# MADAGASCAR

**106th** Madagascar ranks 106th among the 132 economies featured in the GII 2022.

**The Global Innovation Index (GII) ranks world economies according to their innovation capabilities. Consisting of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation.**

The following table shows the rankings of Madagascar 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 Madagascar in the GII 2022 is between ranks 96 and 115.

## Rankings for Madagascar (2020–2022)

| GIIYR | GII | Innovation inputs | Innovation outputs |
|---|---|---|---|
| **2020** | 115 | 125 | 100 |
| **2021** | 110 | 127 | 78 |
| **2022** | 106 | 125 | 85 |

- Madagascar performs better in innovation outputs than innovation inputs in 2022.
- This year Madagascar ranks 125th in innovation inputs, higher than last year but the same as 2020.
- As for innovation outputs, Madagascar ranks 85th. This position is lower than last year but higher than 2020.

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

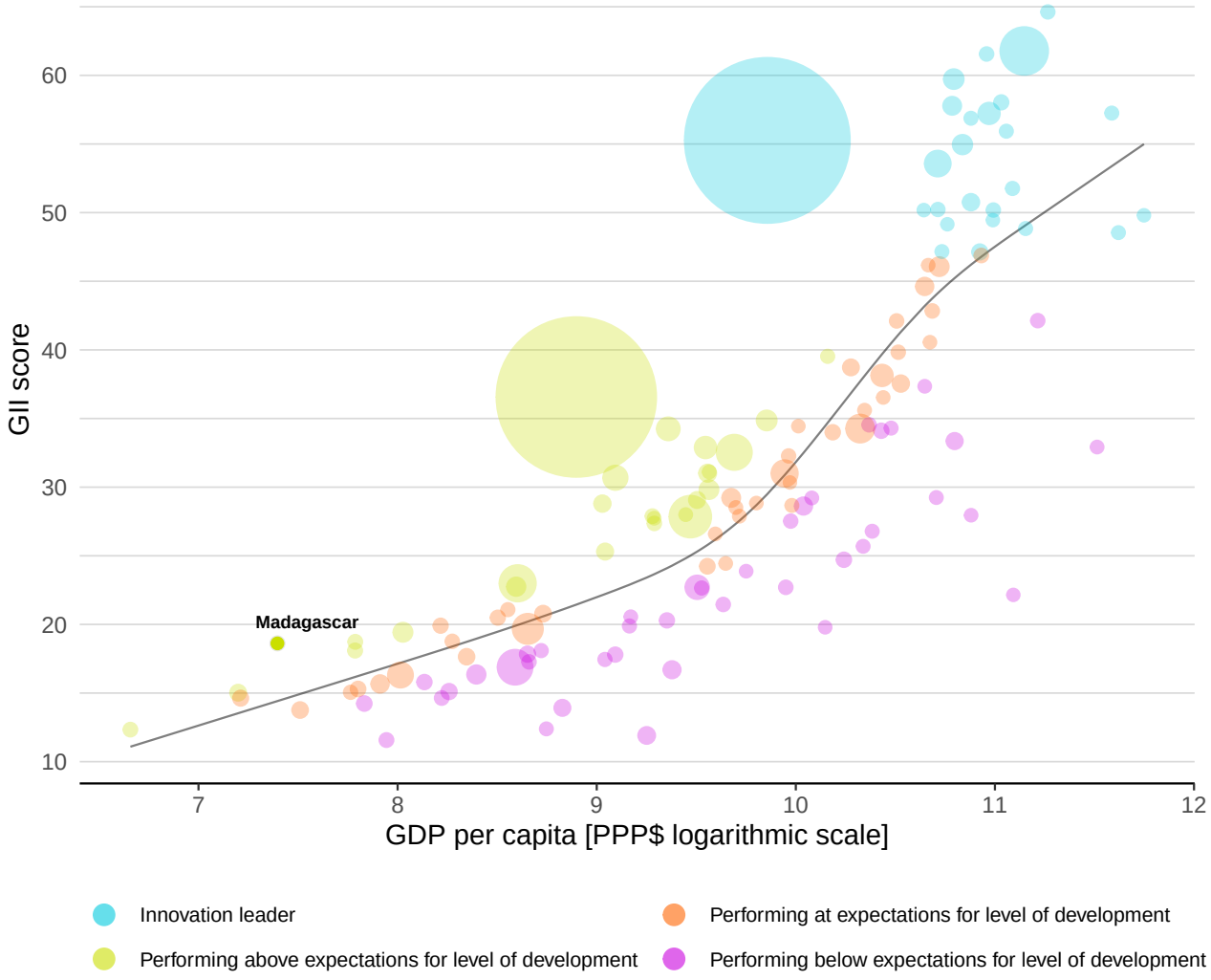
**10th** Madagascar ranks 10th among the 27 economies in Sub-Saharan Africa.

