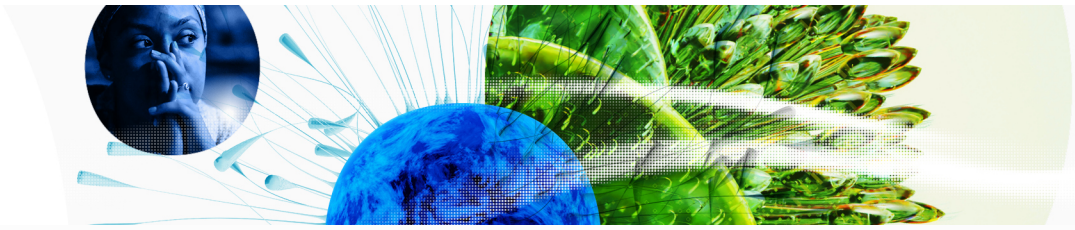
Global Innovation Index 2023



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.

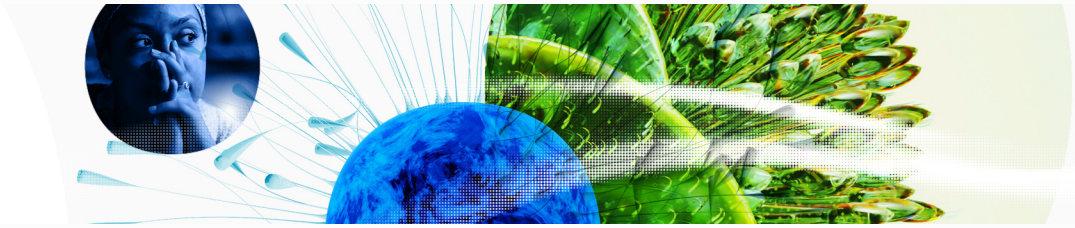
	GII Position	Innovation Inputs	Innovation Outputs
2020	46th	51st	46th
2021	48th	54th	50th
2022	49th	56th	43rd
2023	47th	55th	47th

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.

Global Innovation Index 2023

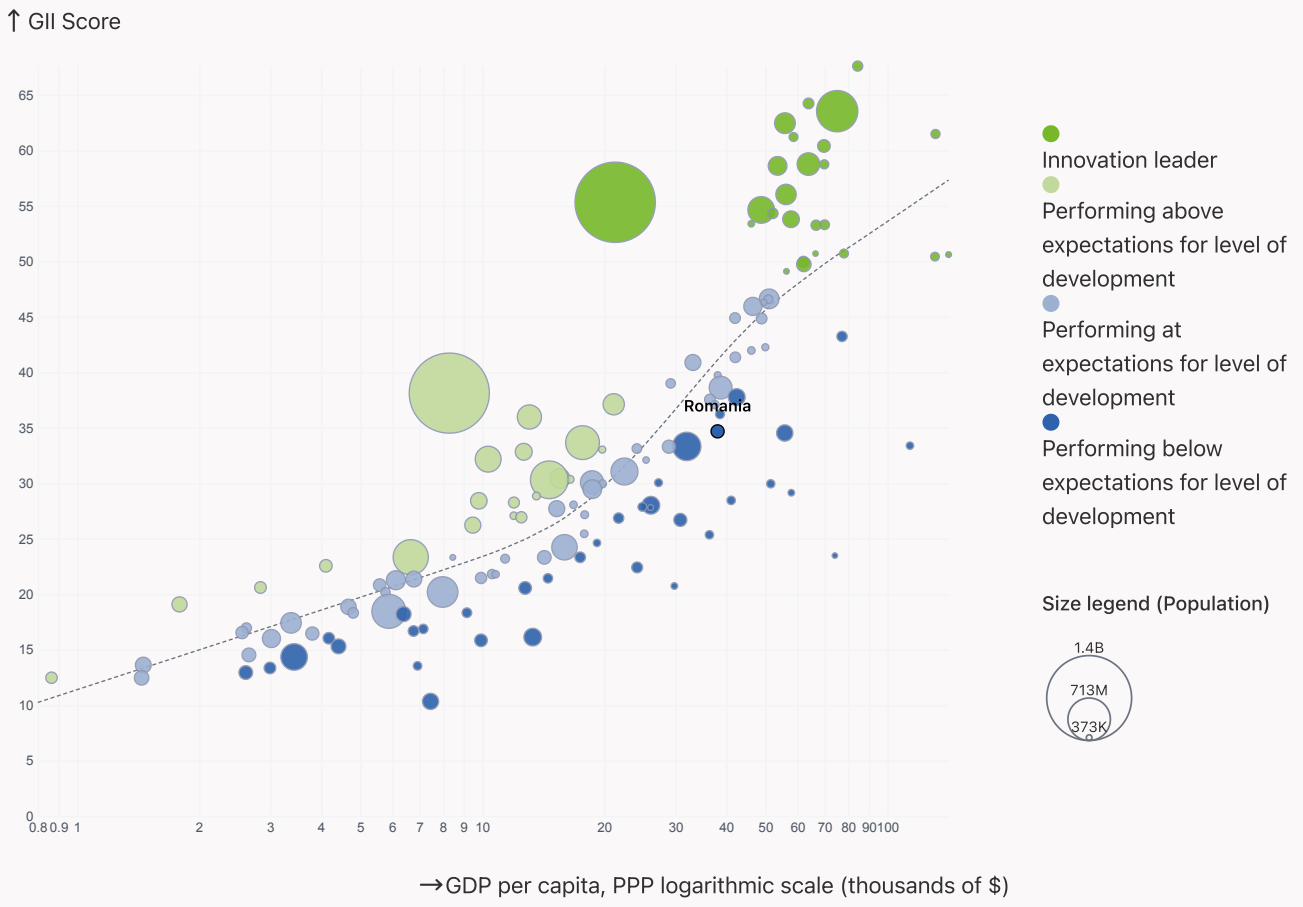


→ Expected vs. observed innovation performance

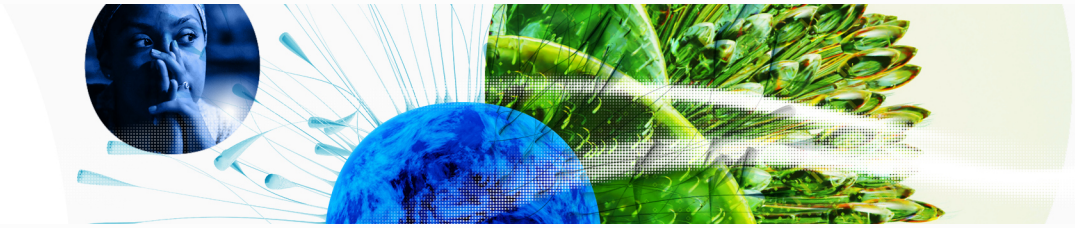
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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



