

Global Innovation Index 2023

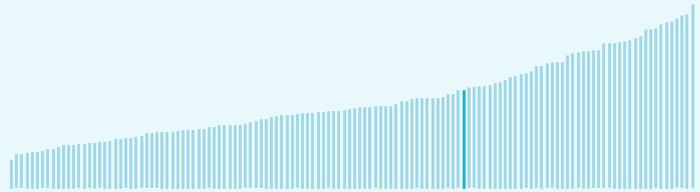


The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

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

Slovakia ranking in the Global Innovation Index 2023

> Slovakia ranks **45th** among the 132 economies featured in the GII 2023.



> Slovakia ranks **39th** among the 50 high-income group economies.



> Slovakia ranks **29th** among the 39 economies in Europe.



> Slovakia GII Ranking (2020-2023)

The table shows the rankings of Slovakia 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 Slovakia in the GII 2023 is between ranks 44 and 46.

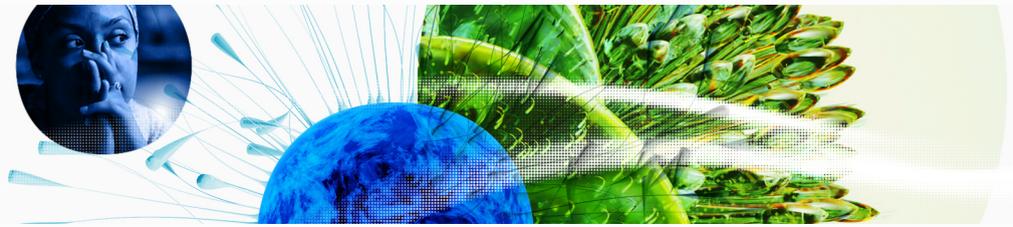
	GII Position	Innovation Inputs	Innovation Outputs
2020	39th	43rd	34th
2021	37th	42nd	35th
2022	46th	54th	45th
2023	45th	51st	45th

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

This year Slovakia ranks 51st in innovation inputs. This position is higher than last year.

Slovakia ranks 45th in innovation outputs. This position is the same as last year.

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→ Expected vs. observed innovation performance

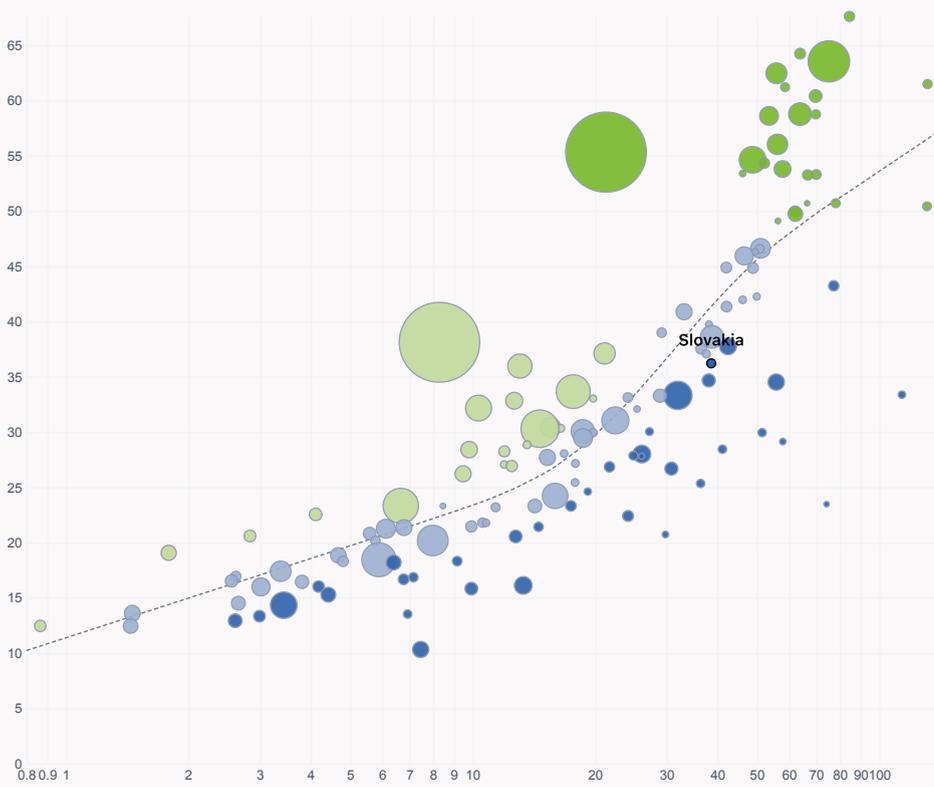
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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