# 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, Madagascar's performance is above expectations for its level of development.

## The positive relationship between innovation and development

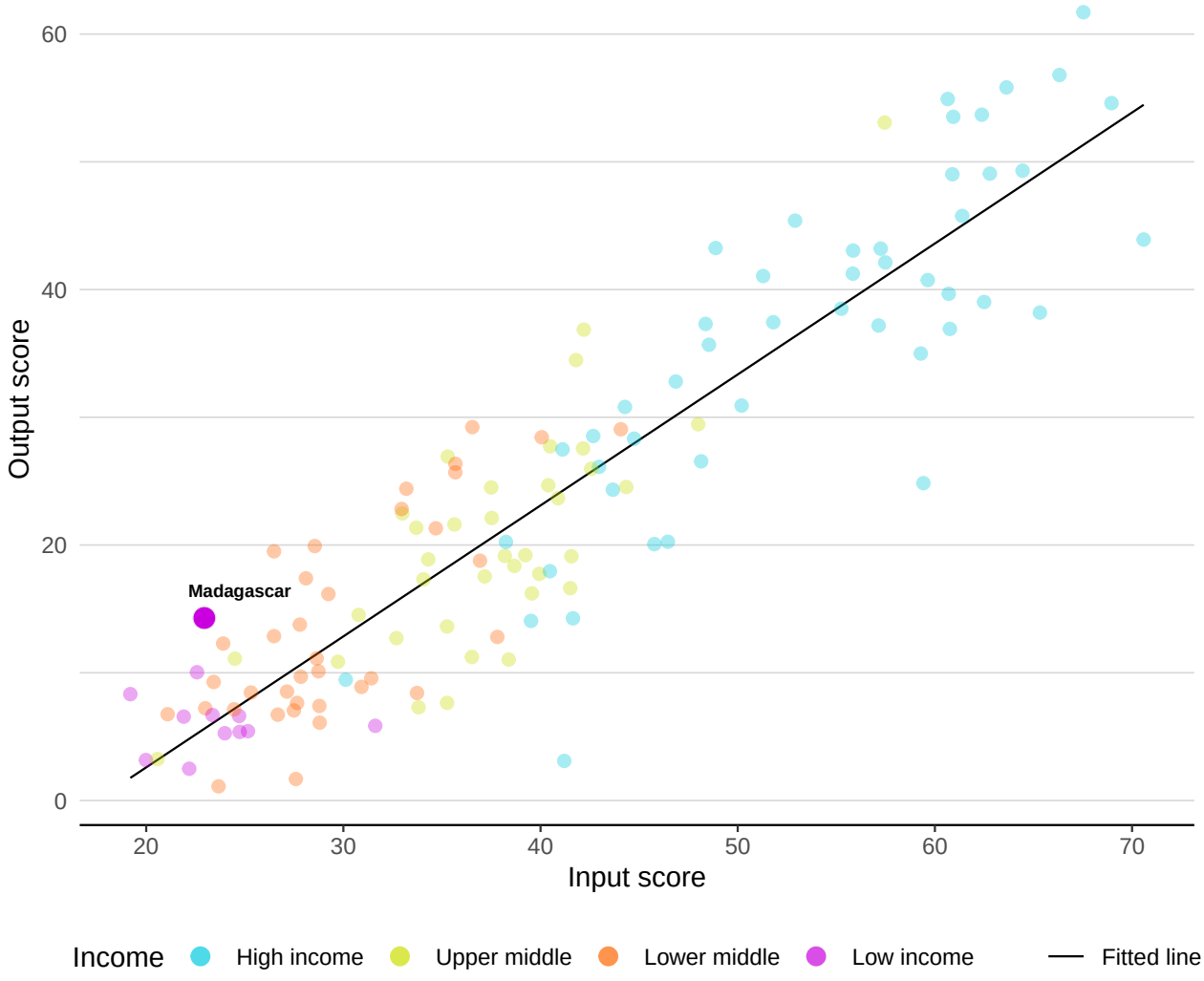


# EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

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

## Innovation input to output performance



# BENCHMARKING AGAINST OTHER LOW-INCOME GROUP ECONOMIES AND SUB-SAHARAN AFRICA

## The seven GII pillar scores for Madagascar


### Low-income group economies

Madagascar performs above the low-income group average in four pillars, namely: Human capital and research; Market sophistication; Knowledge and technology outputs; and, Creative outputs.

