Global Innovation Index 2023

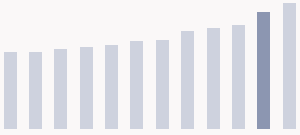
The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

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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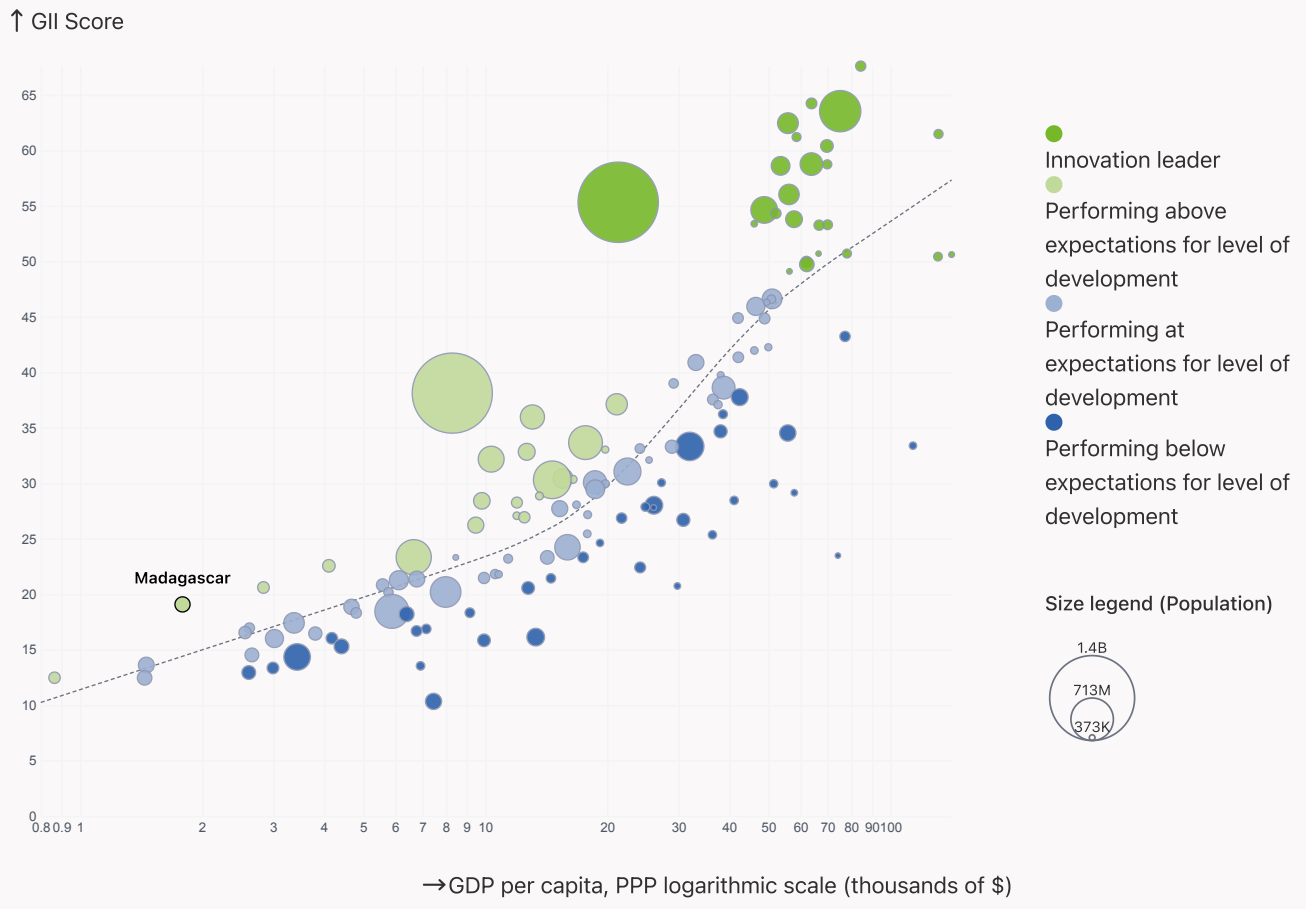
→ Expected vs. observed innovation performance

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



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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