> Relative to GDP, Slovakia'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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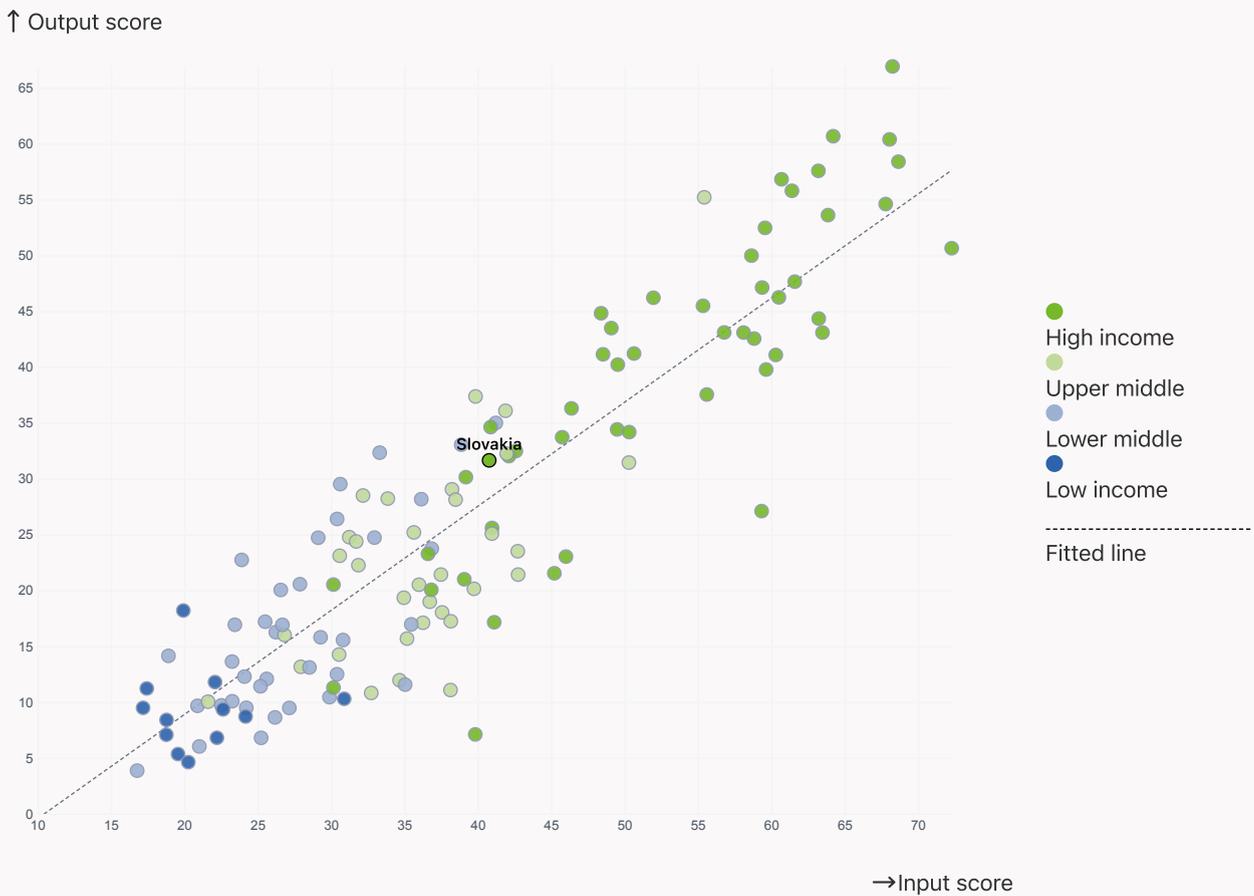
→ Effectively translating innovation investments into innovation outputs

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.