Global Innovation Index 2023

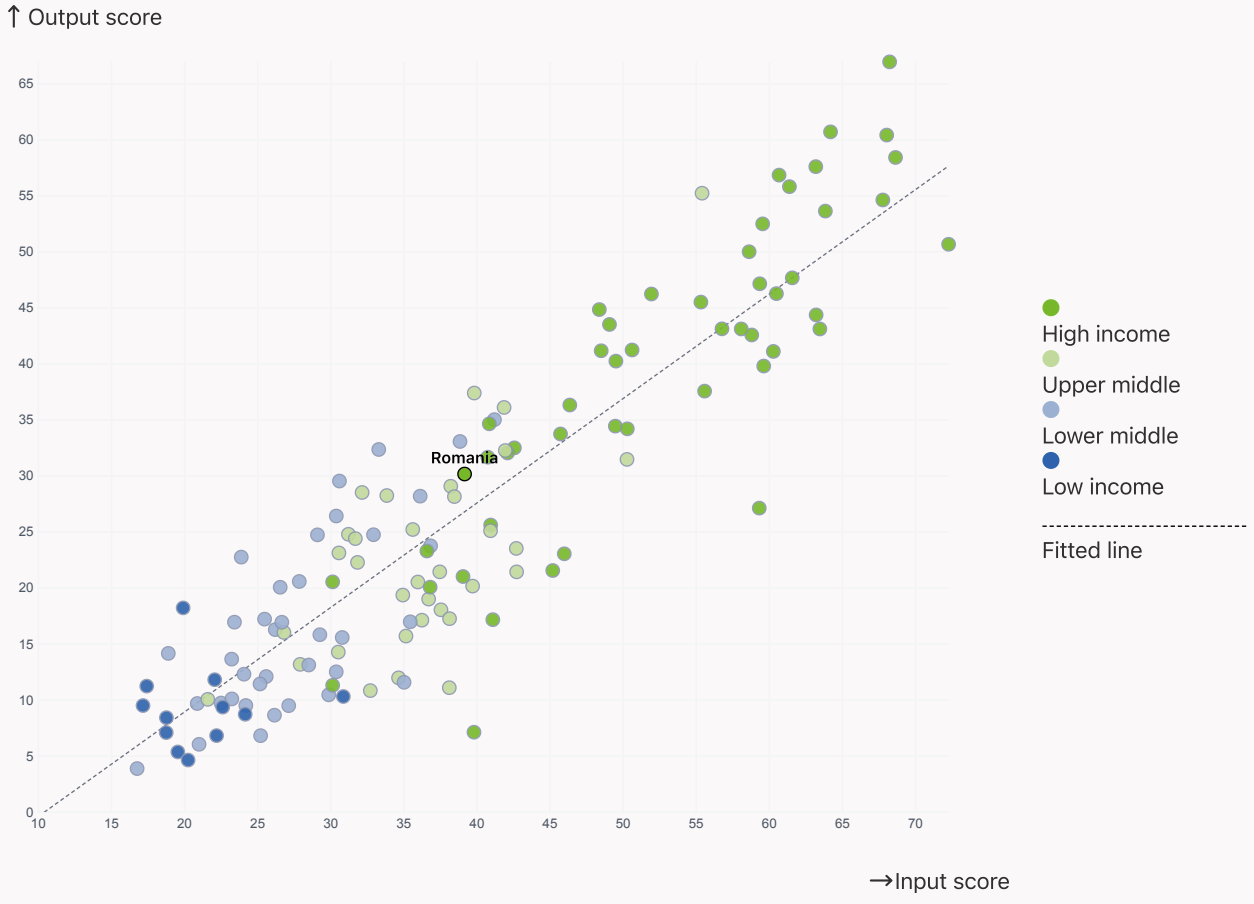


→ Effectively translating innovation investments into innovation outputs

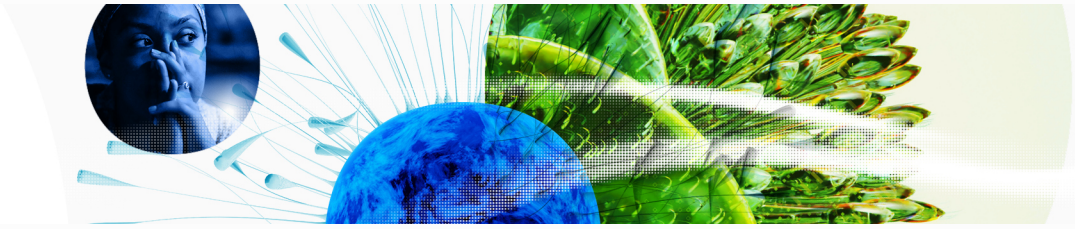
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

