

Global Innovation Index 2023

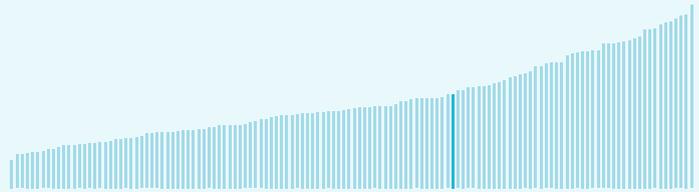


The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

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

Romania ranking in the Global Innovation Index 2023

> Romania ranks **47th** among the 132 economies featured in the GII 2023.



> Romania ranks **40th** among the 50 high-income group economies.



> Romania ranks **30th** among the 39 economies in Europe.



> Romania GII Ranking (2020-2023)

The table shows the rankings of Romania 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 Romania in the GII 2023 is between ranks 46 and 50.

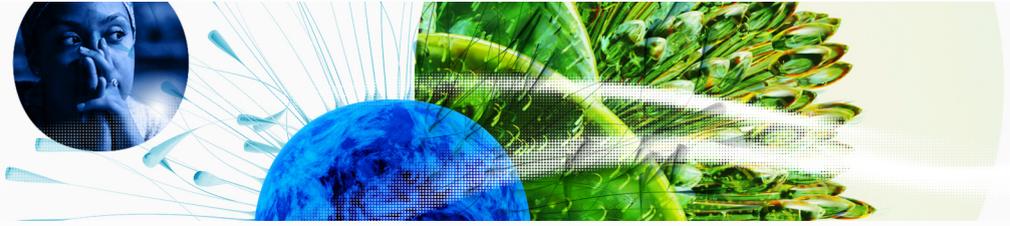
	GII Position	Innovation Inputs	Innovation Outputs
2020	46th	51st	46th
2021	48th	54th	50th
2022	49th	56th	43rd
2023	47th	55th	47th

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

This year Romania ranks 55th in innovation inputs. This position is higher than last year.

Romania ranks 47th in innovation outputs. This position is lower than last year.

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→ Expected vs. observed innovation performance

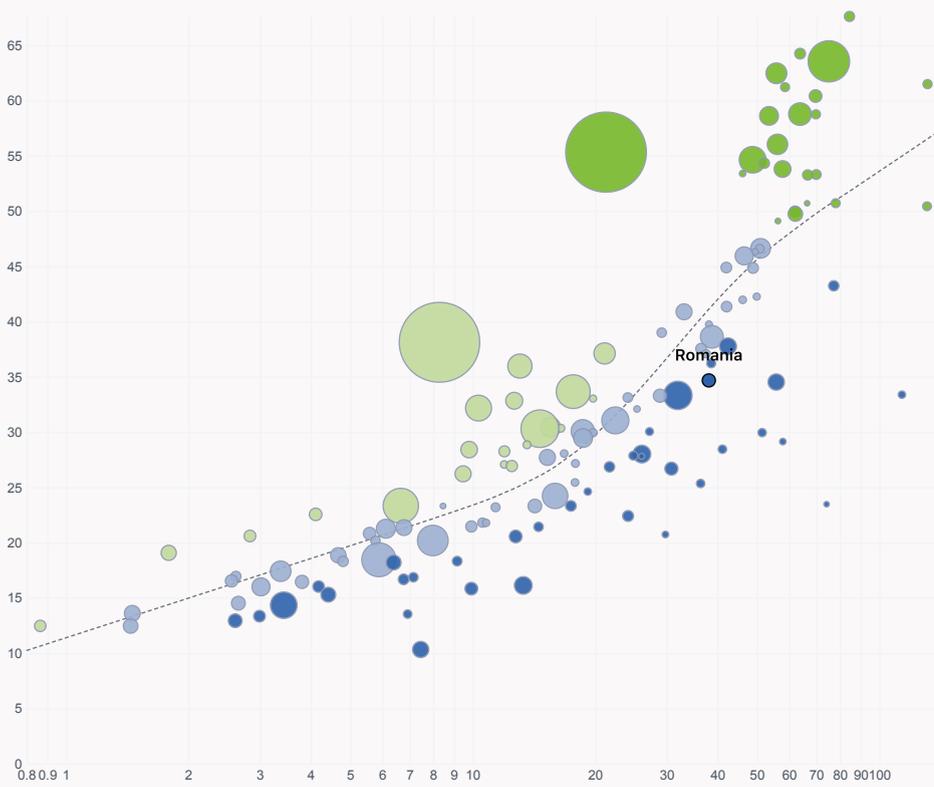
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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



