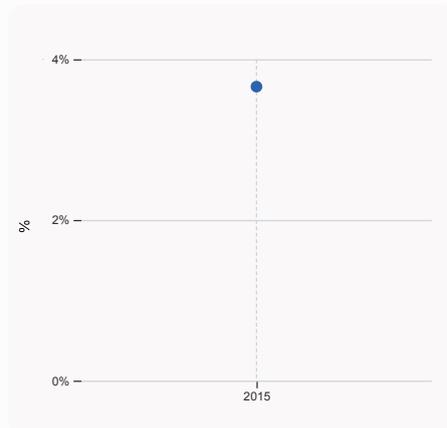


3.1.1 ICT access
was equal to a score of 4.38 in 2021, up by 5.036% from the year prior – and equivalent to an indicator rank of 127.

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4.1.1 Finance for startups and scaleups was equal to an average perception score of 3.33 in 2019, equivalent to an indicator rank of 76.

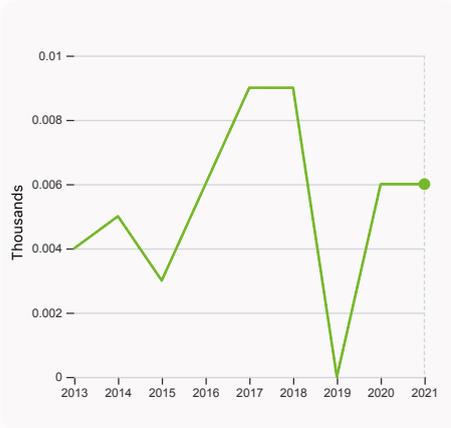


5.1.1 Knowledge-intensive employment, % was equal to 3.66 % in 2015, equivalent to an indicator rank of 123.

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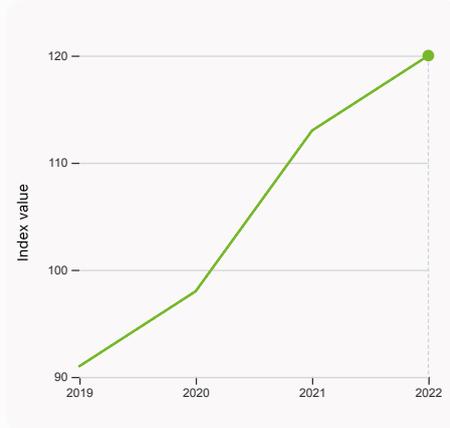


> Innovation outputs in Madagascar



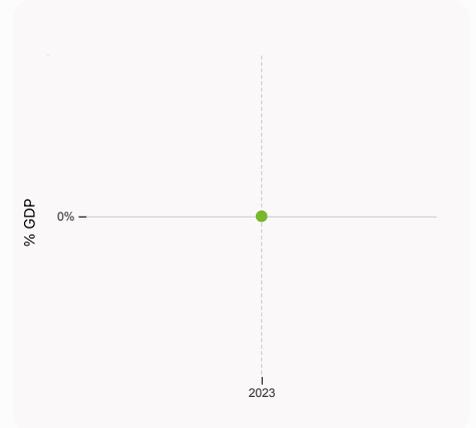
6.1.1 Patents by origin

was equal to 0.006 Thousands in 2021, up by with no change from the year prior – and equivalent to an indicator rank of 107.



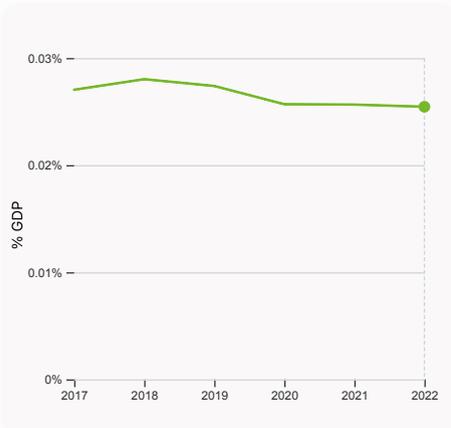
6.1.5 Citable documents H-index

was equal to an index value of 120 in 2022, up by 6.19% from the year prior – and equivalent to an indicator rank of 111.



