RWANDA

105th Rwanda ranks 105th 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 Rwanda 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 Rwanda in the GII 2022 is between ranks 100 and 120.

Rankings for Rwanda (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	91	79	112
2021	102	91	108
2022	105	91	123

- Rwanda performs better in innovation inputs than innovation outputs in 2022.
- This year Rwanda ranks 91st in innovation inputs, the same as last year but lower than 2020.
- As for innovation outputs, Rwanda ranks 123rd. This position is lower than both 2021 and 2020.

1st Rwanda ranks 1st among the 12 low-income group economies.

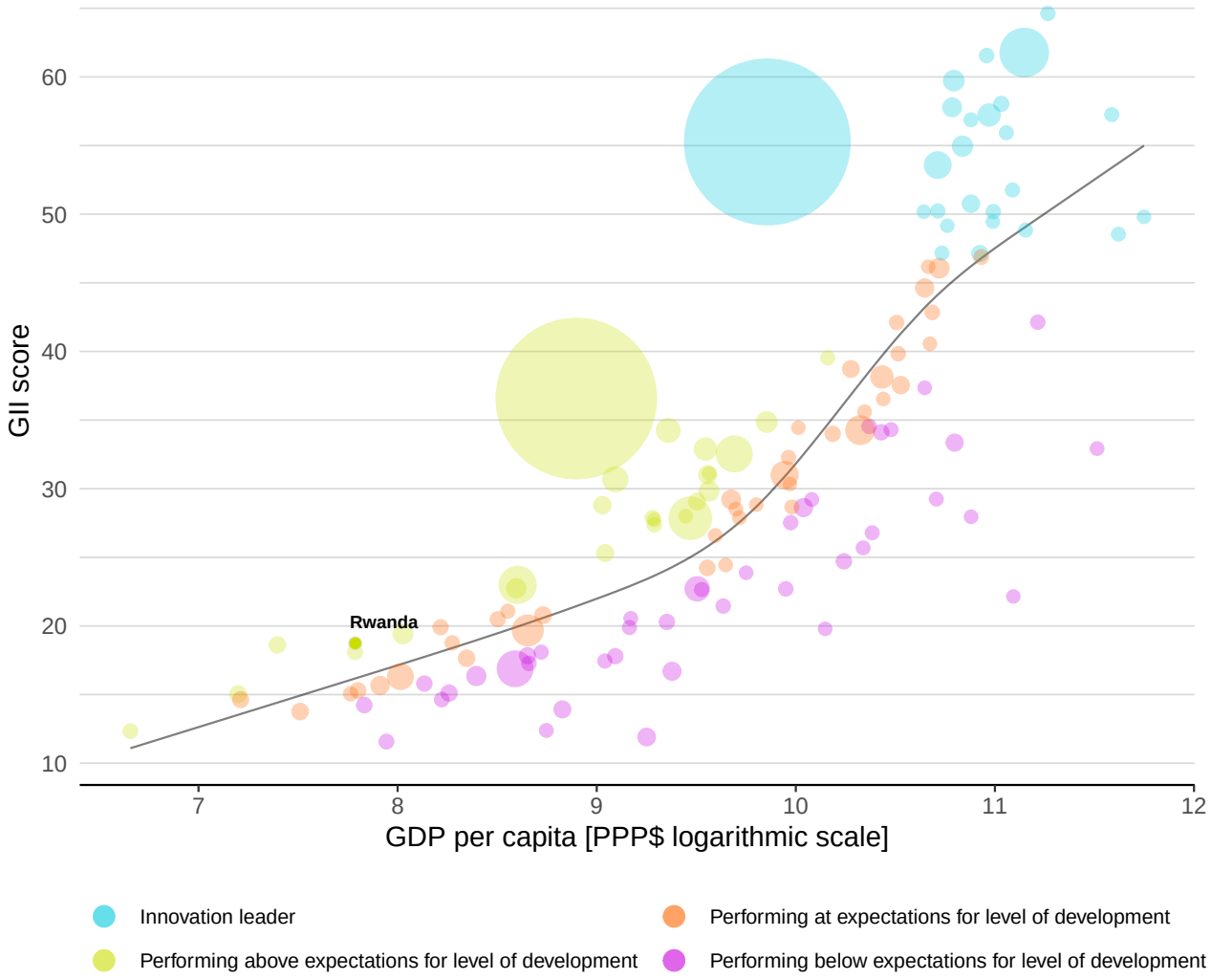
9th Rwanda ranks 9th among the 27 economies in Sub-Saharan Africa.