> Relative to GDP, Romania's performance is below 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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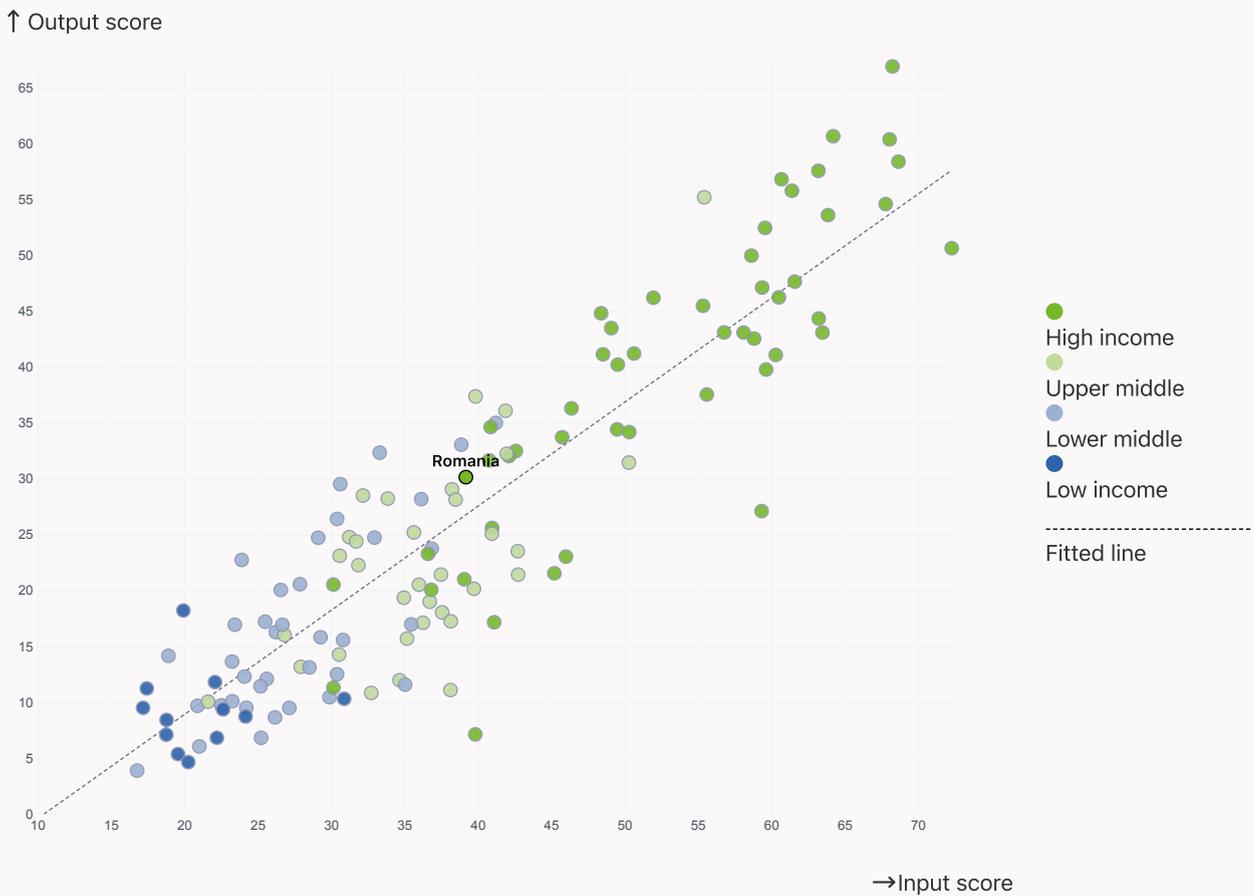
→ Effectively translating innovation investments into innovation outputs

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.

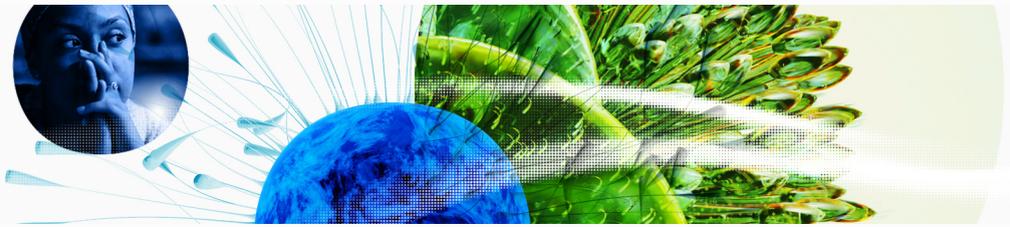


> Romania produces more innovation outputs relative to its level of innovation investments.

> Relationship between innovation inputs and outputs

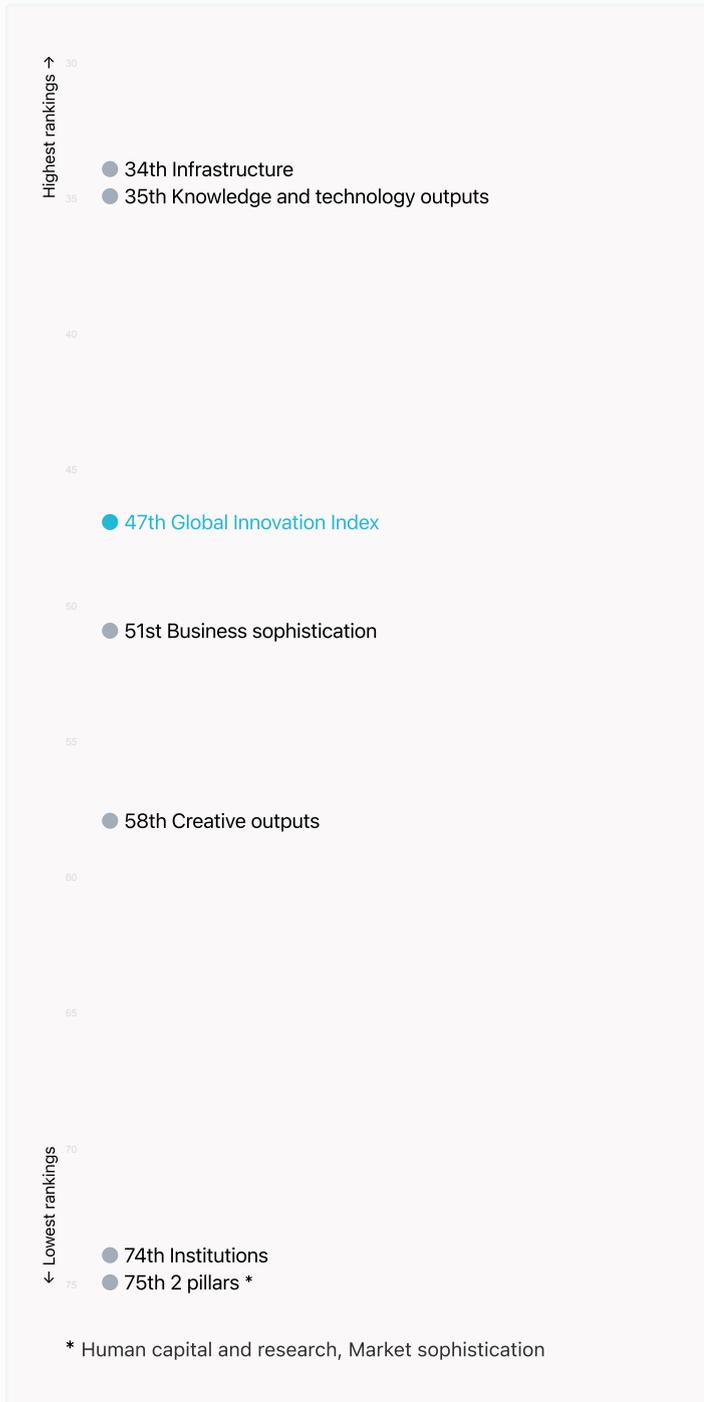


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→ Overview of Romania's rankings in the seven areas of the GII in 2023

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



> Highest rankings



Romania ranks highest in Infrastructure (34th) and Knowledge and technology outputs (35th).