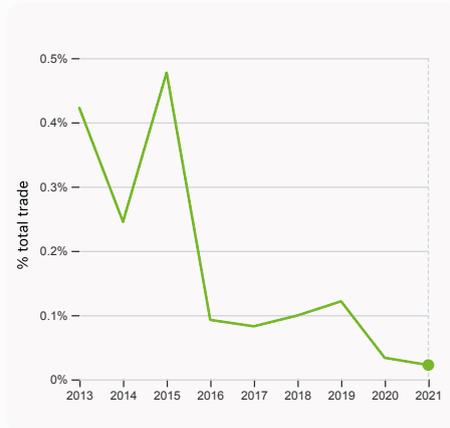
6.2.2 Unicorn valuation, % GDP

was equal to 0 % GDP in 2023 – and equivalent to an indicator rank of 48.



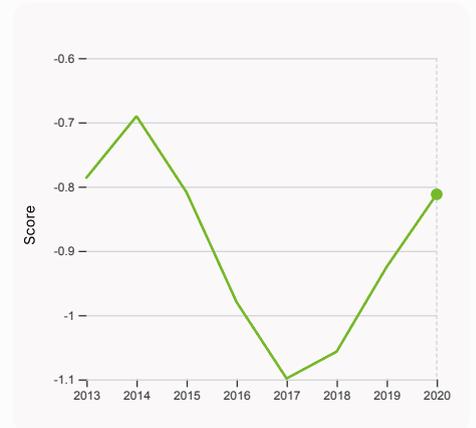
6.2.3 Software spending, % GDP

was equal to 0.025% GDP in 2022, down by 0.0002 percentage points from the year prior – and equivalent to an indicator rank of 116.



6.3.1 Intellectual property receipts, % total trade

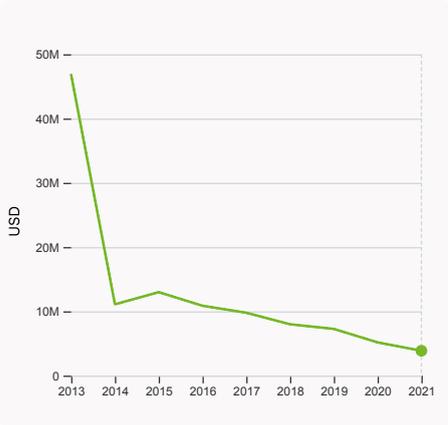
was equal to 0.022% total trade in 2021, down by 0.011 percentage points from the year prior – and equivalent to an indicator rank of 67.



6.3.2 Production and export complexity

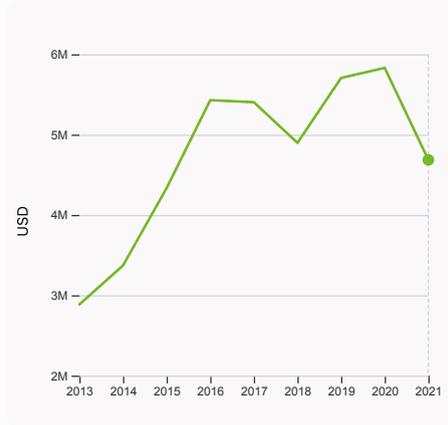
was equal to a score of -0.812 in 2020, up by 12.21% from the year prior – and equivalent to an indicator rank of 101.

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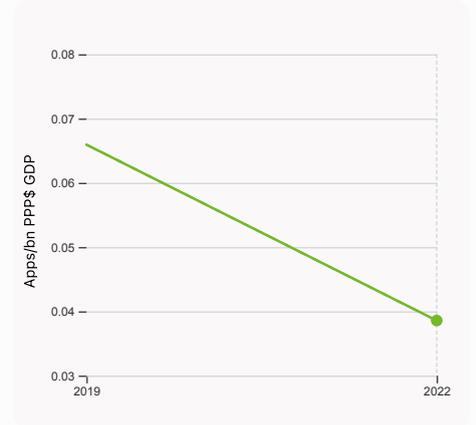
6.3.3 High-tech exports

was equal to 3,869,666 USD in 2021, down by 25.18% from the year prior – and equivalent to an indicator rank of 119.



7.2.1 Cultural and creative services exports

was equal to 4,686,000 USD in 2021, down by 19.64% from the year prior – and equivalent to an indicator rank of 82.



7.3.4 Mobile app creation/bn PPP\$ GDP

was equal to 0.039 Apps/bn PPP\$ GDP in 2022, down by 41.5% from the year prior – and equivalent to an indicator rank of 124.