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

The positive relationship between innovation and development

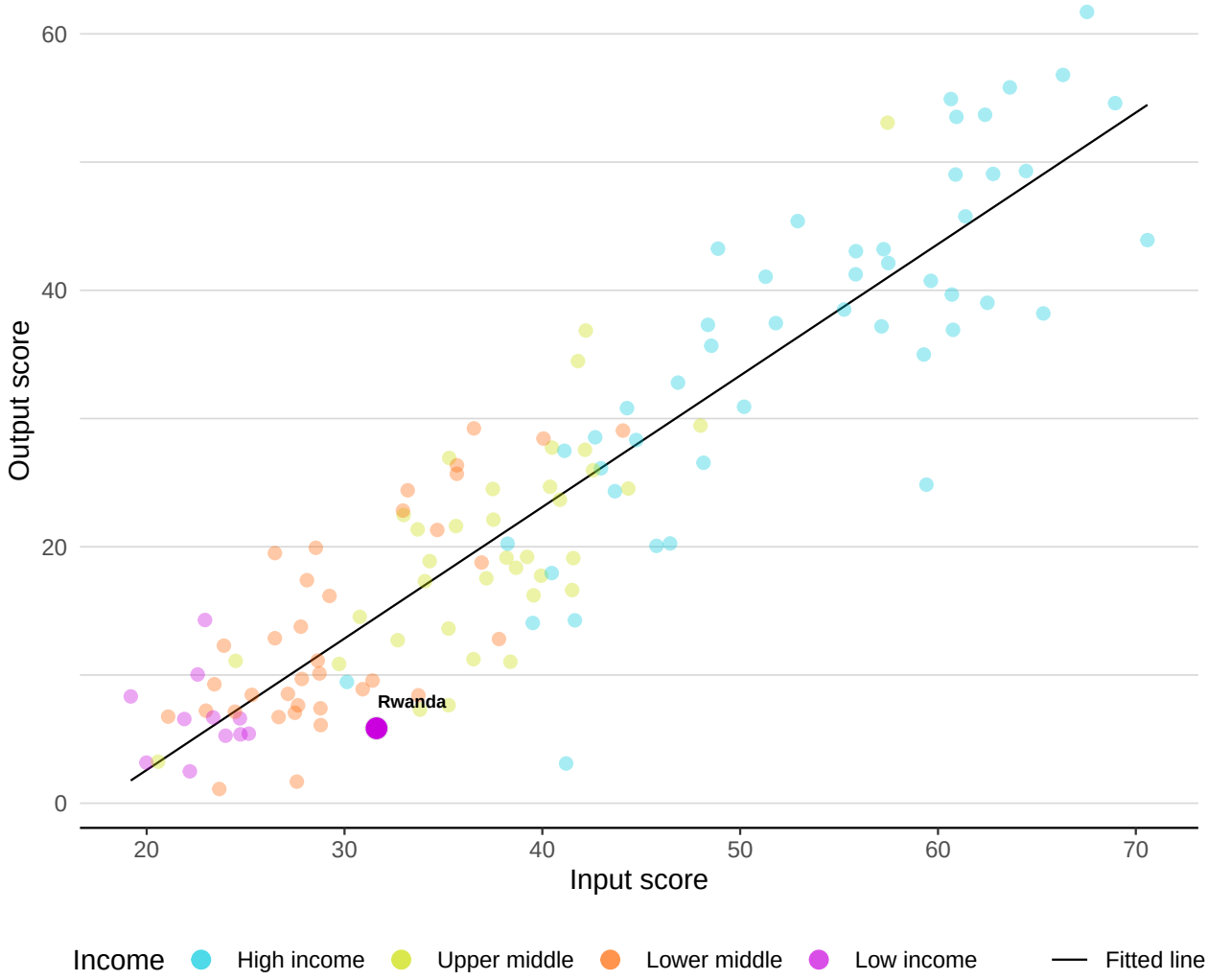


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

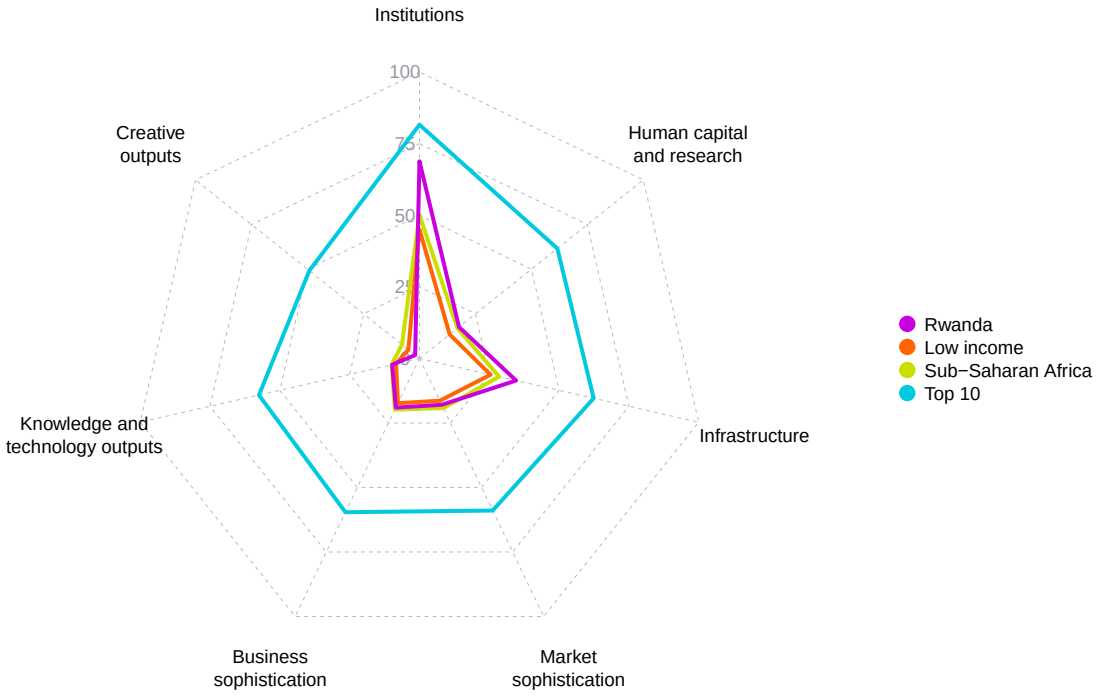
Rwanda produces less innovation outputs relative to its level of innovation investments.

Innovation input to output performance



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

The seven GII pillar scores for Rwanda



Low-income group economies