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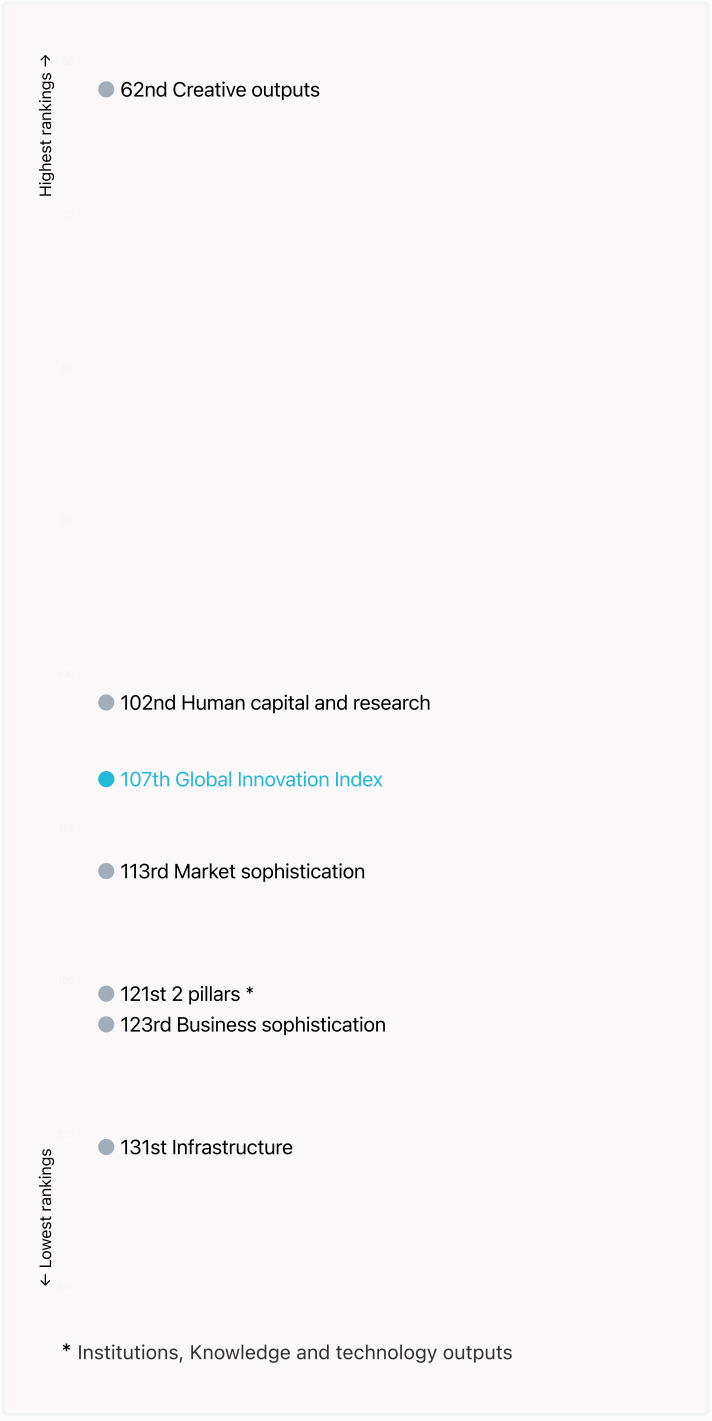
→ Overview of Madagascar's rankings in the seven areas of the GII in 2023