> Lowest rankings



Romania ranks lowest in Human capital and research, Market sophistication (75th), Institutions (74th) and Creative outputs (58th).

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

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

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

> High-Income economies

Romania performs below the high-income group average in all the pillars.



> Europe

Romania performs below the regional average in all the pillars.



Knowledge and technology outputs

Top 10 | Score: 58.96

Europe | Score: 38.80

High income | Score: 38.62

Romania | Score: 33.35

Creative outputs

Top 10 | 56.09

High income | 40.27

Europe | 39.87

Romania | 26.91

Business sophistication

Top 10 | 64.39

High income | 46.38

Europe | 44.61

Romania | 32.06

Market sophistication

Top 10 | 61.93

High income | 46.42

Europe | 43.65

Romania | 32.80

Human capital and research

Top 10 | 60.28

High income | 46.30

Europe | 44.05

Romania | 29.06

Infrastructure

Top 10 | 62.83

High income | 55.85

Europe | 54.69

Romania | 54.48

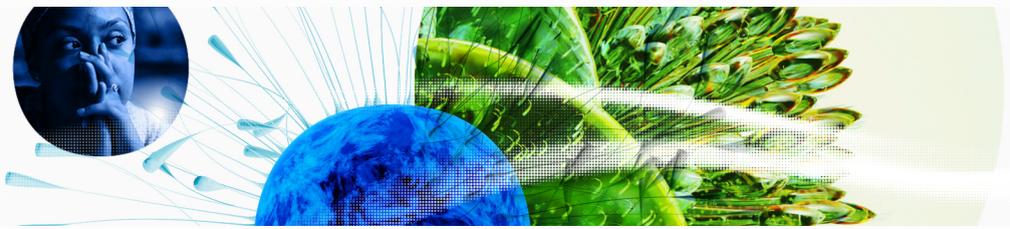
Institutions

Top 10 | 79.85

High income | 68.16

Europe | 61.69

Romania | 47.58



→ Innovation strengths and weaknesses in Romania

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



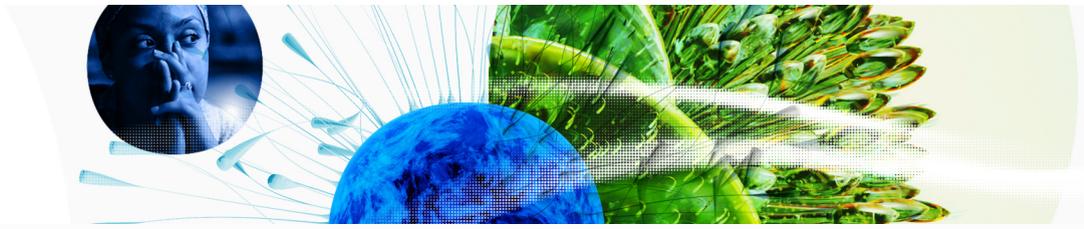
> Romania's main innovation strengths are **Cost of redundancy dismissal** (rank 1), **ISO 14001 environment/bn PPP\$ GDP** (rank 8) and **Labor productivity growth, %** (rank 10).

Strengths

Weaknesses

Rank	Code	Indicator name	Rank	Code	Indicator name
1	1.2.3	Cost of redundancy dismissal	108	4.1.2	Domestic credit to private sector, % GDP
8	3.3.3	ISO 14001 environment/bn PPP\$ GDP	87	4.2.4	VC received, value, % GDP
10	6.2.1	Labor productivity growth, %	84	4.2.3	VC recipients, deals/bn PPP\$ GDP
11	4.1.3	Loans from microfinance institutions, % GDP	80	5.1.2	Firms offering formal training, %
12	7.2.1	Cultural and creative services exports, % total trade	76	1.3.2	Entrepreneurship policies and culture
12	6.3.4	ICT services exports, % total trade	76	4.2.2	Venture capital (VC) investors, deals/bn PPP\$ GDP
15	6.3.5	ISO 9001 quality/bn PPP\$ GDP	73	4.2.1	Market capitalization, % GDP
18	5.3.3	ICT services imports, % total trade	71	2.3.4	QS university ranking, top 3
19	6.3.2	Production and export complexity	48	6.2.2	Unicorn valuation, % GDP
21	3.3.1	GDP/unit of energy use	40	2.3.3	Global corporate R&D investors, top 3, mn US\$

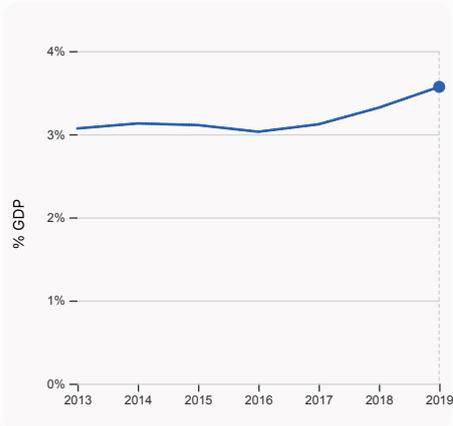
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→ Romania's innovation system

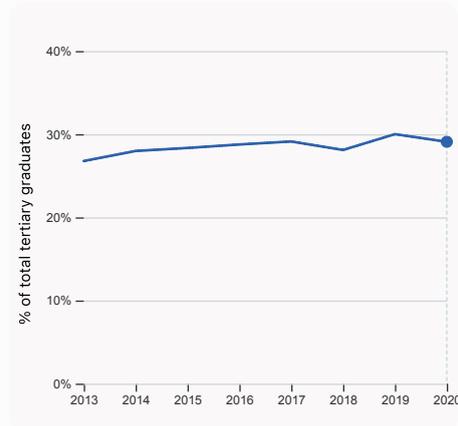
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Romania



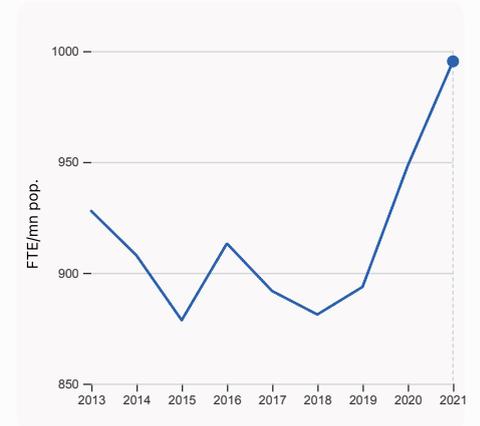
2.1.1 Expenditure on education, % GDP

was equal to 3.57% GDP in 2019, up by 0.25 percentage points from the year prior – and equivalent to an indicator rank of 87.