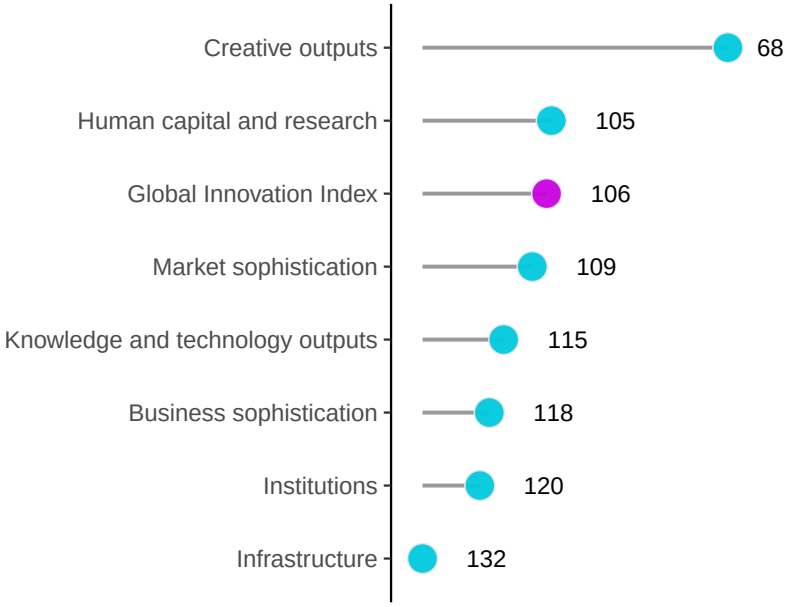
### Sub-Saharan Africa

Madagascar performs above the regional average in three pillars, namely: Human capital and research; Market sophistication; and, Creative outputs.

# OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Madagascar performs best in Creative outputs and its weakest performance is in Infrastructure.

## The seven GII pillar ranks for Madagascar




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

**The full WIPO Intellectual Property Statistics profile for Madagascar can be found at:**

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

# INNOVATION STRENGTHS AND WEAKNESSES

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

## Strengths and weaknesses for Madagascar

| Strengths | | | Weaknesses | | |
|---|---|---|---|---|---|
| **Code** | **Indicator name** | **Rank** | **Code** | **Indicator name** | **Rank** |
| 1.2.3 | Cost of redundancy dismissal | 58 | 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 104 |
| 2.2.2 | Graduates in science and engineering, % | 21 | 2.3.2 | Gross expenditure on R&D, % GDP | 114 |
| 4.1.3 | Loans from microfinance institutions, % GDP | 30 | 2.3.3 | Global corporate R&D investors, top 3, mn USD | 38 |
| 5.3.1 | Intellectual property payments, % total trade | 75 | 2.3.4 | QS university ranking, top 3 | 72 |
| 5.3.3 | ICT services imports, % total trade | 46 | 3.1.4 | E-participation | 126 |
| 5.3.4 | FDI net inflows, % GDP | 33 | 3.2.1 | Electricity output, GWh/mn pop. | 128 |
| 6.3.1 | Intellectual property receipts, % total trade | 57 | 5.1.1 | Knowledge-intensive employment, % | 123 |
| 6.3.4 | ICT services exports, % total trade | 43 | 5.2.5 | Patent families/bn PPP$ GDP | 101 |
| 7.1.2 | Trademarks by origin/bn PPP$ GDP | 38 | 6.2.2 | New businesses/th pop. 15–64 | 118 |
| 7.1.4 | Industrial designs by origin/bn PPP$ GDP | 24 | 7.3.4 | Mobile app creation/bn PPP$ GDP | 117 |

GII 2022 rank

# Madagascar

**106**

| Output rank | Input rank | Income | Region | Population (mn) | GDP, PPP$ (bn) | GDP per capita, PPP$ |
|---|---|---|---|---|---|---|
| 85 | 125 | Low | SSA | 28.4 | 46.1 | 1,630 |