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GII 2023 rank

107

Madagascar

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
82	125	Low	SSA	29.6	51.8	1,790.3
Score / Value Rank				Score / Value Rank		
Institutions				Business sophistication		
31.2 121				16.2 123		
1.1 Institutional environment				5.1 Knowledge workers		
23.0 119				5.0 [129]		
1.1.1 Operational stability for businesses*				5.1.1 Knowledge-intensive employment, %		
36.8 104				3.7 123		
1.1.2 Government effectiveness*				5.1.2 Firms offering formal training, %		
9.1 126				12.7 92		
1.2 Regulatory environment				5.1.3 GERD performed by business, % GDP		
52.2 94				n/a n/a		
1.2.1 Regulatory quality*				5.1.4 GERD financed by business, %		
20.8 116				n/a n/a		
1.2.2 Rule of law*				5.1.5 Females employed w/advanced degrees, %		
14.3 113				1.9 111		
1.2.3 Cost of redundancy dismissal				5.2 Innovation linkages		
14.7 58				11.8 109		
1.3 Business environment				5.2.1 University-industry R&D collaboration+		
18.3 123				20.4 116		
1.3.1 Policies for doing business*				5.2.2 State of cluster development*		
22.8 117				21.9 109		
1.3.2 Entrepreneurship policies and culture*				5.2.3 GERD financed by abroad, % GDP		
13.8 75				n/a n/a		
Human capital and research				5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP		
19.8 102				0.0 76		
2.1 Education				5.2.5 Patent families/bn PPP\$ GDP		
38.1 [104]				0.0 95		
2.1.1 Expenditure on education, % GDP				5.3 Knowledge absorption		
3.2 101				31.9 71		
2.1.2 Government funding/pupil, secondary, % GDP/cap				5.3.1 Intellectual property payments, % total trade		
n/a n/a				0.3 80		
2.1.3 School life expectancy, years				5.3.2 High-tech imports, % total trade		
10.2 103				6.0 104		
2.1.4 PISA scales in reading, maths and science				5.3.3 ICT services imports, % total trade		
n/a n/a				2.0 37		
2.1.5 Pupil-teacher ratio, secondary				5.3.4 FDI net inflows, % GDP		
18.1 92				2.9 52		
2.2 Tertiary education				5.3.5 Research talent, % in businesses		
21.3 87				n/a n/a		
2.2.1 Tertiary enrolment, % gross				Knowledge and technology outputs		
5.5 124				10.4 121		
2.2.2 Graduates in science and engineering, %				6.1 Knowledge creation		
29.1 22				4.7 116		
2.2.3 Tertiary inbound mobility, %				6.1.1 Patents by origin/bn PPP\$ GDP		
1.9 77				0.1 107		
2.3 Research and development (R&D)				6.1.2 PCT patents by origin/bn PPP\$ GDP		
0.1 117				0.0 89		
2.3.1 Researchers, FTE/mn pop.				6.1.3 Utility models by origin/bn PPP\$ GDP		
34.0 98				n/a n/a		
2.3.2 Gross expenditure on R&D, % GDP				6.1.4 Scientific and technical articles/bn PPP\$ GDP		
0.0 112				n/a n/a		
2.3.3 Global corporate R&D investors, top 3, mn US\$				6.1.5 Citable documents H-index		
0.0 40				4.3 111		
2.3.4 QS university ranking, top 3*				6.2 Knowledge impact		
0.0 71				12.7 124		
Infrastructure				6.2.1 Labor productivity growth, %		
12.5 131				-0.9 116		
3.1 Information and communication technologies (ICTs)				6.2.2 Unicorn valuation, % GDP		
22.4 127				0.0 48		
3.1.1 ICT access*				6.2.3 Software spending, % GDP		
15.0 127				0.0 116		
3.1.2 ICT use*				6.2.4 High-tech manufacturing, %		
19.6 125				n/a n/a		
3.1.3 Government's online service*				6.3 Knowledge diffusion		
28.3 126				13.9 94		
3.1.4 E-participation*				6.3.1 Intellectual property receipts, % total trade		
26.7 106				0.1 67		
3.2 General infrastructure				6.3.2 Production and export complexity		
7.2 128				35.5 101		
3.2.1 Electricity output, GWh/mn pop.				6.3.3 High-tech exports, % total trade		
60.7 125				0.1 119		
3.2.2 Logistics performance*				6.3.4 ICT services exports, % total trade		
9.1 106				3.5 36		
3.2.3 Gross capital formation, % GDP				6.3.5 ISO 9001 quality/bn PPP\$ GDP		
19.4 102				1.4 98		
3.3 Ecological sustainability				Creative outputs		
8.0 132				26.0 [62]		
3.3.1 GDP/unit of energy use				7.1 Intangible assets		
4.7 119				50.7 [23]		
3.3.2 Environmental performance*				7.1.1 Intangible asset intensity, top 15, %		
15.4 124				n/a n/a		
3.3.3 ISO 14001 environment/bn PPP\$ GDP				7.1.2 Trademarks by origin/bn PPP\$ GDP		
0.2 114				63.9 33		
Market sophistication				7.1.3 Global brand value, top 5,000		
20.0 113				n/a n/a		
4.1 Credit				7.1.4 Industrial designs by origin/bn PPP\$ GDP		
12.7 107				7.1 15		
4.1.1 Finance for startups and scaleups*				7.2 Creative goods and services		
23.6 76				2.2 [102]		
4.1.2 Domestic credit to private sector, % GDP				7.2.1 Cultural and creative services exports, % total trade		
16.4 115				0.1 82		
4.1.3 Loans from microfinance institutions, % GDP				7.2.2 National feature films/mn pop. 15-69		
0.9 28				n/a n/a		
4.2 Investment				7.2.3 Entertainment and media market/th pop. 15-69		
n/a [n/a]				n/a n/a		
4.2.1 Market capitalization, % GDP				7.2.4 Creative goods exports, % total trade		
n/a n/a				0.2 83		
4.2.2 Venture capital (VC) investors, deals/bn PPP\$ GDP				7.3 Online creativity		
n/a n/a				0.2 130		
4.2.3 VC recipients, deals/bn PPP\$ GDP				7.3.1 Generic top-level domains (TLDs)/th pop. 15-69		
n/a n/a				0.1 123		
4.2.4 VC received, value, % GDP				7.3.2 Country-code TLDs/th pop. 15-69		
n/a n/a				0.1 125		
4.3 Trade, diversification, and market scale				7.3.3 GitHub commits/mn pop. 15-69		
27.2 119				0.6 120		
4.3.1 Applied tariff rate, weighted avg., %				7.3.4 Mobile app creation/bn PPP\$ GDP		
7.2 103				0.0 124		
4.3.2 Domestic industry diversification						
n/a n/a						
4.3.3 Domestic market scale, bn PPP\$						
51.8 105						