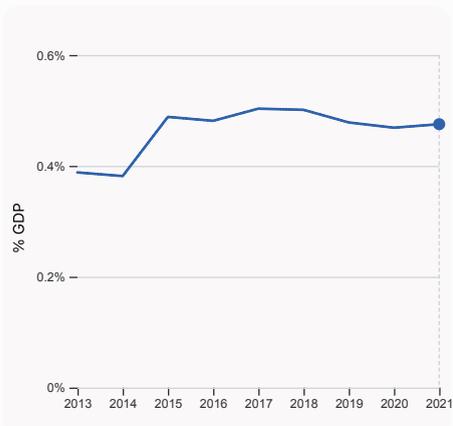
2.2.2 Graduates in science and engineering, %

was equal to 29.09% of total tertiary graduates in 2020, down by 0.92 percentage points from the year prior – and equivalent to an indicator rank of 23.



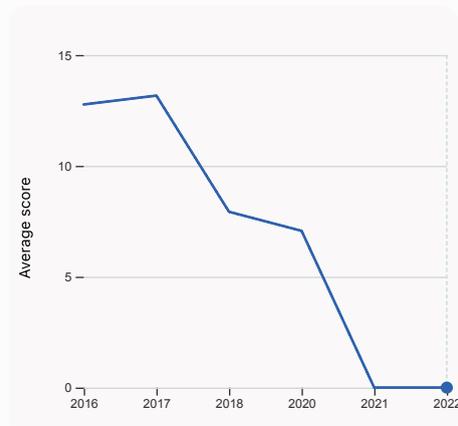
2.3.1 Researchers, FTE/mn pop.

was equal to 995.38 FTE/mn pop. in 2021, up by 4.96% from the year prior – and equivalent to an indicator rank of 52.



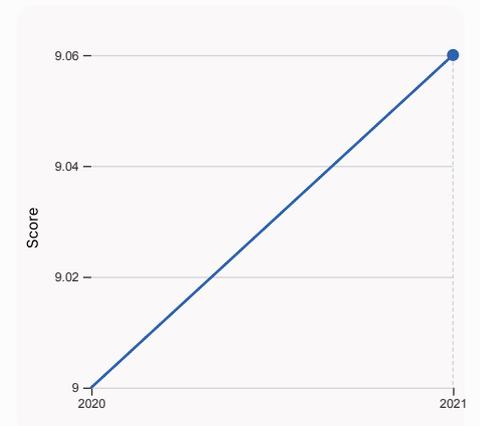
2.3.2 Gross expenditure on R&D, % GDP

was equal to 0.475% GDP in 2021, up by 0.0064 percentage points from the year prior – and equivalent to an indicator rank of 61.



2.3.4 QS university ranking, top 3

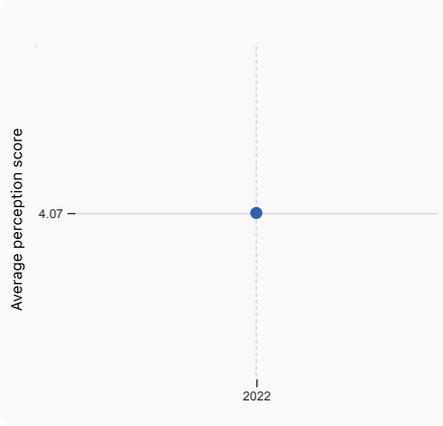
was equal to an average score of 0 for the top 3 universities in 2022, equivalent to an indicator rank of 71.



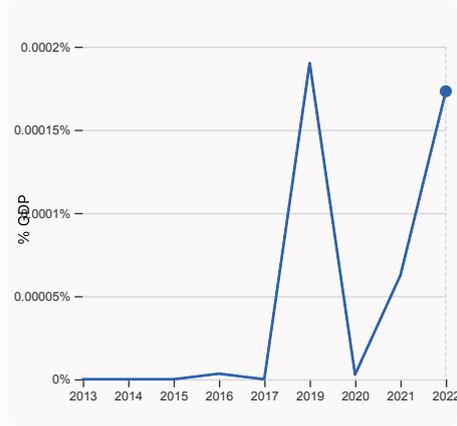
3.1.1 ICT access

was equal to a score of 9.06 in 2021, up by 0.67% from the year prior – and equivalent to an indicator rank of 46.

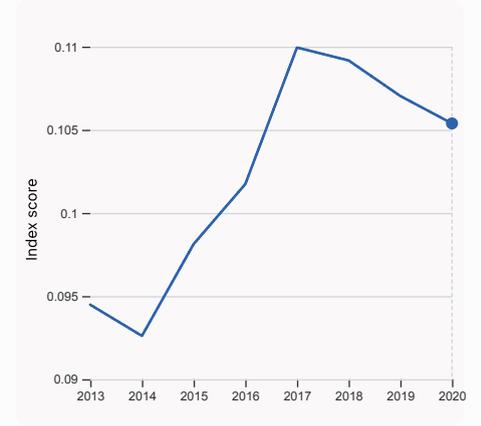
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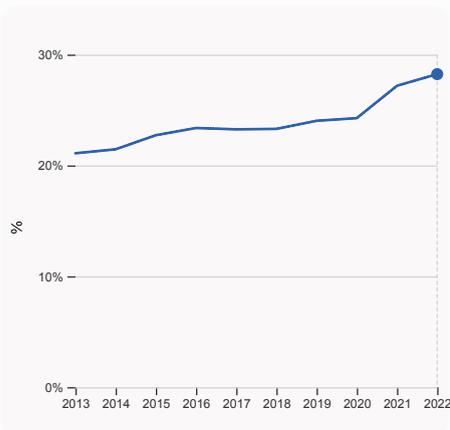
4.1.1 Finance for startups and scaleups was equal to an average perception score of 4.07 in 2022, equivalent to an indicator rank of 58.