| | | Score/ Value | Rank | |
|---|---|---|---|---|
| **Institutions** | | **40.8** | **120** | |
| **1.1** | **Political environment** | 44.1 | 118 | |
| 1.1.1 | Political and operational stability* | 60.0 | 97 | |
| 1.1.2 | Government effectiveness* | 28.1 | 125 | |
| **1.2** | **Regulatory environment** | 55.8 | 92 | |
| 1.2.1 | Regulatory quality* | 26.4 | 115 | |
| 1.2.2 | Rule of law* | 23.2 | 114 | |
| 1.2.3 | Cost of redundancy dismissal | 14.7 | 58 ● | |
| **1.3** | **Business environment** | 22.5 | 123 | |
| 1.3.1 | Policies for doing business† | 29.2 | 118 | ◇ |
| 1.3.2 | Entrepreneurship policies and culture* | 15.7 | 63 | |
| **Human capital and research** | | **18.0** | **105** | ◆ |
| **2.1** | **Education** | 29.9 | 120 | |
| 2.1.1 | Expenditure on education, % GDP | 3.1 | 106 | |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 7.2 | 104 ○ | ◇ |
| 2.1.3 | School life expectancy, years | 10.2 | 102 | |
| 2.1.4 | PISA scales in reading, maths and science | n/a | n/a | |
| 2.1.5 | Pupil-teacher ratio, secondary | 18.1 | 87 | ◆ |
| **2.2** | **Tertiary education** | 24.1 | 84 | ◆ |
| 2.2.1 | Tertiary enrolment, % gross | 5.5 | 123 | |
| 2.2.2 | Graduates in science and engineering, % | 29.1 | 21 ● | ◆ |
| 2.2.3 | Tertiary inbound mobility, % | 1.9 | 79 | |
| **2.3** | **Research and development (R&D)** | 0.0 | 118 | |
| 2.3.1 | Researchers, FTE/mn pop. | 34.0 | 100 | |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.0 | 114 ○ | ◇ |
| 2.3.3 | Global corporate R&D investors, top 3, mn USD | 0.0 | 38 ○ | ◇ |
| 2.3.4 | QS university ranking, top 3* | 0.0 | 72 ○ | ◇ |
| **Infrastructure** | | **18.2** | **132** ○ | ◇ |
| **3.1** | **Information and communication technologies (ICTs)** | 29.3 | 128 ○ | |
| 3.1.1 | ICT access* | 41.7 | 126 | |
| 3.1.2 | ICT use* | 16.8 | 126 | |
| 3.1.3 | Government's online service* | 28.8 | 125 | |
| 3.1.4 | E-participation* | 29.8 | 126 ○ | |
| **3.2** | **General infrastructure** | 12.3 | 126 | |
| 3.2.1 | Electricity output, GWh/mn pop. | 77.9 | 128 ○ | |
| 3.2.2 | Logistics performance* | 15.8 | 113 | |
| 3.2.3 | Gross capital formation, % GDP | 17.6 | 107 | |
| **3.3** | **Ecological sustainability** | 13.0 | 131 ○ | |
| 3.3.1 | GDP/unit of energy use | 5.0 | 121 | |
| 3.3.2 | Environmental performance* | 28.0 | 121 | ◇ |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP$ GDP | 0.2 | 105 | |
| **Market sophistication** | | **20.6** | **109** | |
| **4.1** | **Credit** | 14.1 | 103 | |
| 4.1.1 | Finance for startups and scaleups* | 25.9 | 66 | |
| 4.1.2 | Domestic credit to private sector, % GDP | 16.4 | 114 | |
| 4.1.3 | Loans from microfinance institutions, % GDP | 0.8 | 30 ● | |
| **4.2** | **Investment** | n/a | [n/a] | |
| 4.2.1 | Market capitalization, % GDP | n/a | n/a | |
| 4.2.2 | Venture capital investors, deals/bn PPP$ GDP | n/a | n/a | |
| 4.2.3 | Venture capital recipients, deals/bn PPP$ GDP | n/a | n/a | |
| 4.2.4 | Venture capital received, value, % GDP | n/a | n/a | |
| **4.3** | **Trade, diversification, and market scale** | 27.1 | 117 | |
| 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$ | 46.1 | 106 | |

| | | Score/ Value | Rank | |
|---|---|---|---|---|
| **Business sophistication** | | **17.2** | **118** | |
| **5.1** | **Knowledge workers** | 5.9 | [128] | |
| 5.1.1 | Knowledge-intensive employment, % | 3.7 | 123 ○ | |
| 5.1.2 | Firms offering formal training, % | 12.7 | 93 | ◇ |
| 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 | 107 | |
| **5.2** | **Innovation linkages** | 18.7 | 102 | |
| 5.2.1 | University-industry R&D collaboration† | 32.3 | 110 | |
| 5.2.2 | State of cluster development and depth† | 39.1 | 108 | |
| 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 | 94 | |
| 5.2.5 | Patent families/bn PPP$ GDP | 0.0 | 101 ○ | ◇ |
| **5.3** | **Knowledge absorption** | 26.9 | 81 | |
| 5.3.1 | Intellectual property payments, % total trade | 0.4 | 75 ● | |
| 5.3.2 | High-tech imports, % total trade | 5.7 | 113 | |
| 5.3.3 | ICT services imports, % total trade | 1.8 | 46 ● | |
| 5.3.4 | FDI net inflows, % GDP | 3.5 | 33 ● | |
| 5.3.5 | Research talent, % in businesses | n/a | n/a | |
| **Knowledge and technology outputs** | | **9.3** | **115** | |
| **6.1** | **Knowledge creation** | 4.4 | 113 | |
| 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 | 9.1 | 94 | |
| 6.1.5 | Citable documents H-index | 3.8 | 109 | |
| **6.2** | **Knowledge impact** | 11.4 | 117 | |
| 6.2.1 | Labor productivity growth, % | −0.8 | 103 | |
| 6.2.2 | New businesses/th pop. 15–64 | 0.1 | 118 ○ | |
| 6.2.3 | Software spending, % GDP | 0.0 | 112 | |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 1.7 | 89 | ◆ |
| 6.2.5 | High-tech manufacturing, % | n/a | n/a | |
| **6.3** | **Knowledge diffusion** | 12.1 | 95 | ◆ |
| 6.3.1 | Intellectual property receipts, % total trade | 0.1 | 57 ● | ◆ |
| 6.3.2 | Production and export complexity | 19.3 | 105 | |
| 6.3.3 | High-tech exports, % total trade | 0.2 | 113 | |
| 6.3.4 | ICT services exports, % total trade | 3.0 | 43 ● | |
| **Creative outputs** | | **19.3** | **[68]** | |
| **7.1** | **Intangible assets** | 37.6 | [42] | |
| 7.1.1 | Intangible asset intensity, top 15, % | n/a | n/a | |
| 7.1.2 | Trademarks by origin/bn PPP$ GDP | 63.0 | 38 ● | ◆ |
| 7.1.3 | Global brand value, top 5,000, % GDP | n/a | n/a | |
| 7.1.4 | Industrial designs by origin/bn PPP$ GDP | 4.8 | 24 ● | ◆ |
| **7.2** | **Creative goods and services** | 1.8 | [116] | |
| 7.2.1 | Cultural and creative services exports, % total trade | 0.1 | 88 | |
| 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 | Printing and other media, % manufacturing | n/a | n/a | |
| 7.2.5 | Creative goods exports, % total trade | 0.1 | 90 | ◆ |
| **7.3** | **Online creativity** | 0.1 | 125 | |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 0.1 | 122 | |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.1 | 122 | |
| 7.3.3 | GitHub commit pushes received/mn pop. 15–69 | 0.3 | 116 | |
| 7.3.4 | Mobile app creation/bn PPP$ GDP | 0.0 | 117 ○ | ◇ |