Rwanda performs above the low-income group average in six pillars, namely: Institutions; Human capital and research; Infrastructure; Market sophistication; Business sophistication; and, Knowledge and technology outputs.

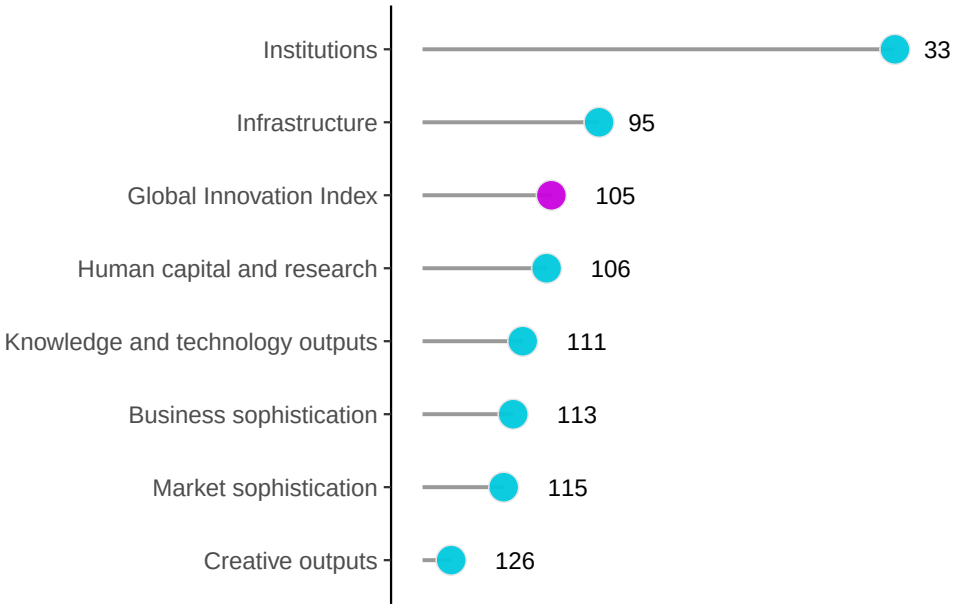
Sub-Saharan Africa

Rwanda performs above the regional average in three pillars, namely: Institutions; Human capital and research; and, Infrastructure.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Rwanda performs best in Institutions and its weakest performance is in Creative outputs.