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

> Relationship between innovation inputs and outputs

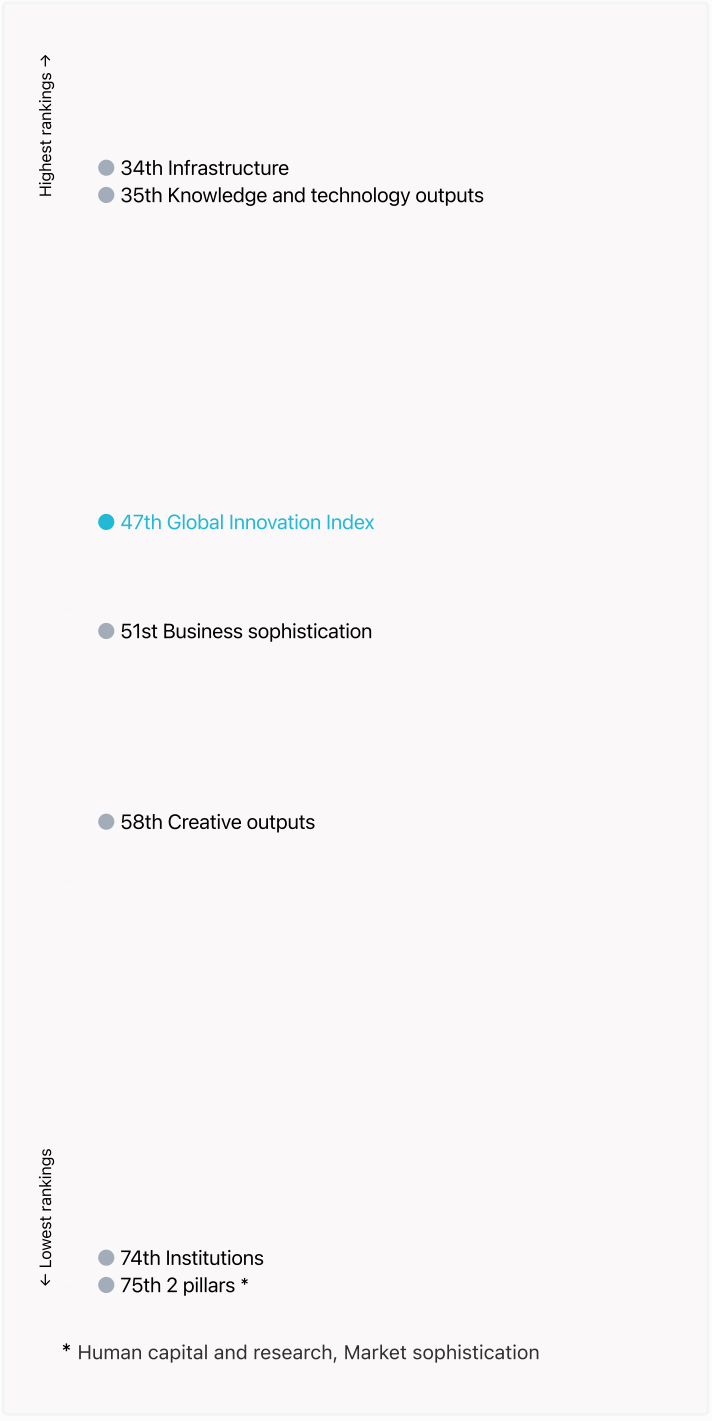


Global Innovation Index 2023



→ 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

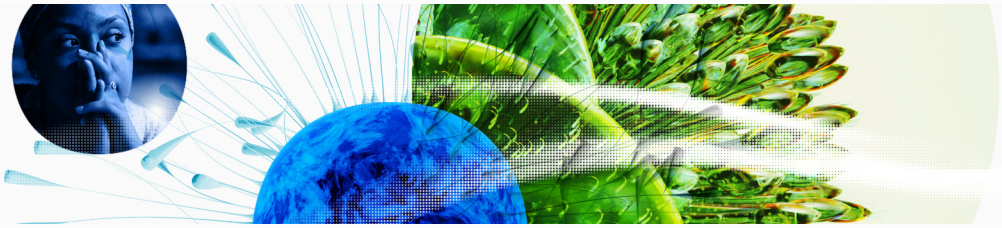
Romania ranks highest in Infrastructure (34th) and Knowledge and technology outputs (35th).

> 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.

Global Innovation Index 2023



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

The charts shows 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

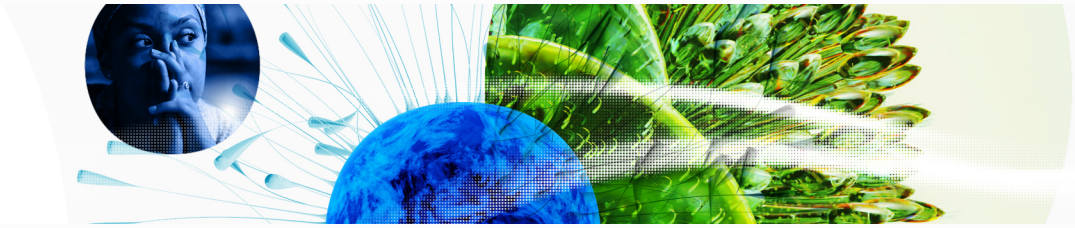
Infrastructure

- 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

Global Innovation Index 2023



→ 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).

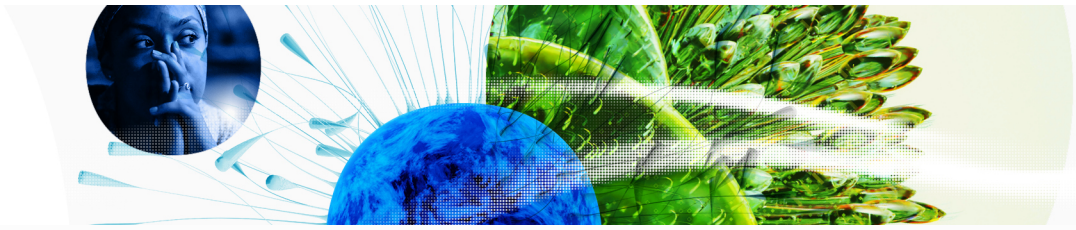
Strengths

Rank	Code	Indicator name
1	1.2.3	Cost of redundancy dismissal
8	3.3.3	ISO 14001 environment/bn PPP$ GDP
10	6.2.1	Labor productivity growth, %
11	4.1.3	Loans from microfinance institutions, % GDP
12	7.2.1	Cultural and creative services exports, % total trade
12	6.3.4	ICT services exports, % total trade
15	6.3.5	ISO 9001 quality/bn PPP$ GDP
18	5.3.3	ICT services imports, % total trade
19	6.3.2	Production and export complexity
21	3.3.1	GDP/unit of energy use