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at https://www.wipo.int/global_innovation_index/en/2022. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

# DATA AVAILABILITY

The following tables list indicators that are either missing or outdated for Madagascar.

## Missing data for Madagascar

| Code | Indicator name | Economy year | Model year | Source |
|---|---|---|---|---|
| 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 |
| 4.2.2 | Venture capital investors, deals/bn PPP$ GDP | n/a | 2021 | Refinitiv |
| 4.2.3 | Venture capital recipients, deals/bn PPP$ GDP | n/a | 2021 | Refinitiv |
| 4.2.4 | Venture capital received, value, % GDP | n/a | 2021 | Refinitiv |
| 4.3.2 | Domestic industry diversification | n/a | 2019 | United Nations Industrial Development Organization |
| 5.1.3 | GERD performed by business, % GDP | n/a | 2020 | UNESCO Institute for Statistics |
| 5.1.4 | GERD financed by business, % | n/a | 2019 | UNESCO Institute for Statistics |
| 5.2.3 | GERD financed by abroad, % GDP | n/a | 2019 | UNESCO Institute for Statistics |
| 5.3.5 | Research talent, % in businesses | n/a | 2020 | UNESCO Institute for Statistics |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | n/a | 2020 | World Intellectual Property Organization |
| 6.2.5 | High-tech manufacturing, % | n/a | 2019 | United Nations Industrial Development Organization |
| 7.1.1 | Intangible asset intensity, top 15, % | n/a | 2021 | Brand Finance |
| 7.1.3 | Global brand value, top 5,000, % GDP | n/a | 2021 | Brand Finance |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | 2019 | OMDIA |
| 7.2.3 | Entertainment and media market/th pop. 15–69 | n/a | 2021 | PwC, GEMO |
| 7.2.4 | Printing and other media, % manufacturing | n/a | 2019 | United Nations Industrial Development Organization |

## Outdated data for Madagascar

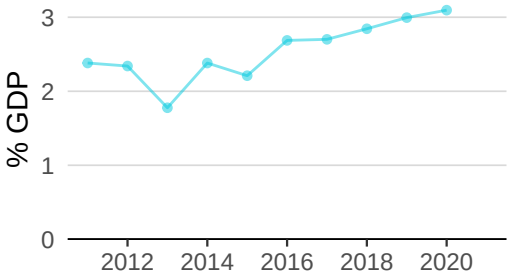
| Code | Indicator name | Economy year | Model year | Source |
|---|---|---|---|---|
| 1.3.1 | Policies for doing business | 2019 | 2021 | World Economic Forum, Executive Opinion Survey (EOS) |
| 1.3.2 | Entrepreneurship policies and culture | 2019 | 2021 | Global Entrepreneurship Monitor |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 2012 | 2018 | UNESCO Institute for Statistics |
| 2.1.3 | School life expectancy, years | 2018 | 2019 | UNESCO Institute for Statistics |
| 2.3.1 | Researchers, FTE/mn pop. | 2018 | 2020 | UNESCO Institute for Statistics |