The seven GII pillar ranks for Rwanda



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

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

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

INNOVATION STRENGTHS AND WEAKNESSES

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

Strengths and weaknesses for Rwanda

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
1.1.1	Political and operational stability	37	2.2.1	Tertiary enrolment, % gross	121
1.1.2	Government effectiveness	53	2.3.3	Global corporate R&D investors, top 3, mn USD	38
1.3.1	Policies for doing business	11	2.3.4	QS university ranking, top 3	72
3.3.1	GDP/unit of energy use	31	3.2.1	Electricity output, GWh/mn pop.	129
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	17	5.1.4	GERD financed by business, %	96
4.2.4	Venture capital received, value, % GDP	41	5.2.5	Patent families/bn PPP$ GDP	101
5.2.3	GERD financed by abroad, % GDP	17	5.3.1	Intellectual property payments, % total trade	118
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	29	6.1.2	PCT patents by origin/bn PPP$ GDP	101
6.1.4	Scientific and technical articles/bn PPP$ GDP	47	6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	124
6.2.1	Labor productivity growth, %	38	7.1.3	Global brand value, top 5,000, % GDP	77

GII 2022 rank

Rwanda

105

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
123	91	Low	SSA	13.3	31.2	2,410

		Score/ Value	Rank	
Institutions		**68.8**	**33**	● ◆
1.1	**Political environment**	66.7	47	● ◆
1.1.1	Political and operational stability*	76.4	37	● ◆
1.1.2	Government effectiveness*	57.1	53	● ◆
1.2	**Regulatory environment**	65.2	65	
1.2.1	Regulatory quality*	48.8	65	◆
1.2.2	Rule of law*	48.9	58	◆
1.2.3	Cost of redundancy dismissal	17.3	70	
1.3	**Business environment**	74.6	[12]	
1.3.1	Policies for doing business†	74.6	11	● ◆
1.3.2	Entrepreneurship policies and culture*	n/a	n/a	
Human capital and research		**17.6**	**106**	
2.1	**Education**	42.9	87	◆
2.1.1	Expenditure on education, % GDP	3.8	88	
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.4	44	
2.1.3	School life expectancy, years	11.2	95	◆
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	16.6	81	◆
2.2	**Tertiary education**	7.6	114	
2.2.1	Tertiary enrolment, % gross	6.2	121	○
2.2.2	Graduates in science and engineering, %	13.0	100	
2.2.3	Tertiary inbound mobility, %	3.6	61	
2.3	**Research and development (R&D)**	2.4	84	◆
2.3.1	Researchers, FTE/mn pop.	58.8	94	
2.3.2	Gross expenditure on R&D, % GDP	0.8	48	◆
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		**34.6**	**95**	◆
3.1	**Information and communication technologies (ICTs)**	54.2	96	◆
3.1.1	ICT access*	63.2	111	◆
3.1.2	ICT use*	28.8	115	◆
3.1.3	Government's online service*	61.8	85	◆
3.1.4	E-participation*	63.1	82	◆
3.2	**General infrastructure**	25.4	77	
3.2.1	Electricity output, GWh/mn pop.	75.2	129	○
3.2.2	Logistics performance*	42.8	56	◆
3.2.3	Gross capital formation, % GDP	24.1	60	
3.3	**Ecological sustainability**	24.3	76	
3.3.1	GDP/unit of energy use	14.1	31	●
3.3.2	Environmental performance*	32.8	98	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	114	
Market sophistication		**17.9**	**115**	
4.1	**Credit**	8.9	116	
4.1.1	Finance for startups and scaleups*	n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	24.7	109	
4.1.3	Loans from microfinance institutions, % GDP	0.7	34	
4.2	**Investment**	18.4	35	● ◆
4.2.1	Market capitalization, % GDP	31.0	47	
4.2.2	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	0.1	17	● ◆
4.2.4	Venture capital received, value, % GDP	0.0	41	● ◆
4.3	**Trade, diversification, and market scale**	26.5	119	
4.3.1	Applied tariff rate, weighted avg., %	10.2	119	
4.3.2	Domestic industry diversification	45.0	103	
4.3.3	Domestic market scale, bn PPP$	31.2	122	