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

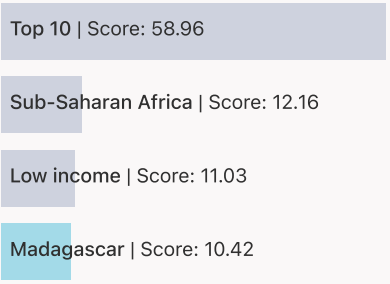
> Low-Income economies

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

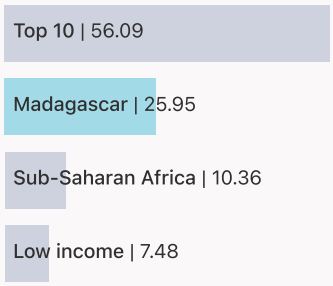
> Sub-Saharan Africa

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

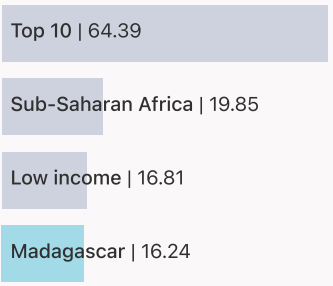
Knowledge and technology outputs



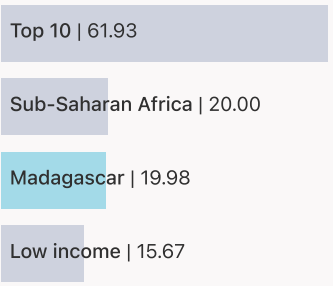
Creative outputs



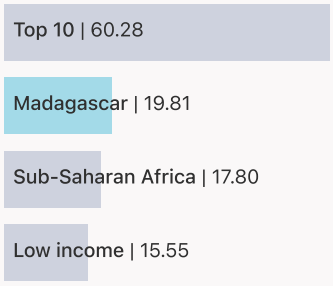
Business sophistication



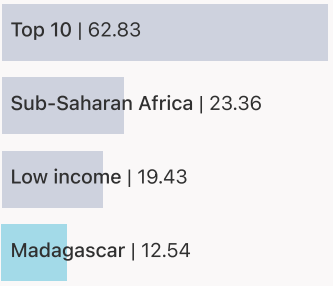
Market sophistication



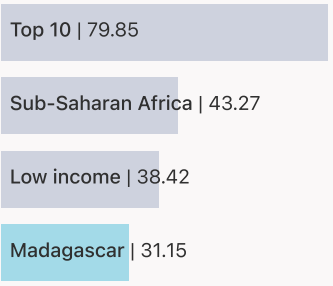
Human capital and research



Infrastructure



Institutions



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→ 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

Rank	Code	Indicator name
15	7.1.4	Industrial designs by origin/bn PPP$ GDP
22	2.2.2	Graduates in science and engineering, %
28	4.1.3	Loans from microfinance institutions, % GDP
33	7.1.2	Trademarks by origin/bn PPP$ GDP
36	6.3.4	ICT services exports, % total trade
37	5.3.3	ICT services imports, % total trade
52	5.3.4	FDI net inflows, % GDP
58	1.2.3	Cost of redundancy dismissal
67	6.3.1	Intellectual property receipts, % total trade
76	5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP

Weaknesses

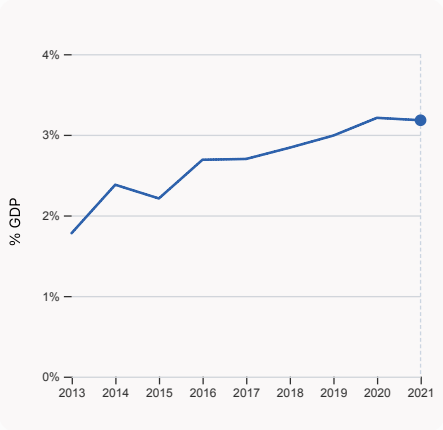
Rank	Code	Indicator name
125	3.2.1	Electricity output, GWh/mn pop.
124	7.3.4	Mobile app creation/bn PPP$ GDP
124	2.2.1	Tertiary enrolment, % gross
112	2.3.2	Gross expenditure on R&D, % GDP
106	3.2.2	Logistics performance
95	5.2.5	Patent families/bn PPP$ GDP
71	2.3.4	QS university ranking, top 3
48	6.2.2	Unicorn valuation, % GDP
40	2.3.3	Global corporate R&D investors, top 3, mn US$

Global Innovation Index 2023

→ Madagascar's innovation system

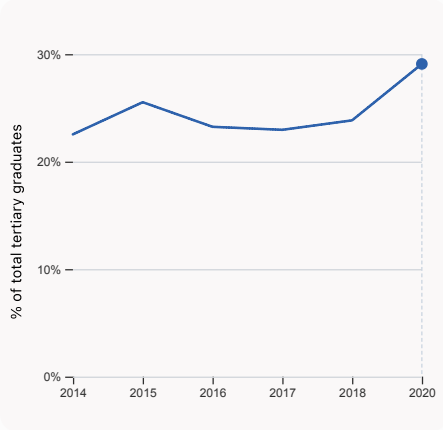
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Madagascar



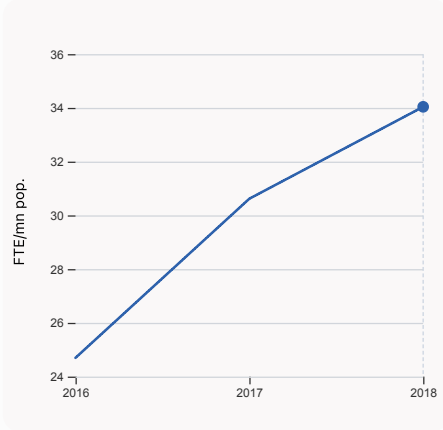
2.1.1 Expenditure on education, % GDP

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.