| Code | Indicator name | Economy year | Model year | Source |
|---|---|---|---|---|
| 2.3.2 | Gross expenditure on R&D, % GDP | 2017 | 2020 | UNESCO Institute for Statistics |
| 3.2.1 | Electricity output, GWh/mn pop. | 2019 | 2020 | International Energy Agency |
| 4.1.1 | Finance for startups and scaleups | 2019 | 2021 | Global Entrepreneurship Monitor |
| 5.1.1 | Knowledge-intensive employment, % | 2015 | 2021 | 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 | 2021 | International Labour Organization |
| 5.2.1 | University-industry R&D collaboration | 2019 | 2021 | World Economic Forum, Executive Opinion Survey (EOS) |
| 5.2.2 | State of cluster development and depth | 2019 | 2021 | World Economic Forum, Executive Opinion Survey (EOS) |
| 5.3.1 | Intellectual property payments, % total trade | 2019 | 2020 | World Trade Organization and United Nations Conference on Trade and Development |
| 5.3.3 | ICT services imports, % total trade | 2019 | 2020 | World Trade Organization and United Nations Conference on Trade and Development |
| 6.2.2 | New businesses/th pop. 15–64 | 2018 | 2020 | World Bank, Enterpreneurship Database |
| 6.3.1 | Intellectual property receipts, % total trade | 2019 | 2020 | World Trade Organization and United Nations Conference on Trade and Development |
| 6.3.4 | ICT services exports, % total trade | 2019 | 2020 | World Trade Organization and United Nations Conference on Trade and Development |
| 7.3.4 | Mobile app creation/bn PPP$ GDP | 2019 | 2021 | data.ia |

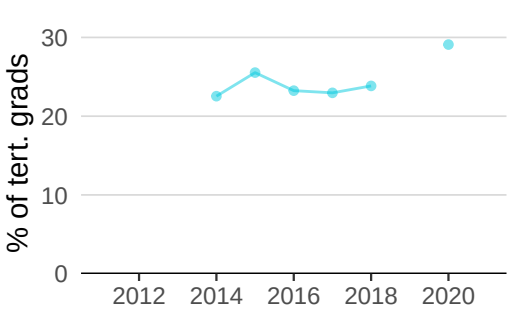
# MADAGASCAR'S INNOVATION SYSTEM

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

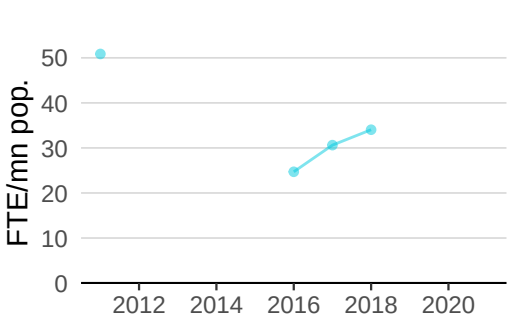
## Innovation inputs



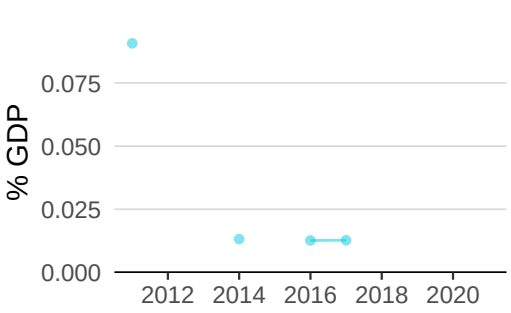

**2.1.1 Expenditure on education** was equal to 3.1% GDP in 2020–up by 3 percentage points from the year prior–and equivalent to an indicator rank of 106.



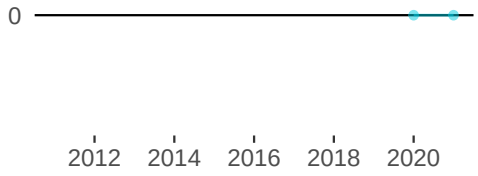

**2.2.2 Graduates in science and engineering** was equal to 29.1% of tert. grads in 2020 and equivalent to an indicator rank of 21.



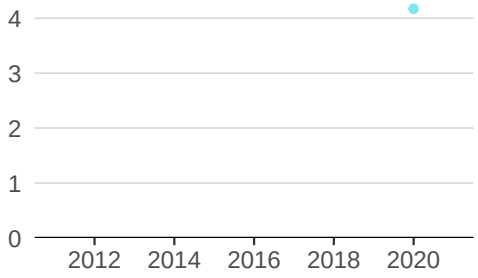

**2.3.1 Researchers** was equal to 34.0 FTE/mn pop. in 2018–up by 11 percentage points from the year prior–and equivalent to an indicator rank of 100.



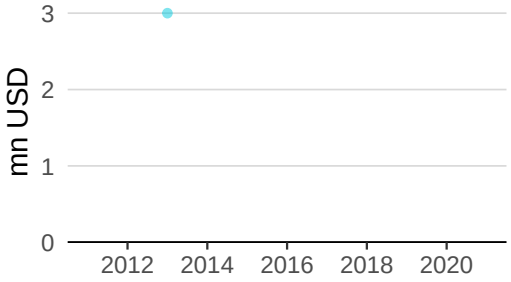

**2.3.2 Gross expenditure on R&D** was equal to 0.0% GDP in 2017–up by 1 percentage point from the year prior–and equivalent to an indicator rank of 114.