Weaknesses

Rank	Code	Indicator name
108	4.1.2	Domestic credit to private sector, % GDP
87	4.2.4	VC received, value, % GDP
84	4.2.3	VC recipients, deals/bn PPP$ GDP
80	5.1.2	Firms offering formal training, %
76	1.3.2	Entrepreneurship policies and culture
76	4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP
73	4.2.1	Market capitalization, % 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$

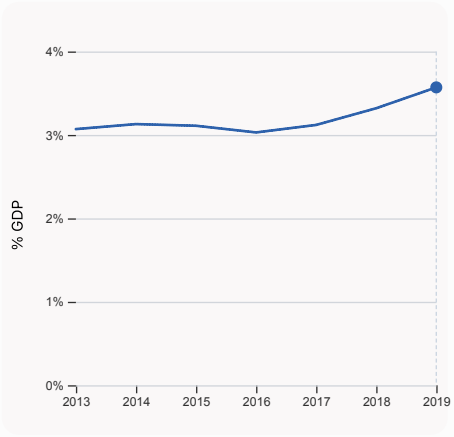
Global Innovation Index 2023



→ Romania's innovation system

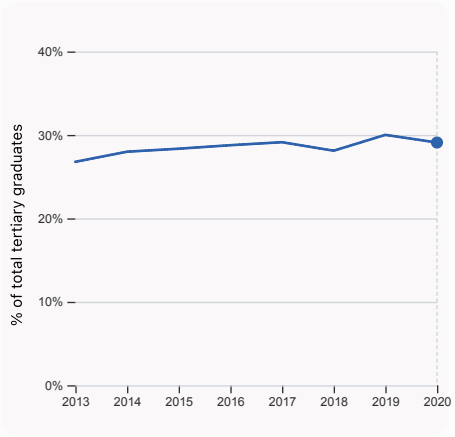
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Romania



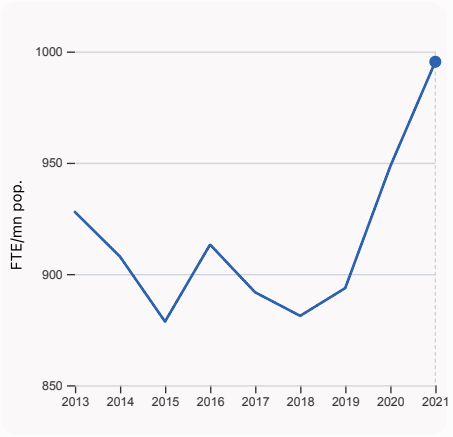
2.1.1 Expenditure on education, % GDP

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.



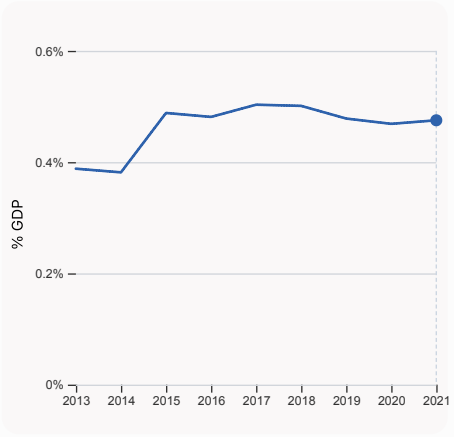
2.2.2 Graduates in science and engineering, %

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.



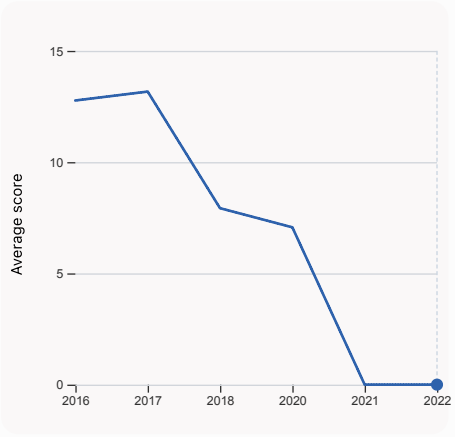
2.3.1 Researchers, FTE/mn pop.

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.



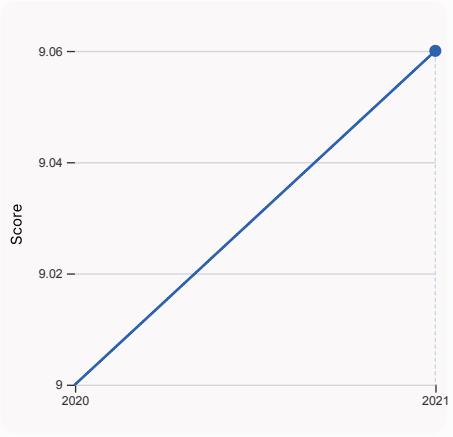
2.3.2 Gross expenditure on R&D, % GDP

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

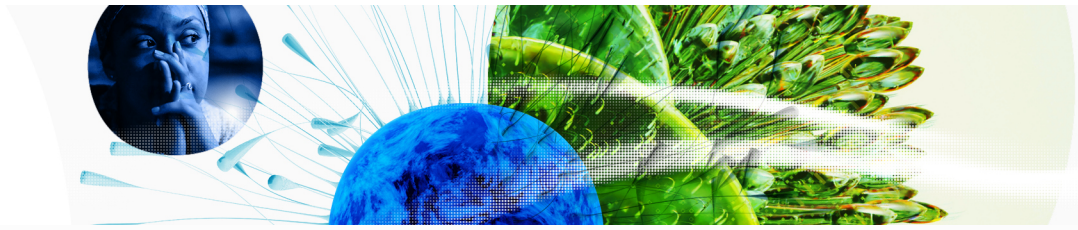
was equal to an average score of 0 for the top 3 universities in 2022, equivalent to an indicator rank of 71.