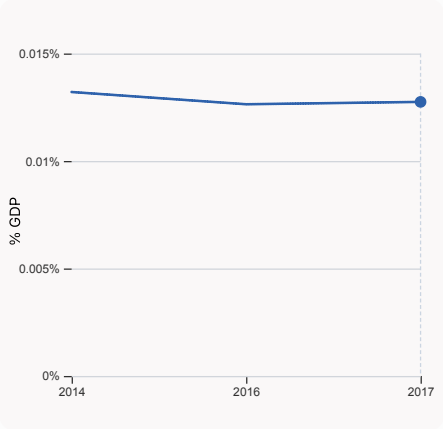
2.2.2 Graduates in science and engineering, %

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.



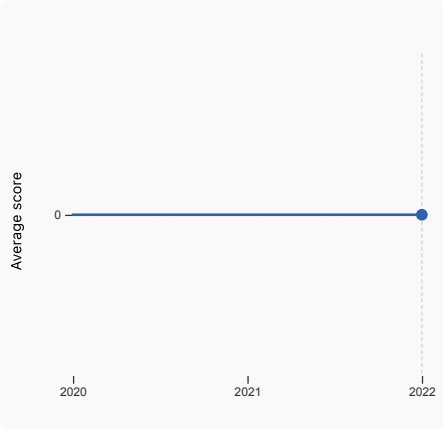
2.3.1 Researchers, FTE/mn pop.

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.



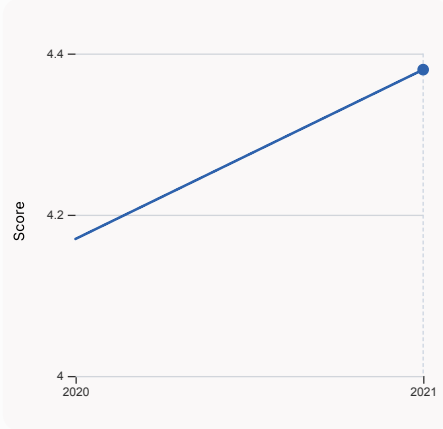
2.3.2 Gross expenditure on R&D, % GDP

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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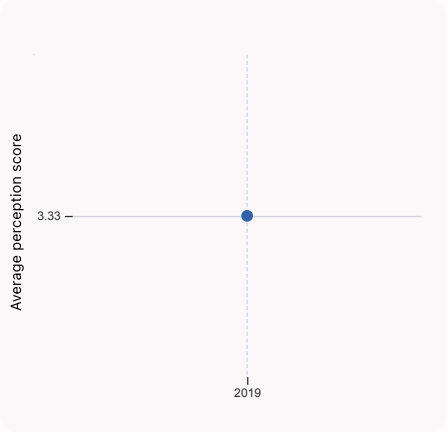
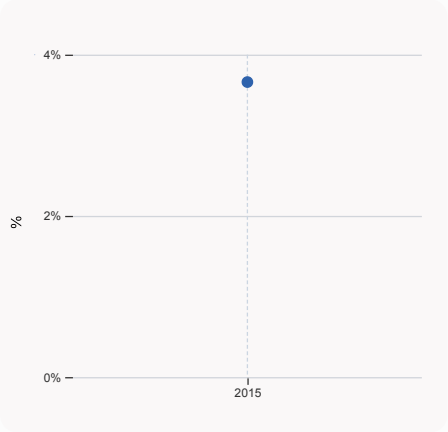