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

> Relationship between innovation inputs and outputs

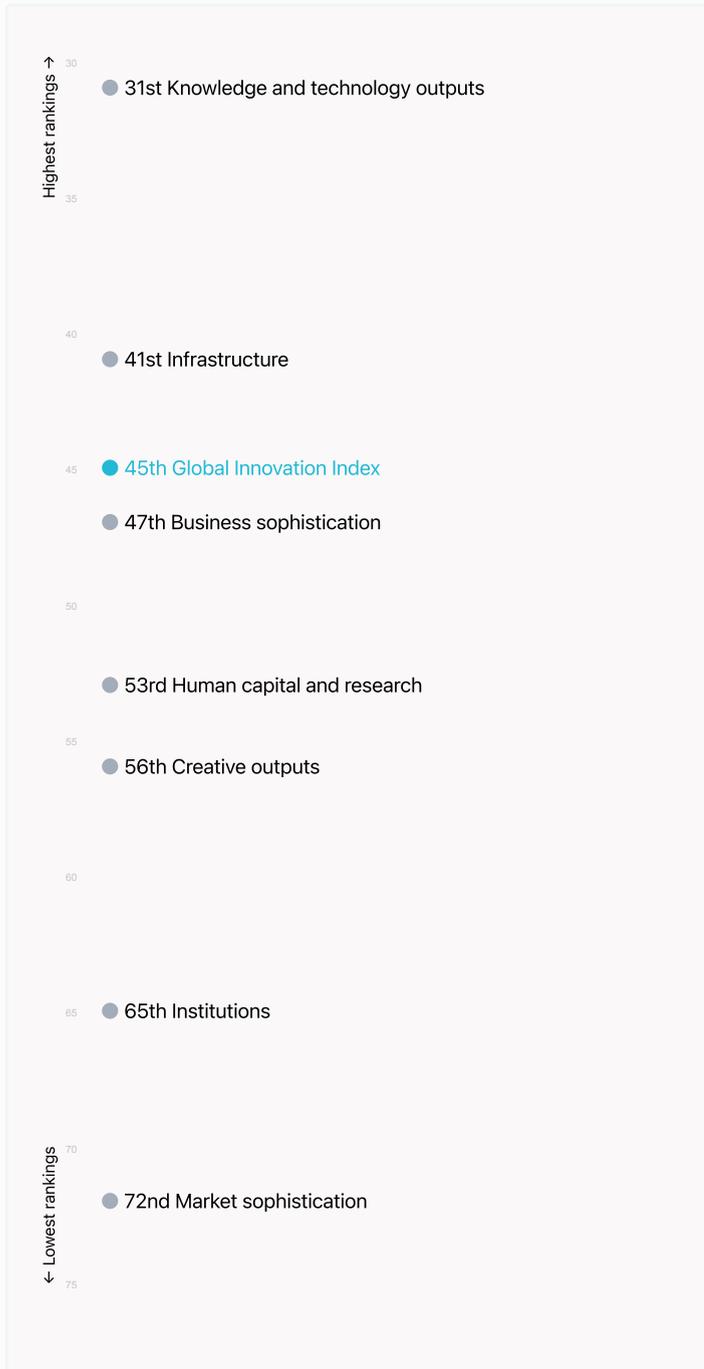


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→ Overview of Slovakia's rankings in the seven areas of the GII in 2023

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



> Highest rankings



Slovakia ranks highest in Knowledge and technology outputs (31st) and Infrastructure (41st).

> Lowest rankings



Slovakia ranks lowest in Market sophistication (72nd), Institutions (65th) and Creative outputs (56th).



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

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

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

> High-Income economies

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



> Europe

Slovakia 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

Slovakia | Score: 34.69

Creative outputs

Top 10 | 56.09

High income | 40.27

Europe | 39.87

Slovakia | 28.58

Business sophistication

Top 10 | 64.39

High income | 46.38

Europe | 44.61

Slovakia | 33.42

Market sophistication

Top 10 | 61.93

High income | 46.42

Europe | 43.65

Slovakia | 33.53

Human capital and research

Top 10 | 60.28

High income | 46.30

Europe | 44.05

Slovakia | 33.95

Infrastructure

Top 10 | 62.83

High income | 55.85

Europe | 54.69

Slovakia | 53.16

Institutions

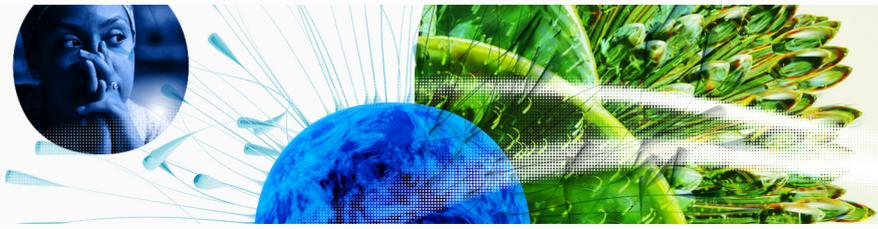
Top 10 | 79.85

High income | 68.16

Europe | 61.69

Slovakia | 49.87

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→ Innovation strengths and weaknesses in Slovakia

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



> Slovakia's main innovation strengths are **High-tech manufacturing, %** (rank 3), **ISO 14001 environment/bn PPP\$ GDP** (rank 7) and **Creative goods exports, % total trade** (rank 8).