4.2.4 VC received, value, % GDP was equal to 0.00017% GDP in 2022, up by 0.00011 percentage points from the year prior – and equivalent to an indicator rank of 87.



4.3.2 Domestic industry diversification was equal to an index score of 0.105 in 2020, down by 1.54% from the year prior – and equivalent to an indicator rank of 23.

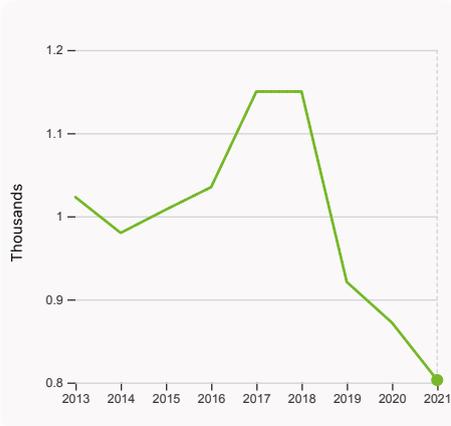


5.1.1 Knowledge-intensive employment, % was equal to 28.24% in 2022, up by 1.05 percentage points from the year prior – and equivalent to an indicator rank of 50.

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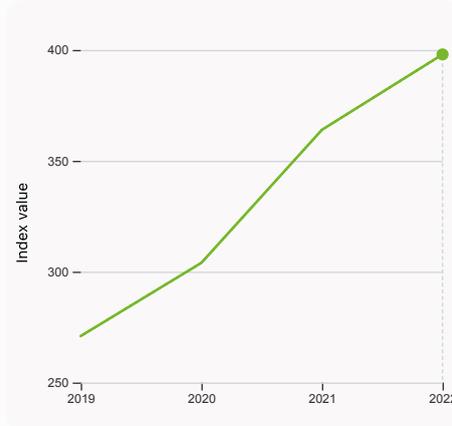


> Innovation outputs in Romania



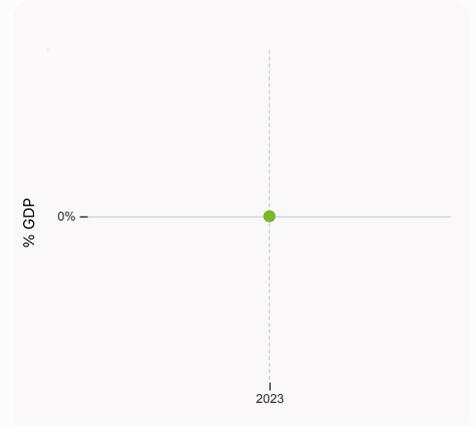
6.1.1 Patents by origin

was equal to 0.8 Thousands in 2021, down by 7.91% from the year prior – and equivalent to an indicator rank of 53.



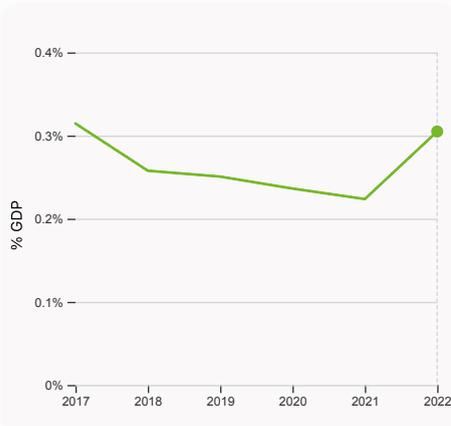
6.1.5 Citable documents H-index

was equal to an index value of 398 in 2022, up by 9.34% from the year prior – and equivalent to an indicator rank of 42.



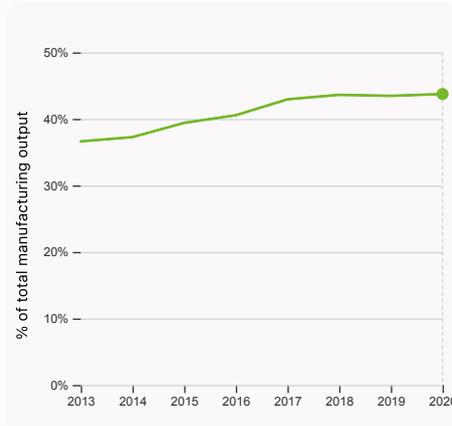
6.2.2 Unicorn valuation, % GDP

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



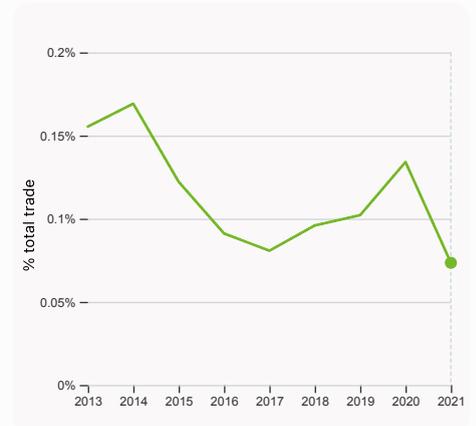
6.2.3 Software spending, % GDP

was equal to 0.305% GDP in 2022, up by 0.081 percentage points from the year prior – and equivalent to an indicator rank of 43.



6.2.4 High-tech manufacturing, %

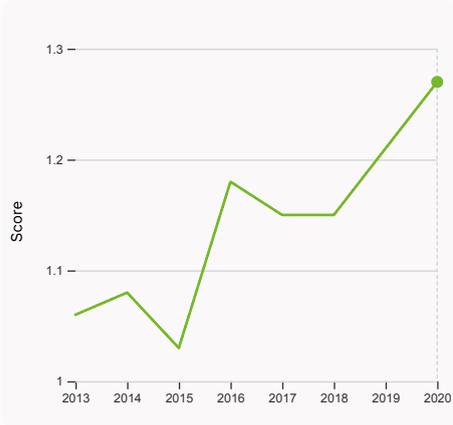
was equal to 43.75% of total manufacturing output in 2020, up by 0.28 percentage points from the year prior – and equivalent to an indicator rank of 21.