4.1.1 Finance for startups and scaleups

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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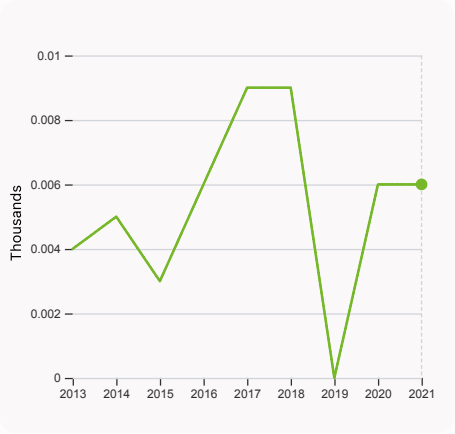
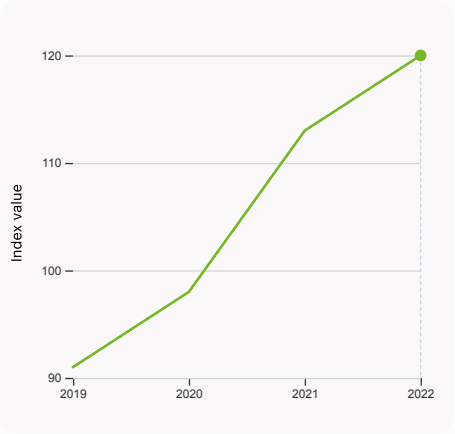
> Innovation outputs in Madagascar



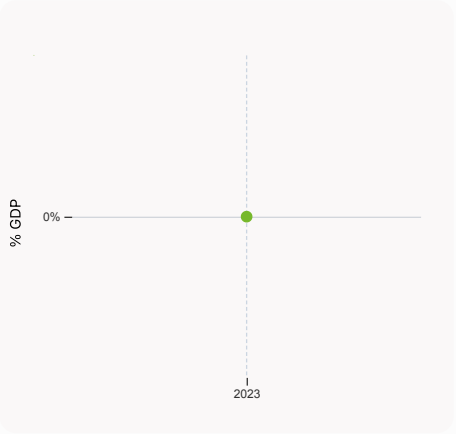
6.1.1 Patents by origin

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.



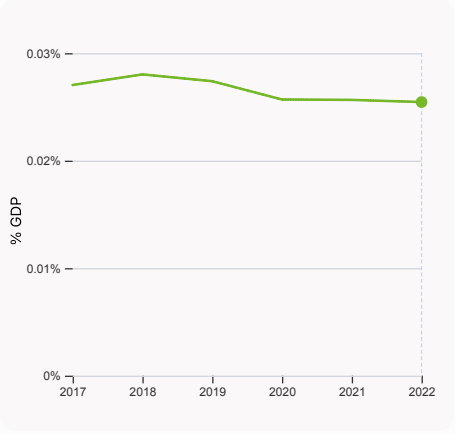
6.1.5 Citable documents H-index

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.