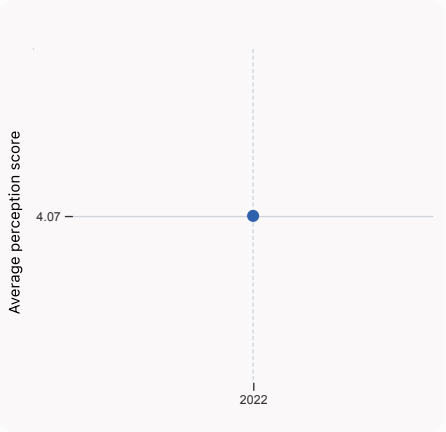


3.1.1 ICT access

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.

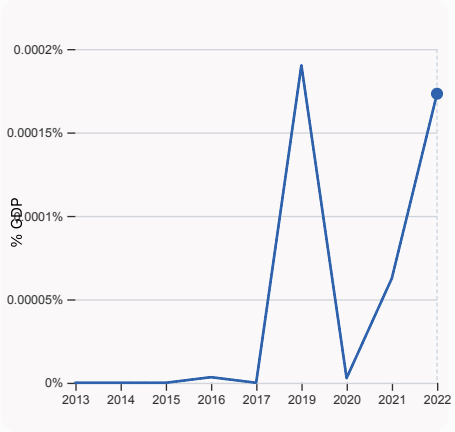
Global Innovation Index 2023





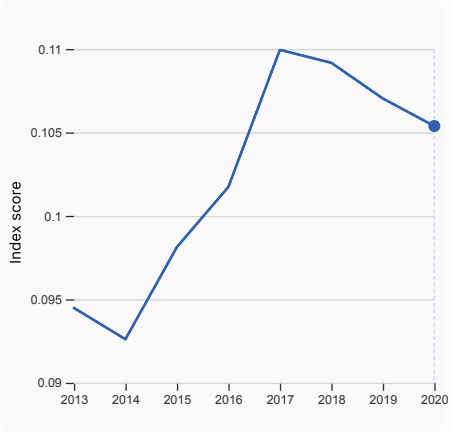
4.1.1 Finance for startups and scaleups

was equal to an average perception score of 4.07 in 2022, equivalent to an indicator rank of 58.



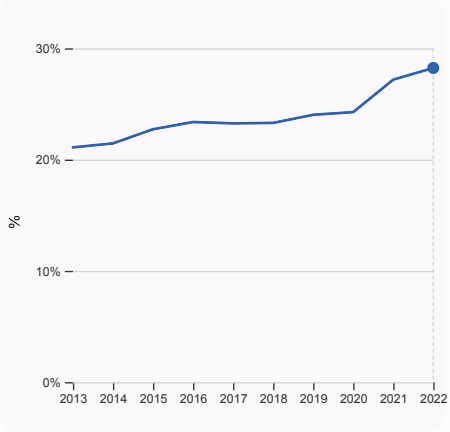
4.2.4 VC received, value, % GDP

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

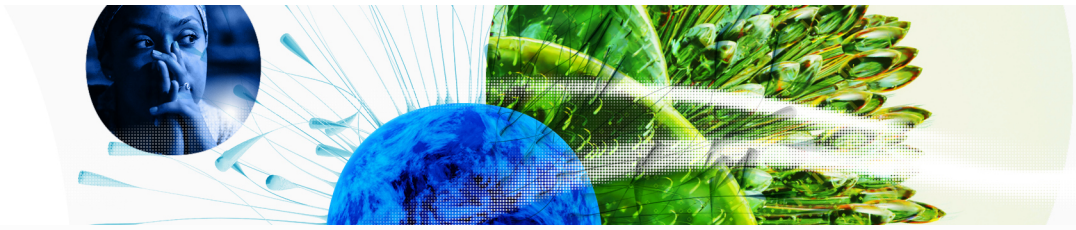
was equal to an index score of 0.105 in 2020, down by 1.54% from the year prior – and equivalent to an indicator rank of 23.



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.

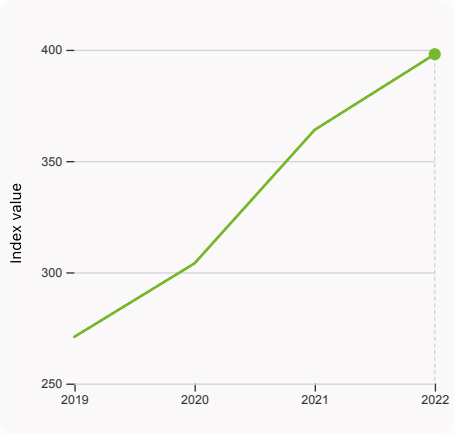
Global Innovation Index 2023



> Innovation outputs in Romania

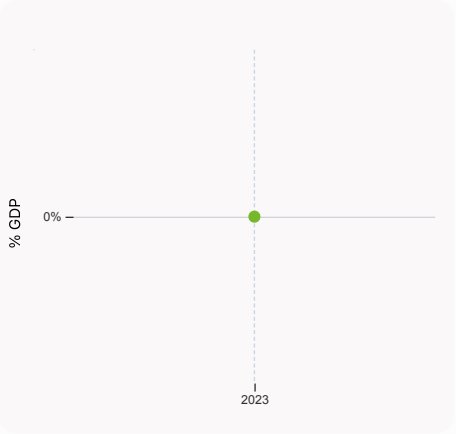
6.1.1 Patents by origin

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



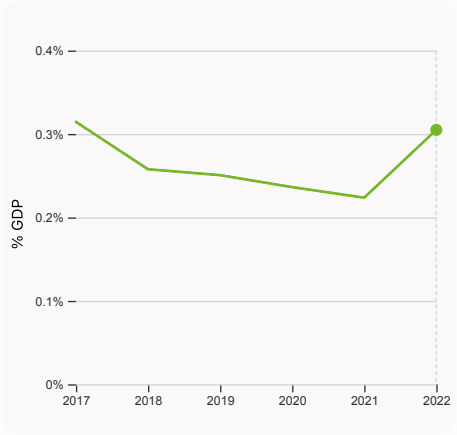
6.1.5 Citable documents H-index

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.