6.3.1 Intellectual property receipts, % total trade

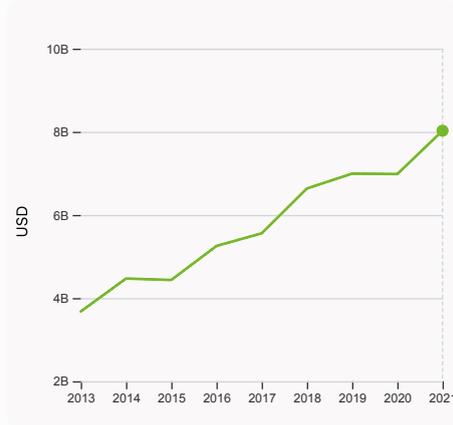
was equal to 0.073% total trade in 2021, down by 0.061 percentage points from the year prior – and equivalent to an indicator rank of 58.

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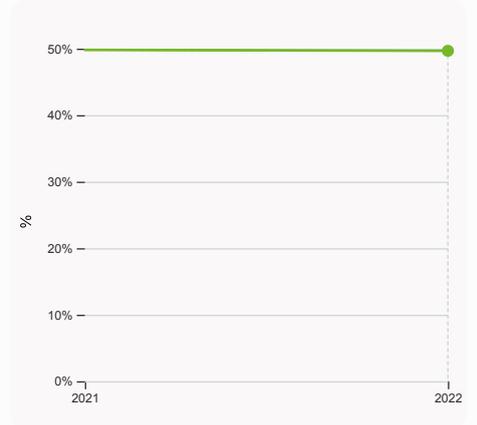
6.3.2 Production and export complexity

was equal to a score of 1.27 in 2020, up by 4.96% from the year prior – and equivalent to an indicator rank of 19.



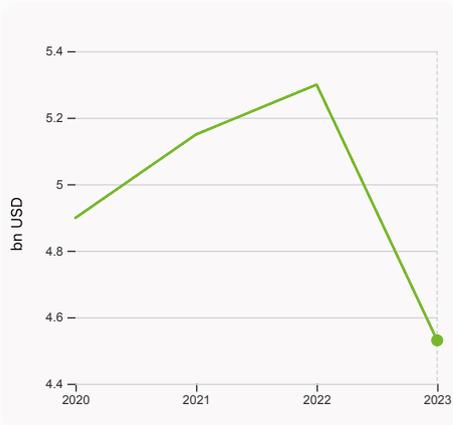
6.3.3 High-tech exports

was equal to 8,026,987,950 USD in 2021, up by 14.92% from the year prior – and equivalent to an indicator rank of 28.



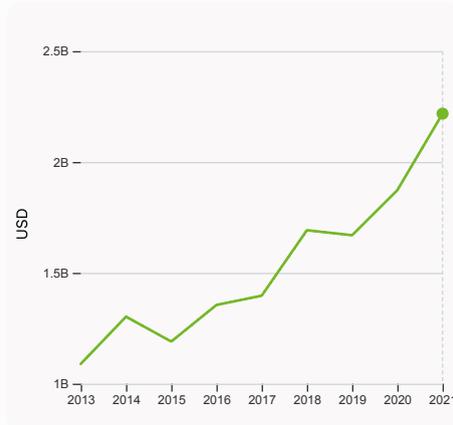
7.1.1 Intangible asset intensity, top 15, %

was equal to 49.68% in 2022, down by 0.14 percentage points from the year prior – and equivalent to an indicator rank of 49.



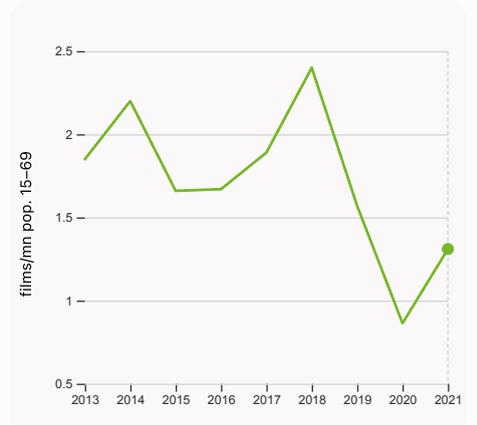
7.1.3 Global brand value, top 5,000

was equal to 4.53 bn USD in 2023, down by 14.51% from the year prior – and equivalent to an indicator rank of 49.



7.2.1 Cultural and creative services exports

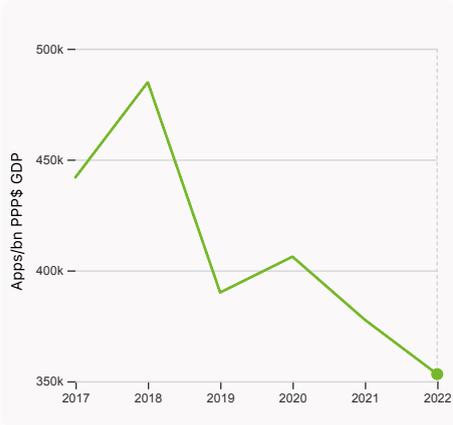
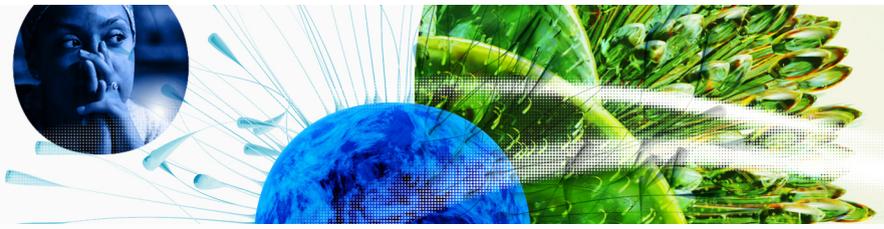
was equal to 2,218,133,000 USD in 2021, up by 18.44% from the year prior – and equivalent to an indicator rank of 12.



7.2.2 National feature films/mn pop. 15-69

was equal to 1.31 films/mn pop. 15-69 in 2021, up by 51.67% from the year prior – and equivalent to an indicator rank of 55.

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7.3.4 Mobile app creation/bn PPP\$ GDP

was equal to 353,210.55 Apps/bn PPP\$ GDP in 2022, down by 6.49% from the year prior – and equivalent to an indicator rank of 53.