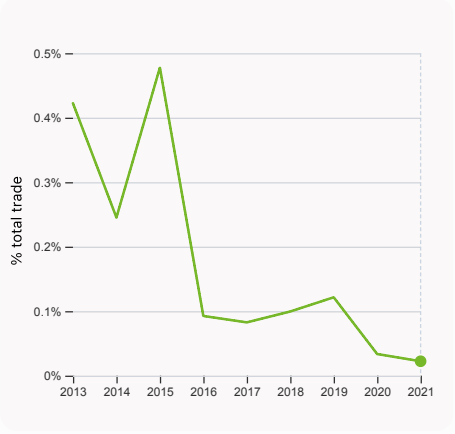
6.2.2 Unicorn valuation, % GDP

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



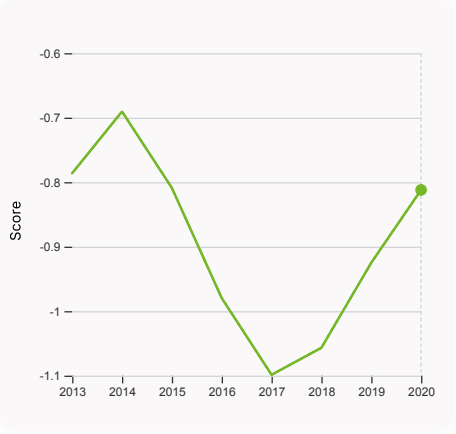
6.2.3 Software spending, % GDP

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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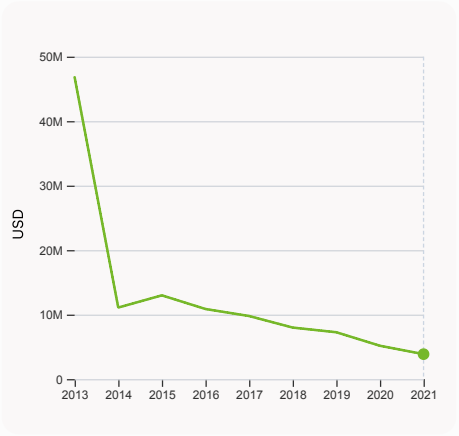
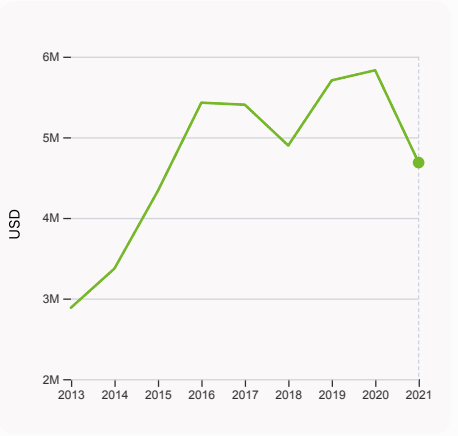


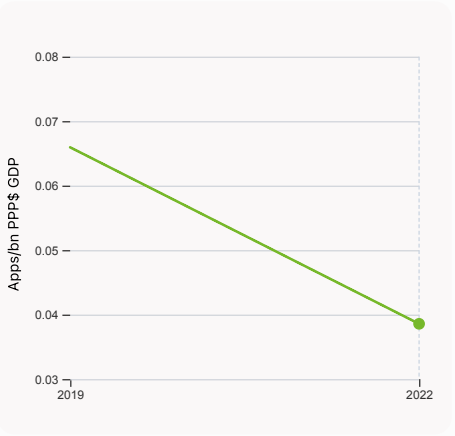
6.3.3 High-tech exports

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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Madagascar

GII 2023 rank
107

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	
Institutions	**31.2**	**121**	
1.1 Institutional environment	**23.0**	**119**	
1.1.1 Operational stability for businesses*	36.8	104	
1.1.2 Government effectiveness*	9.1	126	
1.2 Regulatory environment	**52.2**	**94**	
1.2.1 Regulatory quality*	20.8	116	
1.2.2 Rule of law*	14.3	113	
1.2.3 Cost of redundancy dismissal	14.7	58	●
1.3 Business environment	**18.3**	**123**	◇
1.3.1 Policies for doing business†	22.8	117	◇
1.3.2 Entrepreneurship policies and culture†	13.8	75	
Human capital and research	**19.8**	**102**	
2.1 Education	**38.1**	**104**	
2.1.1 Expenditure on education, % GDP	3.2	101	
2.1.2 Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3 School life expectancy, years	10.2	103	
2.1.4 PISA scales in reading, maths and science	n/a	n/a	
2.1.5 Pupil-teacher ratio, secondary	18.1	92	
2.2 Tertiary education	**21.3**	**87**	
2.2.1 Tertiary enrolment, % gross	5.5	124	○
2.2.2 Graduates in science and engineering, %	29.1	22	●
2.2.3 Tertiary inbound mobility, %	1.9	77	
2.3 Research and development (R&D)	**0.1**	**117**	
2.3.1 Researchers, FTE/mn pop.	34.0	98	
2.3.2 Gross expenditure on R&D, % GDP	0.0	112	○ ◇
2.3.3 Global corporate R&D investors, top 3, mn US$	0.0	40	○ ◇
2.3.4 QS university ranking, top 3*	0.0	71	○ ◇
Infrastructure	**12.5**	**131**	◇
3.1 Information and communication technologies (ICTs)	**22.4**	**127**	
3.1.1 ICT access*	15.0	127	
3.1.2 ICT use*	19.6	125	
3.1.3 Government's online service*	28.3	126	
3.1.4 E-participation*	26.7	106	
3.2 General infrastructure	**7.2**	**128**	
3.2.1 Electricity output, GWh/mn pop.	60.7	125	○
3.2.2 Logistics performance*	9.1	106	○ ◇
3.2.3 Gross capital formation, % GDP	19.4	102	
3.3 Ecological sustainability	**8.0**	**132**	◇
3.3.1 GDP/unit of energy use	4.7	119	
3.3.2 Environmental performance*	15.4	124	◇
3.3.3 ISO 14001 environment/bn PPP$ GDP	0.2	114	
Market sophistication	**20.0**	**113**	
4.1 Credit	**12.7**	**107**	
4.1.1 Finance for startups and scaleups†	23.6	76	
4.1.2 Domestic credit to private sector, % GDP	16.4	115	
4.1.3 Loans from microfinance institutions, % GDP	0.9	28	●
4.2 Investment	**n/a**	**n/a**	
4.2.1 Market capitalization, % GDP	n/a	n/a	
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.3 VC recipients, deals/bn PPP$ GDP	n/a	n/a	
4.2.4 VC received, value, % GDP	n/a	n/a	
4.3 Trade, diversification, and market scale	**27.2**	**119**	
4.3.1 Applied tariff rate, weighted avg., %	7.2	103	
4.3.2 Domestic industry diversification	n/a	n/a	
4.3.3 Domestic market scale, bn PPP$	51.8	105	