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 Madagascar.



> Madagascar has missing data for seventeen indicators and outdated data for fourteen indicators.

> Missing data for Madagascar

Code	Indicator name	Economy Year	Model Year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2019	UNESCO Institute for Statistics
2.1.4	PISA scales in reading, maths and science	n/a	2018	OECD, PISA
4.2.1	Market capitalization, % GDP	n/a	2020	World Federation of Exchanges; World Bank
4.2.2	Venture capital (VC) investors, deals/bn PPP\$ GDP	n/a	2022	Refinitiv; International Monetary Fund
4.2.3	VC recipients, deals/bn PPP\$ GDP	n/a	2022	Refinitiv; International Monetary Fund
4.2.4	VC received, value, % GDP	n/a	2022	Refinitiv; International Monetary Fund
4.3.2	Domestic industry diversification	n/a	2020	United Nations Industrial Development Organization
5.1.3	GERD performed by business, % GDP	n/a	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.1.4	GERD financed by business, %	n/a	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.2.3	GERD financed by abroad, % GDP	n/a	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.3.5	Research talent, % in businesses	n/a	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
6.1.3	Utility models by origin/bn PPP\$ GDP	n/a	2021	World Intellectual Property Organization; International Monetary Fund
6.2.4	High-tech manufacturing, %	n/a	2020	United Nations Industrial Development Organization
7.1.1	Intangible asset intensity, top 15, %	n/a	2022	Brand Finance
7.1.3	Global brand value, top 5,000	n/a	2023	Brand Finance; International Monetary Fund
7.2.2	National feature films/mn pop. 15-69	n/a	2021	OMDIA; United Nations, World Population Prospects
7.2.3	Entertainment and media market/th pop. 15-69	n/a	2022	PwC, GEMO; United Nations, World Population

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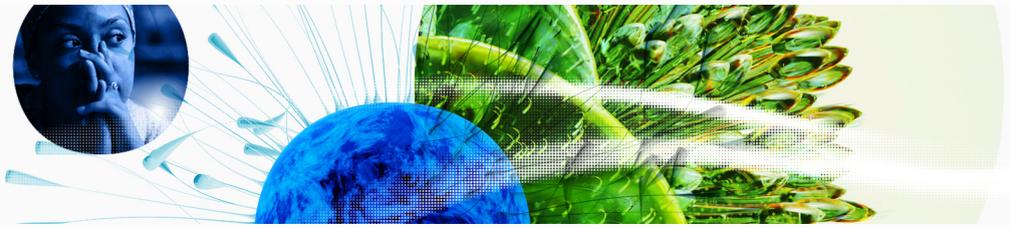