→ Romania's innovation top performers

> 2.3.4 QS university ranking of Romania's top universities

Rank	University	Score
1001-1200	BABES-BOLYAI UNIVERSITY	10.10
1001-1200	UNIVERSITY OF BUCHAREST	9.60
1201-1400	UNIVERSITATEA DE VEST DIN TIMISOARA / WEST UNIVERSITY OF TIMISOARA	6.20

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

Note: QS Quacquarelli Symonds Ltd annually assesses over 1,200 universities across the globe and scores them between [0,100]. Ranks can represent a single value "x", a tie "x=" or a range "x-y".

> 7.1.1 Top 15 intangible-asset intensive companies in Romania

Rank	Firm	Intensity, %
1	CHIMCOMPLEX BORZESTI SA ONESTI	76.76
2	DIGI COMMUNICATIONS NV	50.54
3	SOCIETATEA ENERGETICA ELECTRICA SA	87.82

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

Note: Brand Finance only provides within economy ranks.

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

Rank	Brand	Industry	Brand Value, mn USD
1	DACIA	Automobiles	1,102.1
2	PETROM	Oil & Gas	765.5
3	BANCA TRANSILVANIA	Banking	512.9

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

Note: Rank corresponds to within economy ranks.

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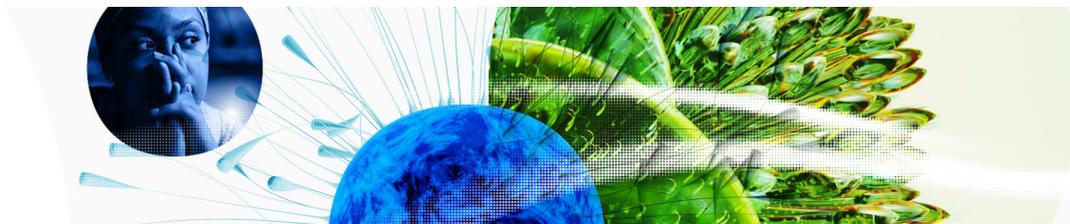
GII 2023 rank

47

Romania

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$							
47	55	High	EUR	19.7	731.5	38,096.8							
Score / Value Rank				Score / Value Rank									
Institutions				47.6	74	◇	Business sophistication				32.1	51	
1.1 Institutional environment				44.4	70	◇	5.1 Knowledge workers				35.6	59	
1.1.1 Operational stability for businesses*				55.6	56	◇	5.1.1 Knowledge-intensive employment, %				28.2	50	◇
1.1.2 Government effectiveness*				33.2	79	◇	5.1.2 Firms offering formal training, %				20.5	80	○◇
1.2 Regulatory environment				75.4	33		5.1.3 GERD performed by business, % GDP				0.3	48	
1.2.1 Regulatory quality*				50.1	55	◇	5.1.4 GERD financed by business, %				55.6	21	
1.2.2 Rule of law*				51.7	46	◇	5.1.5 Females employed w/advanced degrees, %				13.3	57	◇
1.2.3 Cost of redundancy dismissal				8.0	1	◆◆	5.2 Innovation linkages				17.9	86	◇
1.3 Business environment				22.9	115	○◇	5.2.1 University-industry R&D collaboration†				38.2	79	◇
1.3.1 Policies for doing business†				32.2	102	◇	5.2.2 State of cluster development†				38.1	76	◇
1.3.2 Entrepreneurship policies and culture†				13.7	76	○◇	5.2.3 GERD financed by abroad, % GDP				0.1	49	
Human capital and research				29.1	75	◇	5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP				0.0	87	
2.1 Education				46.8	77	◇	5.2.5 Patent families/bn PPP\$ GDP				0.0	66	
2.1.1 Expenditure on education, % GDP				3.6	87	●	5.3 Knowledge absorption				42.7	37	
2.1.2 Government funding/pupil, secondary, % GDP/cap				20.0	54		5.3.1 Intellectual property payments, % total trade				0.9	43	
2.1.3 School life expectancy, years				14.3	68	◇	5.3.2 High-tech imports, % total trade				10.1	35	
2.1.4 PISA scales in reading, maths and science				427.8	49	◇	5.3.3 ICT services imports, % total trade				2.9	18	◆◆
2.1.5 Pupil-teacher ratio, secondary				11.7	50		5.3.4 FDI net inflows, % GDP				2.8	53	
2.2 Tertiary education				35.8	43		5.3.5 Research talent, % in businesses				33.1	39	
2.2.1 Tertiary enrolment, % gross				53.2	66		Knowledge and technology outputs				33.3	35	
2.2.2 Graduates in science and engineering, %				29.1	23		6.1 Knowledge creation				13.5	68	◇
2.2.3 Tertiary inbound mobility, %				6.0	42		6.1.1 Patents by origin/bn PPP\$ GDP				1.2	53	
2.3 Research and development (R&D)				4.6	77	◇	6.1.2 PCT patents by origin/bn PPP\$ GDP				0.1	73	◇
2.3.1 Researchers, FTE/mn pop.				995.4	52	◇	6.1.3 Utility models by origin/bn PPP\$ GDP				0.1	57	
2.3.2 Gross expenditure on R&D, % GDP				0.5	61	◇	6.1.4 Scientific and technical articles/bn PPP\$ GDP				n/a	n/a	
2.3.3 Global corporate R&D investors, top 3, mn US\$				0.0	40	○◇	6.1.5 Citable documents H-index				19.8	42	
2.3.4 QS university ranking, top 3*				0.0	71	○◇	6.2 Knowledge impact				39.6	31	
Infrastructure				54.5	34		6.2.1 Labor productivity growth, %				3.3	10	◆◆
3.1 Information and communication technologies (ICTs)				74.0	53		6.2.2 Unicorn valuation, % GDP				0.0	48	○◇
3.1.1 ICT access*				86.0	46		6.2.3 Software spending, % GDP				0.3	43	
3.1.2 ICT use*				83.5	49		6.2.4 High-tech manufacturing, %				43.8	21	
3.1.3 Government's online service*				64.8	69	◇	6.3 Knowledge diffusion				46.9	21	◆◆
3.1.4 E-participation*				61.6	54		6.3.1 Intellectual property receipts, % total trade				0.1	58	
3.2 General infrastructure				30.6	52	◇	6.3.2 Production and export complexity				79.2	19	◆◆
3.2.1 Electricity output, GWh/mn pop.				3,082.9	65	◇	6.3.3 High-tech exports, % total trade				6.5	28	
3.2.2 Logistics performance*				50.0	50	◇	6.3.4 ICT services exports, % total trade				6.7	12	◆◆
3.2.3 Gross capital formation, % GDP				27.8	33		6.3.5 ISO 9001 quality/bn PPP\$ GDP				18.3	15	◆◆
3.3 Ecological sustainability				58.9	6	◆◆	Creative outputs				26.9	58	
3.3.1 GDP/unit of energy use				15.7	21	◆◆	7.1 Intangible assets				32.4	62	
3.3.2 Environmental performance*				62.9	29		7.1.1 Intangible asset intensity, top 15, %				49.7	49	
3.3.3 ISO 14001 environment/bn PPP\$ GDP				9.5	8	◆◆	7.1.2 Trademarks by origin/bn PPP\$ GDP				38.3	61	
Market sophistication				32.8	75		7.1.3 Global brand value, top 5,000				1.5	49	
4.1 Credit				28.4	68	◇	7.1.4 Industrial designs by origin/bn PPP\$ GDP				1.1	65	
4.1.1 Finance for startups and scaleups†				39.3	58	◇	7.2 Creative goods and services				15.5	57	
4.1.2 Domestic credit to private sector, % GDP				25.8	108	○◇	7.2.1 Cultural and creative services exports, % total trade				1.8	12	◆◆
4.1.3 Loans from microfinance institutions, % GDP				3.2	11	◆◆	7.2.2 National feature films/mn pop. 15-69				1.3	55	◇
4.2 Investment				2.5	98	○◇	7.2.3 Entertainment and media market/th pop. 15-69				7.8	38	◇
4.2.1 Market capitalization, % GDP				9.7	73	○◇	7.2.4 Creative goods exports, % total trade				0.8	50	
4.2.2 Venture capital (VC) investors, deals/bn PPP\$ GDP				0.0	76	○	7.3 Online creativity				27.3	45	
4.2.3 VC recipients, deals/bn PPP\$ GDP				0.0	84	○	7.3.1 Generic top-level domains (TLDs)/th pop. 15-69				5.7	53	
4.2.4 VC received, value, % GDP				0.0	87	○◇	7.3.2 Country-code TLDs/th pop. 15-69				13.7	36	
4.3 Trade, diversification, and market scale				67.5	25		7.3.3 GitHub commits/mn pop. 15-69				19.1	45	
4.3.1 Applied tariff rate, weighted avg., %				1.5	20		7.3.4 Mobile app creation/bn PPP\$ GDP				70.5	53	
4.3.2 Domestic industry diversification				96.5	23								
4.3.3 Domestic market scale, bn PPP\$				731.5	35								