Strengths

Weaknesses

Rank	Code	Indicator name	Rank	Code	Indicator name
3	6.2.4	High-tech manufacturing, %	109	5.3.4	FDI net inflows, % GDP
7	3.3.3	ISO 14001 environment/bn PPP\$ GDP	109	1.3.1	Policies for doing business
8	7.2.4	Creative goods exports, % total trade	101	5.2.1	University-industry R&D collaboration
9	6.3.5	ISO 9001 quality/bn PPP\$ GDP	83	4.2.4	VC received, value, % GDP
13	6.3.2	Production and export complexity	82	4.2.3	VC recipients, deals/bn PPP\$ GDP
15	7.2.2	National feature films/mn pop. 15-69	81	1.3.2	Entrepreneurship policies and culture
18	3.3.2	Environmental performance	79	7.1.1	Intangible asset intensity, top 15, %
23	7.3.2	Country-code TLDs/th pop. 15-69	48	6.2.2	Unicorn valuation, % GDP
23	5.3.2	High-tech imports, % total trade	40	2.3.3	Global corporate R&D investors, top 3, mn US\$
24	6.3.3	High-tech exports, % total trade			

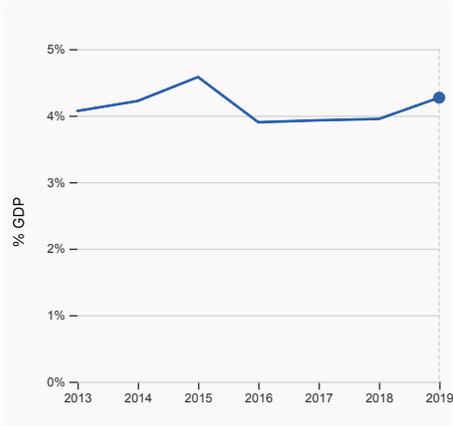
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→ Slovakia's innovation system

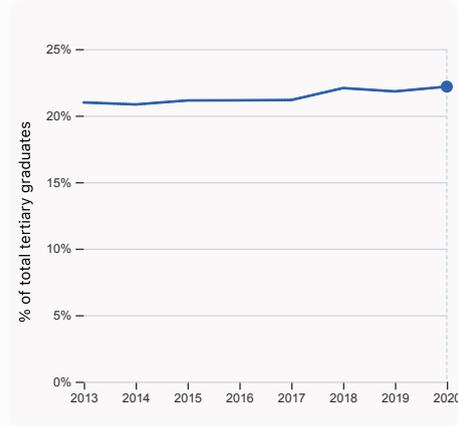
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Slovakia



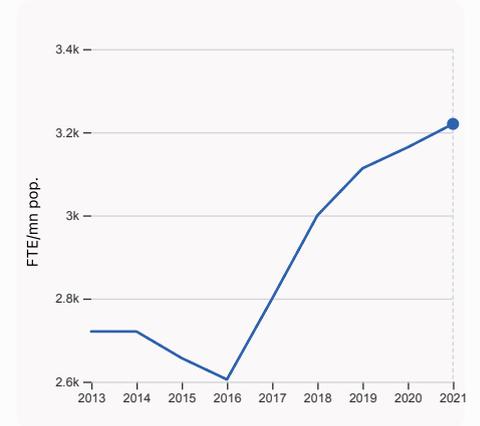
2.1.1 Expenditure on education, % GDP

was equal to 4.27% GDP in 2019, up by 0.32 percentage points from the year prior – and equivalent to an indicator rank of 61.



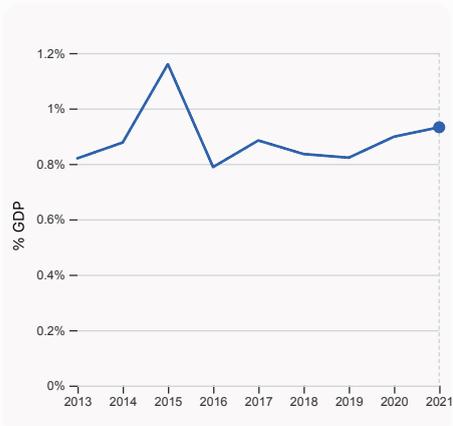
2.2.2 Graduates in science and engineering, %

was equal to 22.18% of total tertiary graduates in 2020, up by 0.36 percentage points from the year prior – and equivalent to an indicator rank of 60.