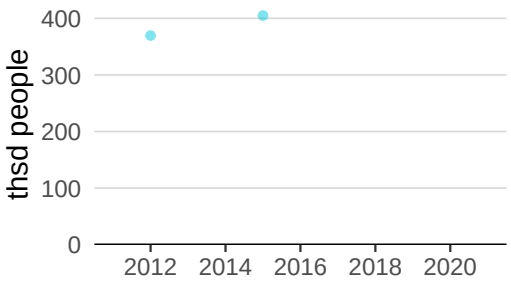

**2.3.4 QS university ranking** was equal to 0.0 in 2021–effectively unchanged from the year prior–and equivalent to an indicator rank of 72.




**3.1.1 ICT access** was equal to 4.2 in 2020 and equivalent to an indicator rank of 126.

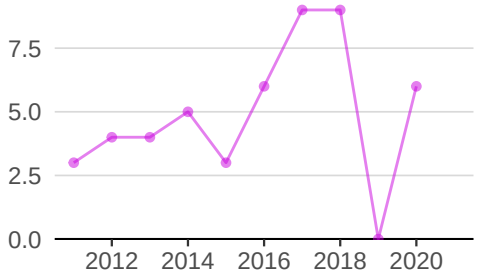



**4.2.4 Venture capital received** was equal to 3.0 mn USD in 2013 .

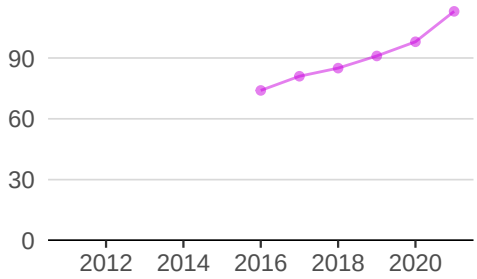



**5.1.1 Knowledge-intensive employment** was equal to 404.9 thsd people in 2015 and equivalent to an indicator rank of 123.

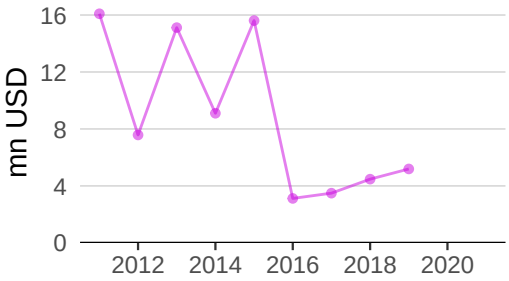
## Innovation outputs



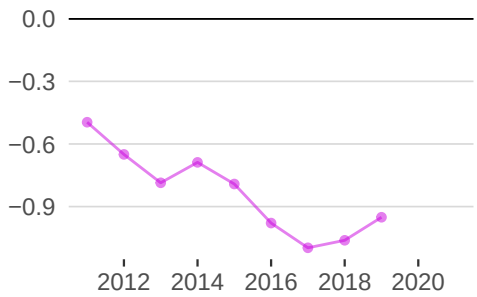

**6.1.1 Patents by origin** was equal to 6.0 in 2020–up by Inf percentage points from the year prior–and equivalent to an indicator rank of 107.



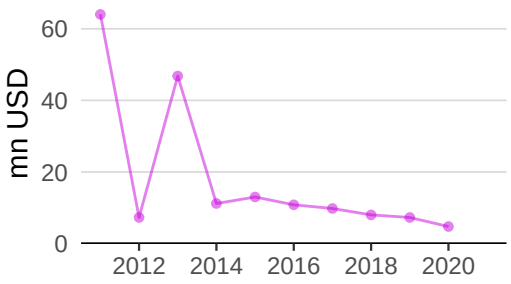

**6.1.5 Citable documents H-index** was equal to 113.0 in 2021–up by 15 percentage points from the year prior–and equivalent to an indicator rank of 109.



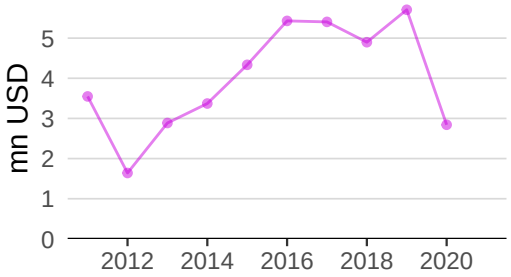

**6.3.1 Intellectual property receipts** was equal to 5.2 mn USD in 2019–up by 16 percentage points from the year prior–and equivalent to an indicator rank of 57.