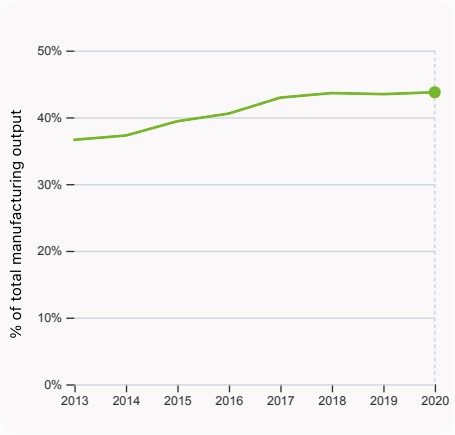
6.2.2 Unicorn valuation, % GDP

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.



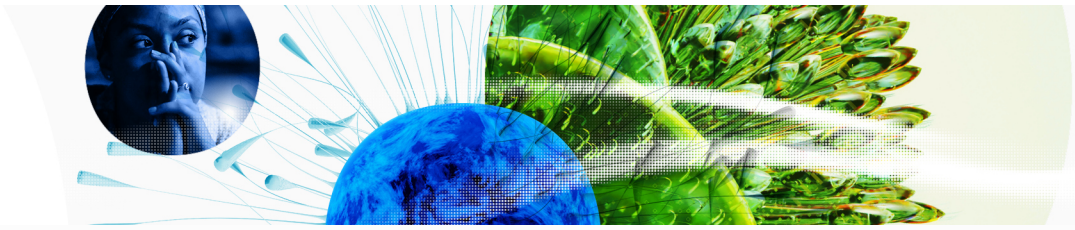
6.2.4 High-tech manufacturing, %

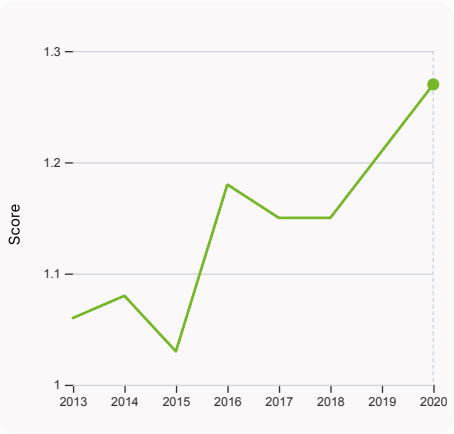
was equal to 43.75% of total manufacturing output in 2020, up by 0.28 percentage points from the year prior – and equivalent to an indicator rank of 21.

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.

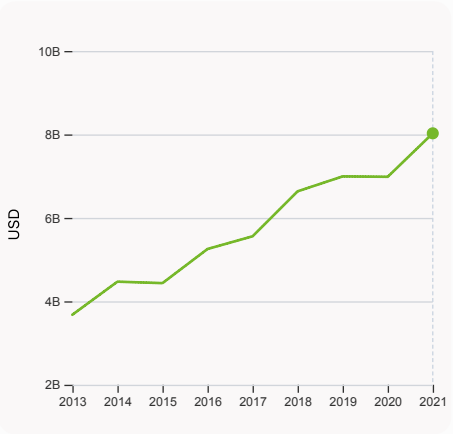
Global Innovation Index 2023





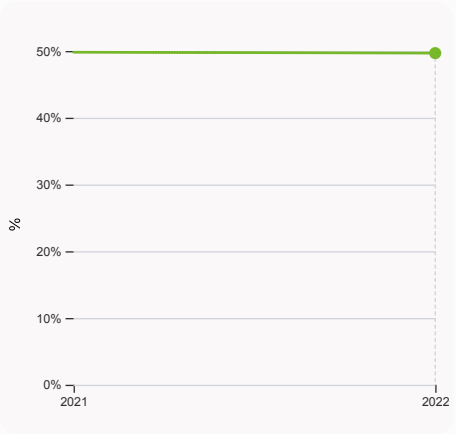
6.3.2 **Production and export complexity**

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.



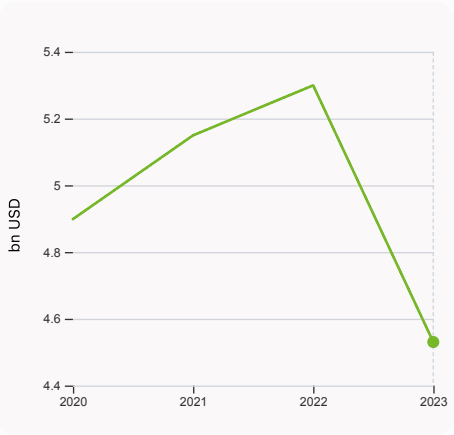
6.3.3 **High-tech exports**

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.



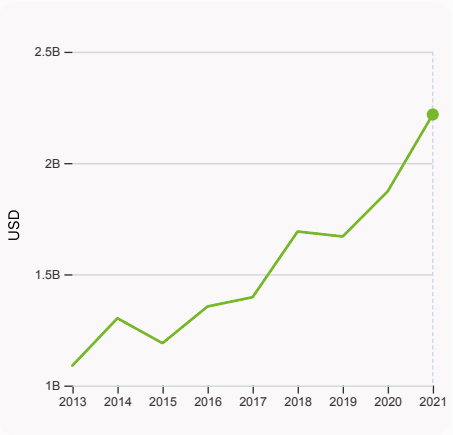
7.1.1 **Intangible asset intensity, top 15, %**

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.