		Score/ Value	Rank	
Business sophistication		**19.0**	**113**	◆
5.1	**Knowledge workers**	12.2	115	
5.1.1	Knowledge-intensive employment, %	7.1	114	
5.1.2	Firms offering formal training, %	35.9	42	◆
5.1.3	GERD performed by business, % GDP	0.0	73	◆
5.1.4	GERD financed by business, %	0.6	96	○
5.1.5	Females employed w/advanced degrees, %	3.3	99	◆
5.2	**Innovation linkages**	26.9	47	● ◆
5.2.1	University-industry R&D collaboration†	34.6	102	
5.2.2	State of cluster development and depth†	44.7	78	◆
5.2.3	GERD financed by abroad, % GDP	0.2	17	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	29	● ◆
5.2.5	Patent families/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	18.0	123	◇
5.3.1	Intellectual property payments, % total trade	0.0	118	○
5.3.2	High-tech imports, % total trade	8.4	66	
5.3.3	ICT services imports, % total trade	0.6	105	◇
5.3.4	FDI net inflows, % GDP	2.4	60	
5.3.5	Research talent, % in businesses	5.6	68	
Knowledge and technology outputs		**9.8**	**111**	
6.1	**Knowledge creation**	7.5	87	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	95	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	101	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	51	
6.1.4	Scientific and technical articles/bn PPP$ GDP	19.6	47	● ◆
6.1.5	Citable documents H-index	3.4	111	
6.2	**Knowledge impact**	16.7	102	
6.2.1	Labor productivity growth, %	1.8	38	●
6.2.2	New businesses/th pop. 15–64	2.2	57	◆
6.2.3	Software spending, % GDP	0.1	103	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	124	○
6.2.5	High-tech manufacturing, %	7.3	93	
6.3	**Knowledge diffusion**	5.2	121	
6.3.1	Intellectual property receipts, % total trade	0.0	93	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.5	90	◆
6.3.4	ICT services exports, % total trade	0.7	94	
Creative outputs		**1.9**	**126**	○
7.1	**Intangible assets**	3.2	119	
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	13.8	102	
7.1.3	Global brand value, top 5,000, % GDP	0.0	77	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.2	104	
7.2	**Creative goods and services**	0.8	[126]	
7.2.1	Cultural and creative services exports, % total trade	0.0	100	
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	99	
7.3	**Online creativity**	0.5	110	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.2	118	
7.3.2	Country-code TLDs/th pop. 15–69	0.2	111	
7.3.3	GitHub commit pushes received/mn pop. 15–69	1.2	97	◆
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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 Rwanda.

Missing data for Rwanda

Code	Indicator name	Economy year	Model year	Source
1.3.2	Entrepreneurship policies and culture	n/a	2021	Global Entrepreneurship Monitor
2.1.4	PISA scales in reading, maths and science	n/a	2018	OECD, PISA
4.1.1	Finance for startups and scaleups	n/a	2021	Global Entrepreneurship Monitor
4.2.2	Venture capital investors, deals/bn PPP$ GDP	n/a	2021	Refinitiv
6.3.2	Production and export complexity	n/a	2019	Harvard University, Growth Lab
7.1.1	Intangible asset intensity, top 15, %	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
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	2021	data.ia

Outdated data for Rwanda

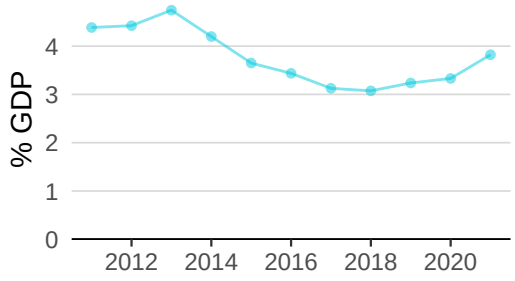
Code	Indicator name	Economy year	Model year	Source
2.2.2	Graduates in science and engineering, %	2019	2020	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2019	2020	UNESCO Institute for Statistics
2.3.2	Gross expenditure on R&D, % GDP	2019	2020	UNESCO Institute for Statistics
3.2.1	Electricity output, GWh/mn pop.	2019	2020	International Energy Agency
4.2.1	Market capitalization, % GDP	2019	2020	World Federation of Exchanges
5.1.1	Knowledge-intensive employment, %	2020	2021	International Labour Organization
5.1.3	GERD performed by business, % GDP	2016	2020	UNESCO Institute for Statistics
5.1.4	GERD financed by business, %	2016	2019	UNESCO Institute for Statistics
5.1.5	Females employed w/advanced degrees, %	2020	2021	International Labour Organization
5.2.3	GERD financed by abroad, % GDP	2016	2019	UNESCO Institute for Statistics
5.3.2	High-tech imports, % total trade	2019	2020	United Nations Comtrade Database
5.3.5	Research talent, % in businesses	2016	2020	UNESCO Institute for Statistics
6.1.1	Patents by origin/bn PPP$ GDP	2018	2020	World Intellectual Property Organization

Code	Indicator name	Economy year	Model year	Source
6.3.3	High-tech exports, % total trade	2019	2020	United Nations Comtrade Database
7.2.5	Creative goods exports, % total trade	2019	2020	United Nations Comtrade Database