	Score / Value	Rank	
Business sophistication	**16.2**	**123**	
5.1 Knowledge workers	**5.0**	**129**	
5.1.1 Knowledge-intensive employment, %	3.7	123	
5.1.2 Firms offering formal training, %	12.7	92	
5.1.3 GERD performed by business, % GDP	n/a	n/a	
5.1.4 GERD financed by business, %	n/a	n/a	
5.1.5 Females employed w/advanced degrees, %	1.9	111	
5.2 Innovation linkages	**11.8**	**109**	
5.2.1 University-industry R&D collaboration†	20.4	116	◇
5.2.2 State of cluster development†	21.9	109	
5.2.3 GERD financed by abroad, % GDP	n/a	n/a	
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	76	●
5.2.5 Patent families/bn PPP$ GDP	0.0	95	○ ◇
5.3 Knowledge absorption	**31.9**	**71**	
5.3.1 Intellectual property payments, % total trade	0.3	80	
5.3.2 High-tech imports, % total trade	6.0	104	
5.3.3 ICT services imports, % total trade	2.0	37	●
5.3.4 FDI net inflows, % GDP	2.9	52	●
5.3.5 Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs	**10.4**	**121**	
6.1 Knowledge creation	**4.7**	**116**	
6.1.1 Patents by origin/bn PPP$ GDP	0.1	107	
6.1.2 PCT patents by origin/bn PPP$ GDP	0.0	89	
6.1.3 Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4 Scientific and technical articles/bn PPP$ GDP	n/a	n/a	
6.1.5 Citable documents H-index	4.3	111	
6.2 Knowledge impact	**12.7**	**124**	
6.2.1 Labor productivity growth, %	-0.9	116	
6.2.2 Unicorn valuation, % GDP	0.0	48	○ ◇
6.2.3 Software spending, % GDP	0.0	116	
6.2.4 High-tech manufacturing, %	n/a	n/a	
6.3 Knowledge diffusion	**13.9**	**94**	
6.3.1 Intellectual property receipts, % total trade	0.1	67	●
6.3.2 Production and export complexity	35.5	101	
6.3.3 High-tech exports, % total trade	0.1	119	
6.3.4 ICT services exports, % total trade	3.5	36	●
6.3.5 ISO 9001 quality/bn PPP$ GDP	1.4	98	
Creative outputs	**26.0**	**62**	
7.1 Intangible assets	**50.7**	**23**	
7.1.1 Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2 Trademarks by origin/bn PPP$ GDP	63.9	33	●
7.1.3 Global brand value, top 5,000	n/a	n/a	
7.1.4 Industrial designs by origin/bn PPP$ GDP	7.1	15	●
7.2 Creative goods and services	**2.2**	**102**	
7.2.1 Cultural and creative services exports, % total trade	0.1	82	
7.2.2 National feature films/mn pop. 15-69	n/a	n/a	
7.2.3 Entertainment and media market/th pop. 15-69	n/a	n/a	
7.2.4 Creative goods exports, % total trade	0.2	83	
7.3 Online creativity	**0.2**	**130**	◇
7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	0.1	123	
7.3.2 Country-code TLDs/th pop. 15-69	0.1	125	
7.3.3 GitHub commits/mn pop. 15-69	0.6	120	
7.3.4 Mobile app creation/bn PPP$ GDP	0.0	124	○ ◇

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.

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→ 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

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Code	Indicator name	Economy Year	Model Year	Source
7.2.3	Entertainment and media market/th pop. 15-69	n/a	2022	PwC, GEMO; United Nations, World Population Prospects; International Monetary Fund

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> 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.

Source: Global Innovation Index Database, WIPO, 2023.

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.