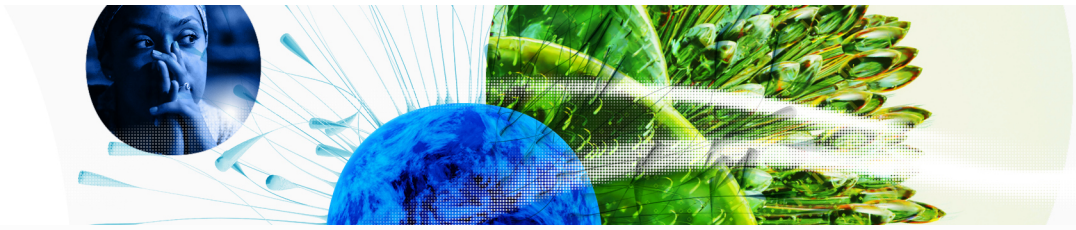
7.2.1 **Cultural and creative services exports**

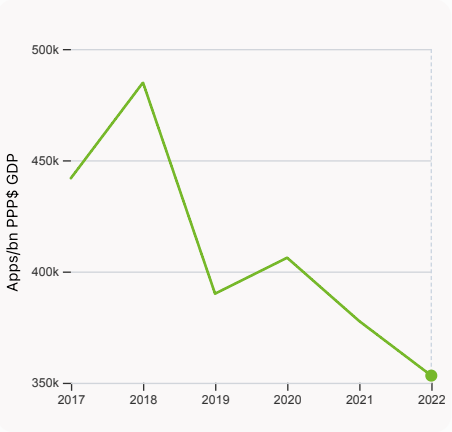
was equal to 2,218,133,000 USD in 2021, up by 18.44% from the year prior – and equivalent to an indicator rank of 12.

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.

Global Innovation Index 2023

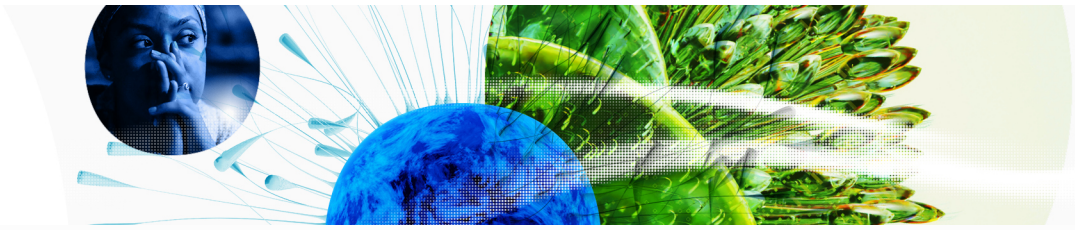




7.3.4 Mobile app creation/bn PPP$ GDP

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.

Global Innovation Index 2023



→ 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

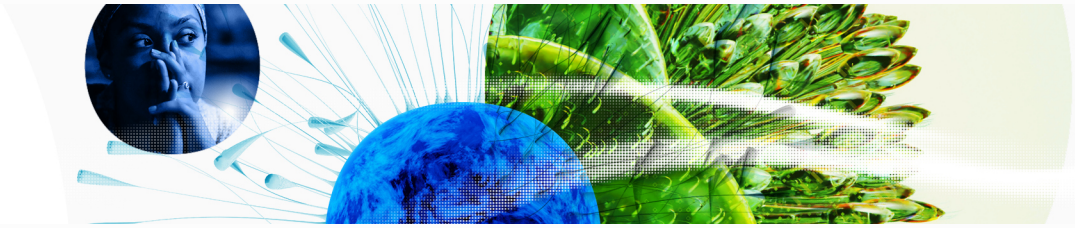
Source: Brand Finance (https://brandirectory.com/reports/gift-2022).
Note: Brand Finance only provides within economy ranks.

> 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.

Global Innovation Index 2023



Romania

GII 2023 rank **47**

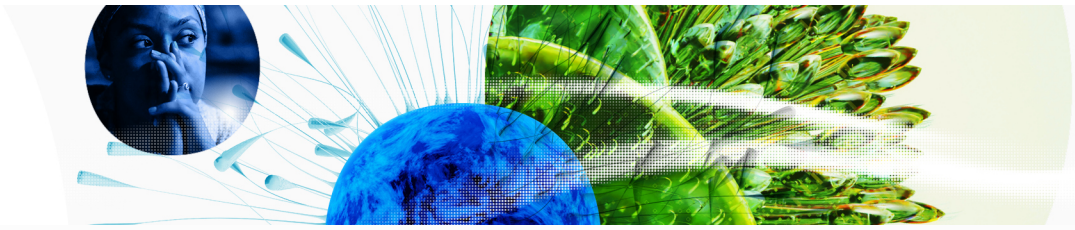
Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
47	55	High	EUR	19.7	731.5	38,096.8

	Score / Value	Rank
Institutions	**47.6**	**74** ◇
1.1 Institutional environment	**44.4**	**70** ◇
1.1.1 Operational stability for businesses*	55.6	56 ◇
1.1.2 Government effectiveness*	33.2	79 ◇
1.2 Regulatory environment	**75.4**	**33**
1.2.1 Regulatory quality*	50.1	55 ◇
1.2.2 Rule of law*	51.7	46 ◇
1.2.3 Cost of redundancy dismissal	8.0	1 ●
1.3 Business environment	**22.9**	**115** ◇
1.3.1 Policies for doing business†	32.2	102 ◇
1.3.2 Entrepreneurship policies and culture†	13.7	76 ○ ◇
Human capital and research	**29.1**	**75** ◇
2.1 Education	**46.8**	**77** ◇
2.1.1 Expenditure on education, % GDP	3.6	87
2.1.2 Government funding/pupil, secondary, % GDP/cap	20.0	54
2.1.3 School life expectancy, years	14.3	68 ◇
2.1.4 PISA scales in reading, maths and science	427.8	49 ◇
2.1.5 Pupil-teacher ratio, secondary	11.7	50
2.2 Tertiary education	**35.8**	**43**
2.2.1 Tertiary enrolment, % gross	53.2	66
2.2.2 Graduates in science and engineering, %	29.1	23
2.2.3 Tertiary inbound mobility, %	6.0	42
2.3 Research and development (R&D)	**4.6**	**77** ◇
2.3.1 Researchers, FTE/mn pop.	995.4	52 ◇
2.3.2 Gross expenditure on R&D, % GDP	0.5	61 ◇
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	**54.5**	**34**
3.1 Information and communication technologies (ICTs)	**74.0**	**53**
3.1.1 ICT access*	86.0	46
3.1.2 ICT use*	83.5	49
3.1.3 Government's online service*	64.8	69 ◇
3.1.4 E-participation*	61.6	54
3.2 General infrastructure	**30.6**	**52** ◇
3.2.1 Electricity output, GWh/mn pop.	3,082.9	65 ◇
3.2.2 Logistics performance*	50.0	50 ◇
3.2.3 Gross capital formation, % GDP	27.8	33
3.3 Ecological sustainability	**58.9**	**6**
3.3.1 GDP/unit of energy use	15.7	21 ●
3.3.2 Environmental performance*	62.9	29
3.3.3 ISO 14001 environment/bn PPP$ GDP	9.5	8 ●
Market sophistication	**32.8**	**75**
4.1 Credit	**28.4**	**68** ◇
4.1.1 Finance for startups and scaleups†	39.3	58 ◇
4.1.2 Domestic credit to private sector, % GDP	25.8	108 ○ ◇
4.1.3 Loans from microfinance institutions, % GDP	3.2	11 ●
4.2 Investment	**2.5**	**98** ◇
4.2.1 Market capitalization, % GDP	9.7	73 ○ ◇
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	0.0	76 ○
4.2.3 VC recipients, deals/bn PPP$ GDP	0.0	84 ○
4.2.4 VC received, value, % GDP	0.0	87 ○ ◇
4.3 Trade, diversification, and market scale	**67.5**	**25**
4.3.1 Applied tariff rate, weighted avg., %	1.5	20
4.3.2 Domestic industry diversification	96.5	23
4.3.3 Domestic market scale, bn PPP$	731.5	35