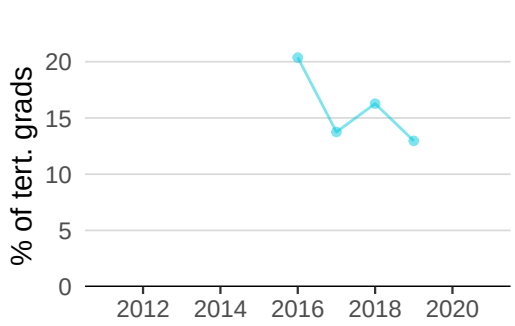
RWANDA'S INNOVATION SYSTEM

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

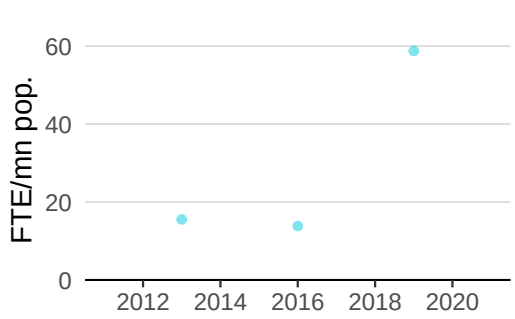
Innovation inputs



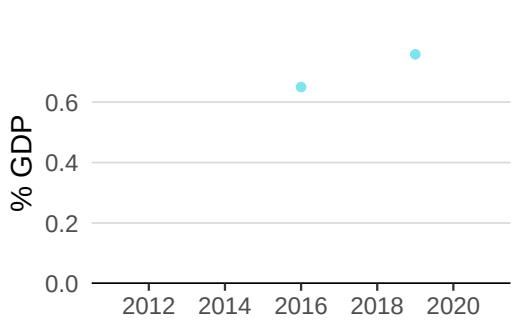
2.1.1 Expenditure on education was equal to 3.8% GDP in 2021–up by 15 percentage points from the year prior–and equivalent to an indicator rank of 88.



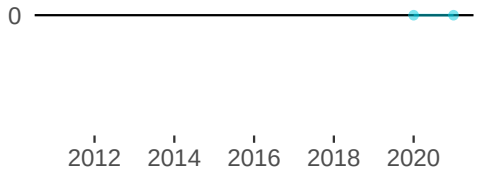
2.2.2 Graduates in science and engineering was equal to 13.0% of tert. grads in 2019–down by 20 percentage points from the year prior–and equivalent to an indicator rank of 100.



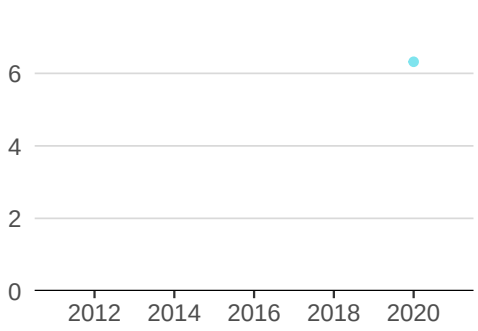
2.3.1 Researchers was equal to 58.8 FTE/mn pop. in 2019 and equivalent to an indicator rank of 94.



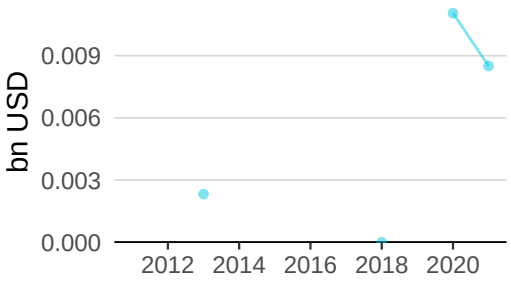
2.3.2 Gross expenditure on R&D was equal to 0.8% GDP in 2019 and equivalent to an indicator rank of 48.



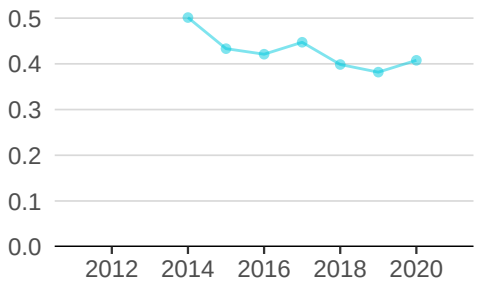
2.3.4 QS university ranking was equal to 0.0 in 2021–effectively unchanged from the year prior–and equivalent to an indicator rank of 72.