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 Romania.



> Romania has missing data for zero indicators and outdated data for one indicator.

> Outdated data for Romania

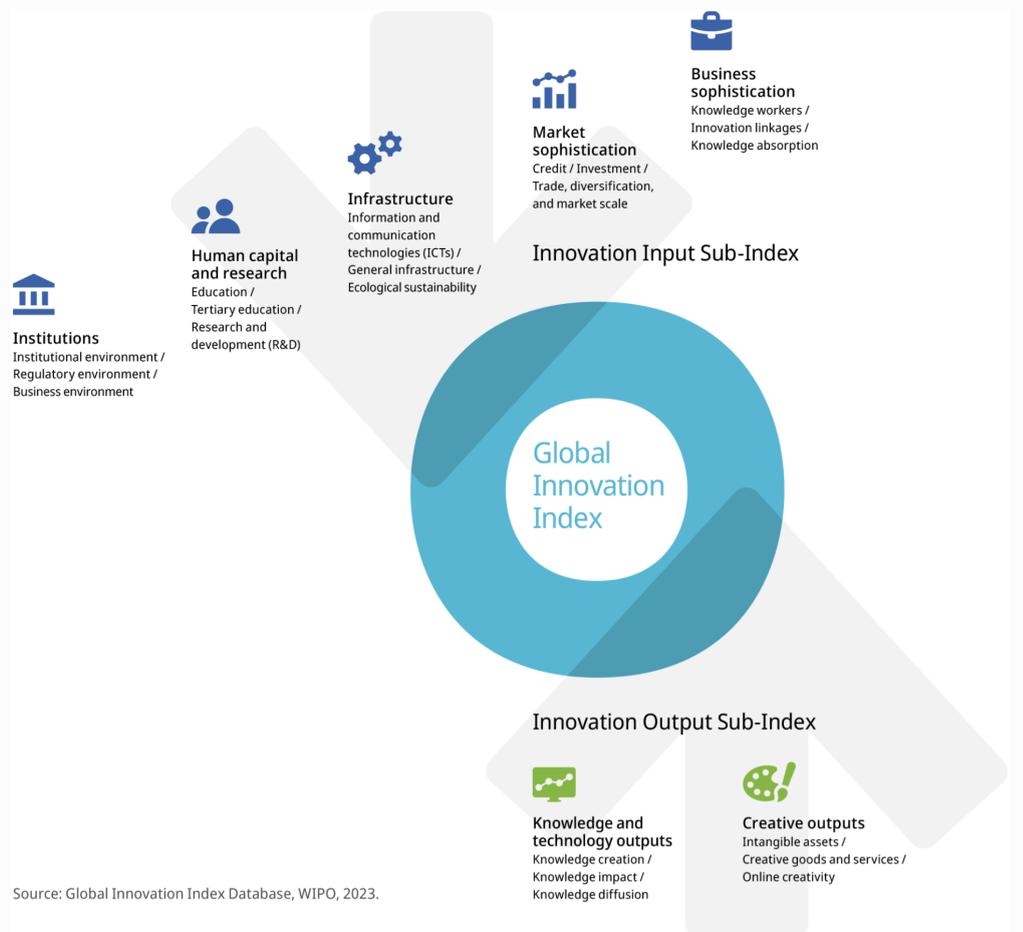
Code	Indicator name	Economy Year	Model Year	Source
2.1.1	Expenditure on education, % GDP	2019	2021	UNESCO Institute for Statistics

Global Innovation Index 2023



→ About the Global Innovation Index

- The Global Innovation Index (GII) is published by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations.
- Recognizing that innovation is a key driver of economic development, the GII aims to provide an innovation ranking and rich analysis referencing around 130 economies. Over the last decade, the GII has established itself as both a leading reference on innovation and a “tool for action” for economies that incorporate the GII into their innovation agendas.



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

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