**6.3.2 Production and export complexity** was equal to -1.0 in 2019–up by 10 percentage points from the year prior–and equivalent to an indicator rank of 105.




**6.3.3 High-tech exports** was equal to 4.7 mn USD in 2020–down by 35 percentage points from the year prior–and equivalent to an indicator rank of 113.




**7.2.1 Cultural and creative services exports** was equal to 2.8 mn USD in 2020–down by 50 percentage points from the year prior–and equivalent to an indicator rank of 88.

# MADAGASCAR'S INNOVATION TOP PERFORMERS

## 2.3.3 Global corporate R&D investors

| Firm | Industry | R&D | R&D Growth | R&D Intensity | Rank |
|---|---|---|---|---|---|

No observations

Source: European Commission's Joint Research Centre (https://iri.jrc.ec.europa.eu/scoreboard/2021-eu-industrial-rd-investment-scoreboard).

## 2.3.4 QS university ranking

| University | Score | Rank |
|---|---|---|

No observations

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2022).

## 7.1.1 Intangible asset intensity, top 15

| Firm | Rank |
|---|---|

No observations

Source: Brand Finance (https://brandirectory.com/reports/gift-2021).

## 7.1.3 Global brand value, top 5,000

| Brand | Industry | Rank |
|---|---|---|

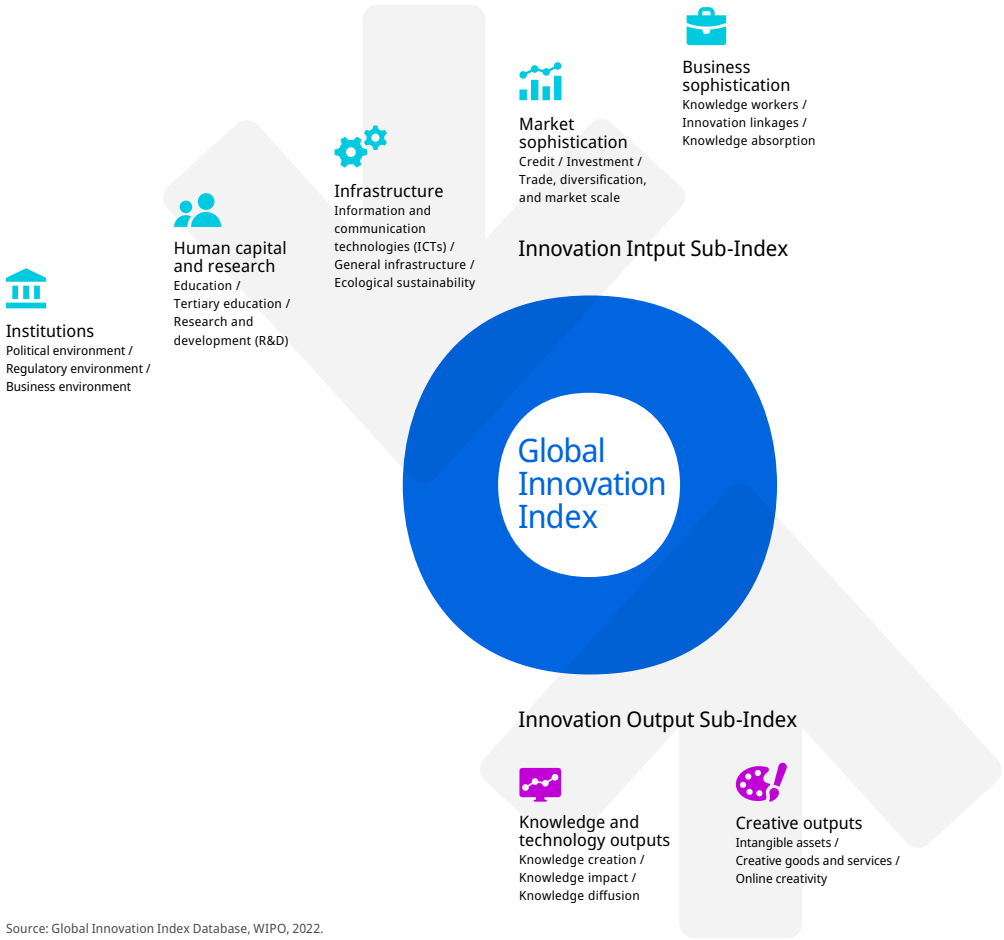
No observations

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

# ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is published by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations.

Recognizing that innovation is a key driver of economic development, the GII aims to provide an innovation ranking and rich analysis referencing around 130 economies. Over the last decade, the GII has established itself as both a leading reference on innovation and a “tool for action” for economies that incorporate the GII into their innovation agendas.




Source: Global Innovation Index Database, WIPO, 2022.

The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that include institutions, human capital and research, infrastructure, credit, investment, linkages; the creation, absorption and diffusion of knowledge; and creative outputs.

The GII has two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index, and seven pillars, each consisting of three sub-pillars.