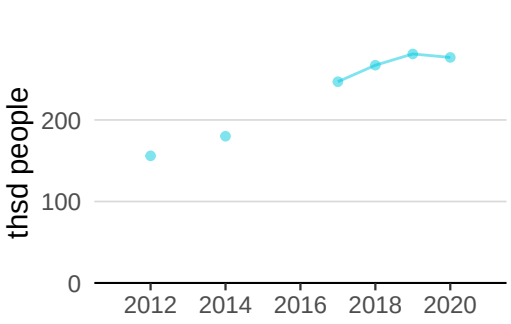
3.1.1 ICT access was equal to 6.3 in 2020 and equivalent to an indicator rank of 111.



4.2.4 Venture capital received was equal to 0.0 bn USD in 2021–down by 23 percentage points from the year prior–and equivalent to an indicator rank of 41.

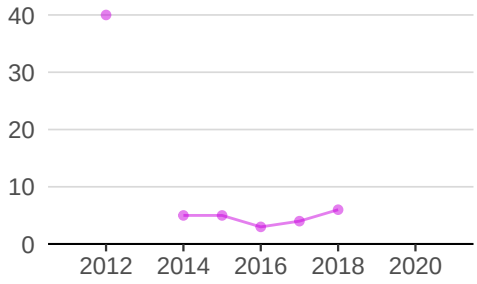


4.3.2 Domestic industry diversification was equal to 0.4 in 2020–up by 7 percentage points from the year prior–and equivalent to an indicator rank of 103.

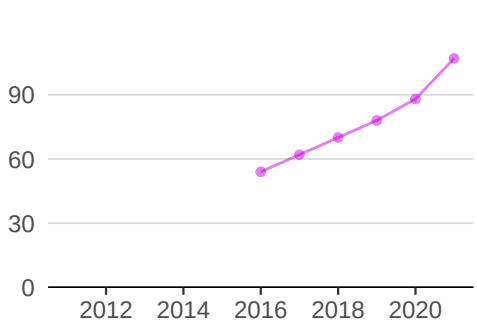


5.1.1 Knowledge-intensive employment was equal to 276.6 thsd people in 2020–down by 2 percentage points from the year prior–and equivalent to an indicator rank of 114.

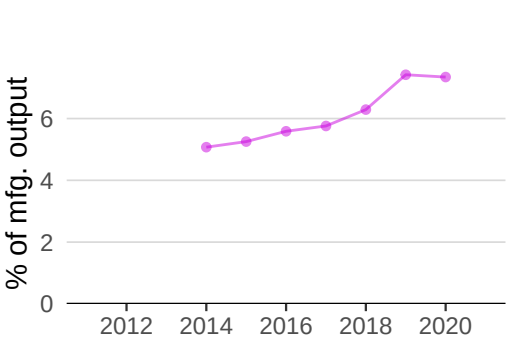
Innovation outputs



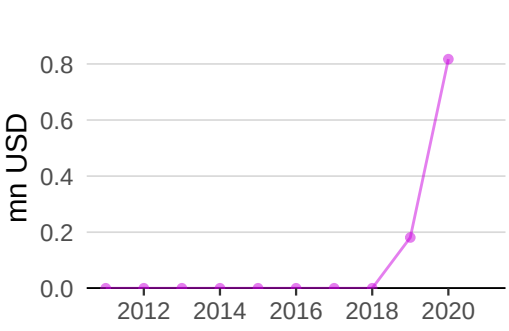
6.1.1 Patents by origin was equal to 6.0 in 2018–up by 50 percentage points from the year prior–and equivalent to an indicator rank of 95.



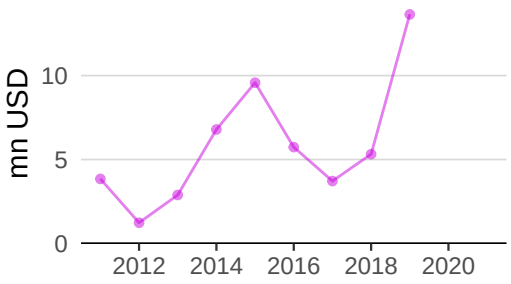
6.1.5 Citable documents H-index was equal to 107.0 in 2021–up by 22 percentage points from the year prior–and equivalent to an indicator rank of 111.



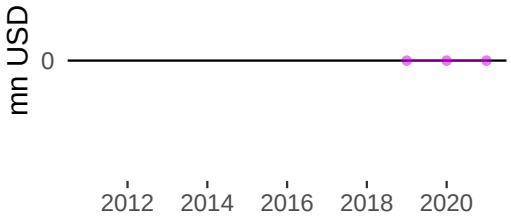
6.2.5 High-tech manufacturing was equal to 7.3% of mfg. output in 2020–down by 1 percentage point from the year prior–and equivalent to an indicator rank of 93.