	Score / Value	Rank
Business sophistication	**32.1**	**51**
5.1 Knowledge workers	**35.6**	**59**
5.1.1 Knowledge-intensive employment, %	28.2	50 ◇
5.1.2 Firms offering formal training, %	20.5	80 ○ ◇
5.1.3 GERD performed by business, % GDP	0.3	48
5.1.4 GERD financed by business, %	55.6	21
5.1.5 Females employed w/advanced degrees, %	13.3	57 ◇
5.2 Innovation linkages	**17.9**	**86** ◇
5.2.1 University-industry R&D collaboration†	38.2	79 ◇
5.2.2 State of cluster development†	38.1	76 ◇
5.2.3 GERD financed by abroad, % GDP	0.1	49
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	87
5.2.5 Patent families/bn PPP$ GDP	0.0	66
5.3 Knowledge absorption	**42.7**	**37**
5.3.1 Intellectual property payments, % total trade	0.9	43
5.3.2 High-tech imports, % total trade	10.1	35
5.3.3 ICT services imports, % total trade	2.9	18 ●
5.3.4 FDI net inflows, % GDP	2.8	53
5.3.5 Research talent, % in businesses	33.1	39
Knowledge and technology outputs	**33.3**	**35**
6.1 Knowledge creation	**13.5**	**68** ◇
6.1.1 Patents by origin/bn PPP$ GDP	1.2	53
6.1.2 PCT patents by origin/bn PPP$ GDP	0.1	73 ◇
6.1.3 Utility models by origin/bn PPP$ GDP	0.1	57
6.1.4 Scientific and technical articles/bn PPP$ GDP	n/a	n/a
6.1.5 Citable documents H-index	19.8	42
6.2 Knowledge impact	**39.6**	**31**
6.2.1 Labor productivity growth, %	3.3	10 ●
6.2.2 Unicorn valuation, % GDP	0.0	48 ○ ◇
6.2.3 Software spending, % GDP	0.3	43
6.2.4 High-tech manufacturing, %	43.8	21
6.3 Knowledge diffusion	**46.9**	**21**
6.3.1 Intellectual property receipts, % total trade	0.1	58
6.3.2 Production and export complexity	79.2	19 ●
6.3.3 High-tech exports, % total trade	6.5	28
6.3.4 ICT services exports, % total trade	6.7	12 ●
6.3.5 ISO 9001 quality/bn PPP$ GDP	18.3	15 ●
Creative outputs	**26.9**	**58**
7.1 Intangible assets	**32.4**	**62**
7.1.1 Intangible asset intensity, top 15, %	49.7	49
7.1.2 Trademarks by origin/bn PPP$ GDP	38.3	61
7.1.3 Global brand value, top 5,000	1.5	49
7.1.4 Industrial designs by origin/bn PPP$ GDP	1.1	65
7.2 Creative goods and services	**15.5**	**57**
7.2.1 Cultural and creative services exports, % total trade	1.8	12 ●
7.2.2 National feature films/mn pop. 15-69	1.3	55 ◇
7.2.3 Entertainment and media market/th pop. 15-69	7.8	38 ◇
7.2.4 Creative goods exports, % total trade	0.8	50
7.3 Online creativity	**27.3**	**45**
7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	5.7	53
7.3.2 Country-code TLDs/th pop. 15-69	13.7	36
7.3.3 GitHub commits/mn pop. 15-69	19.1	45
7.3.4 Mobile app creation/bn PPP$ GDP	70.5	53

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.

Global Innovation Index 2023



→ Data availability

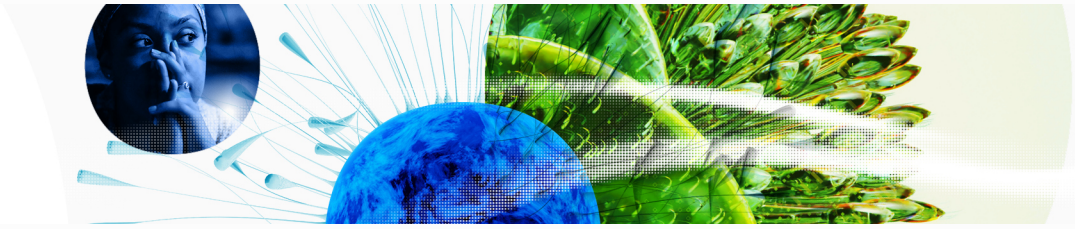
The following tables list indicators that are either missing or outdated for Romania.

> 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.

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.