Code	Indicator name	Economy Year	Model Year	Source
				Prospects; International Monetary Fund

> Outdated data for Madagascar

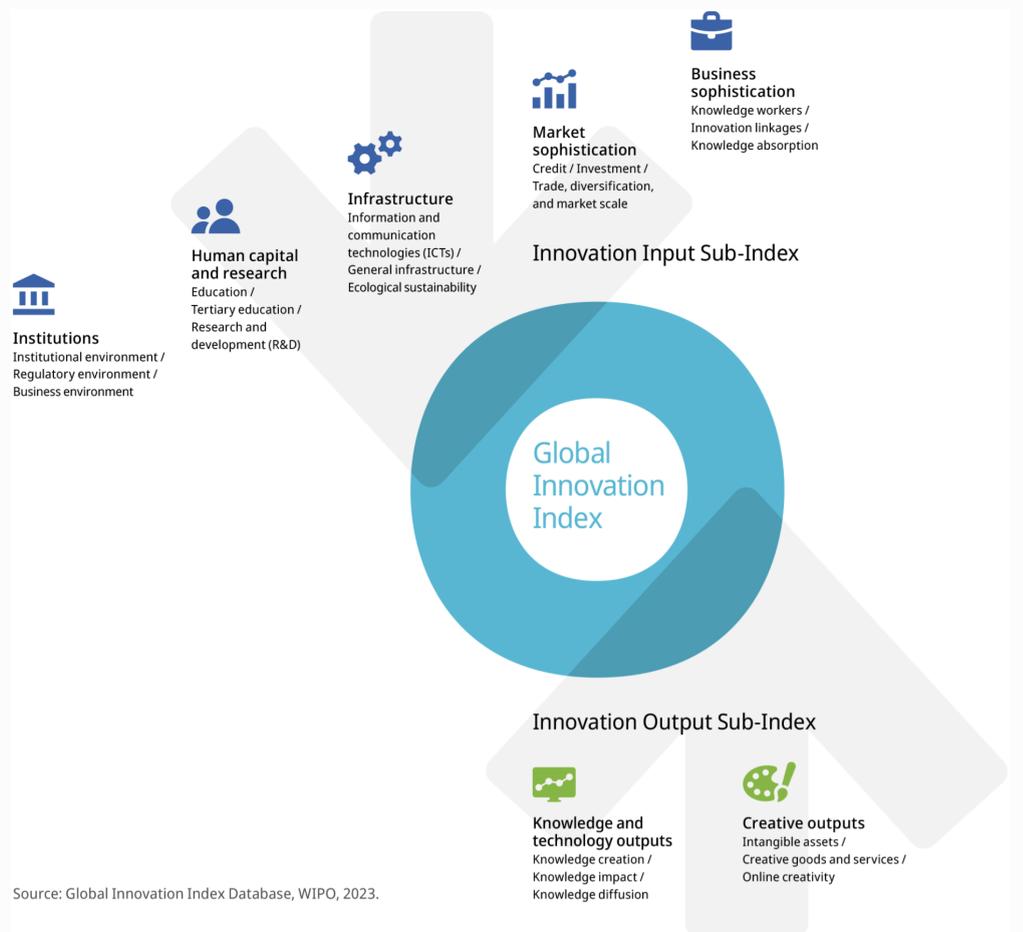
Code	Indicator name	Economy Year	Model Year	Source
1.3.1	Policies for doing business	2019	2022	World Economic Forum, Executive Opinion Survey (EOS)
1.3.2	Entrepreneurship policies and culture	2019	2022	Global Entrepreneurship Monitor
2.1.3	School life expectancy, years	2018	2020	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2019	2020	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2018	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
2.3.2	Gross expenditure on R&D, % GDP	2017	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
3.2.1	Electricity output, GWh/mn pop.	2020	2021	International Energy Agency
4.1.1	Finance for startups and scaleups	2019	2022	Global Entrepreneurship Monitor
5.1.1	Knowledge-intensive employment, %	2015	2022	International Labour Organization
5.1.2	Firms offering formal training, %	2013	2019	World Bank Enterprise Surveys
5.1.5	Females employed w/advanced degrees, %	2015	2022	International Labour Organization
5.2.1	University-industry R&D collaboration	2019	2022	World Economic Forum, Executive Opinion Survey (EOS)
5.2.2	State of cluster development	2019	2022	World Economic Forum, Executive Opinion Survey (EOS)
5.2.4	Joint venture/strategic alliance deals/bn PPP\$ GDP	2021	2022	Refinitiv; International Monetary Fund

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→ 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.