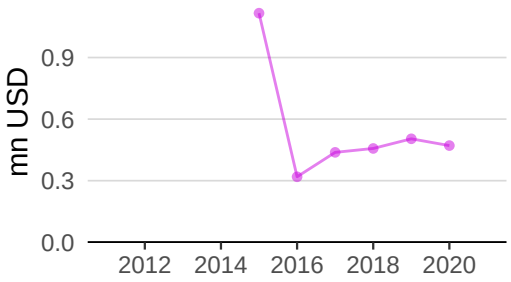
6.3.1 Intellectual property receipts was equal to 0.8 mn USD in 2020–up by 351 percentage points from the year prior–and equivalent to an indicator rank of 93.



6.3.3 High-tech exports was equal to 13.6 mn USD in 2019–up by 157 percentage points from the year prior–and equivalent to an indicator rank of 90.



7.1.3 Global brand value was equal to 0.0 mn USD in 2021–effectively unchanged from the year prior–and equivalent to an indicator rank of 77.



7.2.1 Cultural and creative services exports was equal to 0.5 mn USD in 2020–down by 7 percentage points from the year prior–and equivalent to an indicator rank of 100.

RWANDA'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

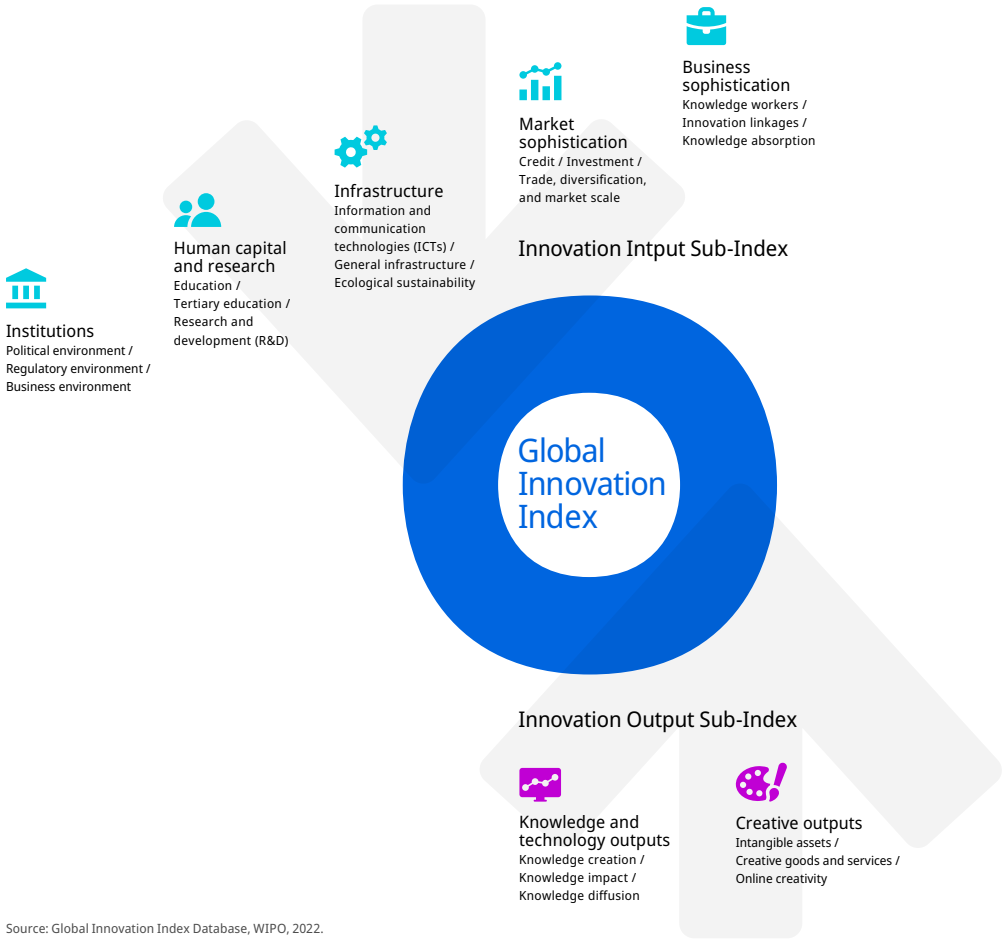
No observations

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.