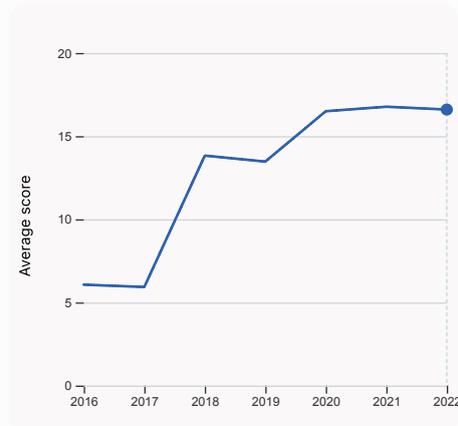
2.3.1 Researchers, FTE/mn pop.

was equal to 3,220.01 FTE/mn pop. in 2021, up by 1.77% from the year prior – and equivalent to an indicator rank of 31.



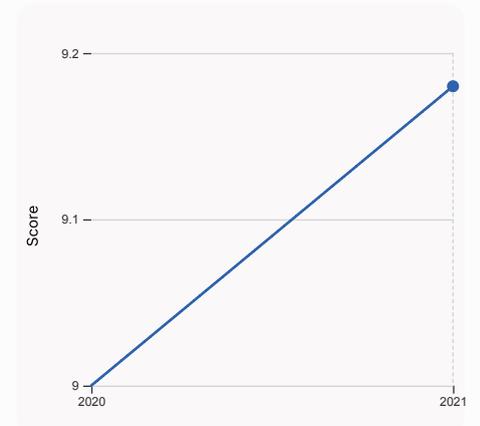
2.3.2 Gross expenditure on R&D, % GDP

was equal to 0.932% GDP in 2021, up by 0.034 percentage points from the year prior – and equivalent to an indicator rank of 44.



2.3.4 QS university ranking, top 3

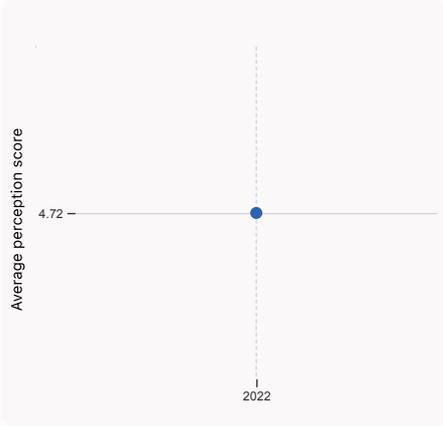
was equal to an average score of 16.6 for the top 3 universities in 2022, down by 1.014% from the year prior – and equivalent to an indicator rank of 58.



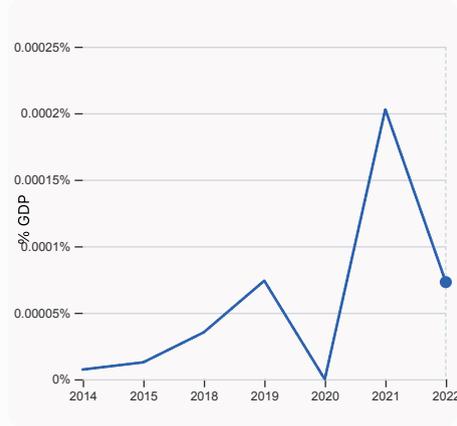
3.1.1 ICT access

was equal to a score of 9.18 in 2021, up by 2% from the year prior – and equivalent to an indicator rank of 35.

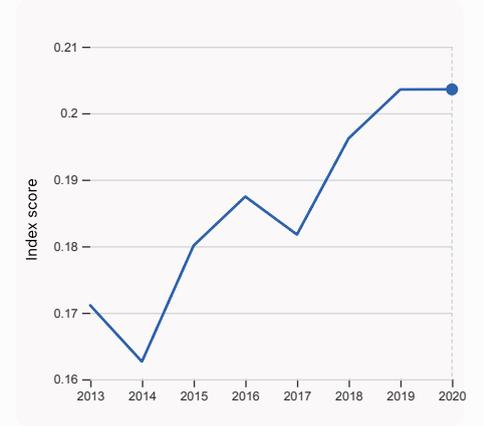
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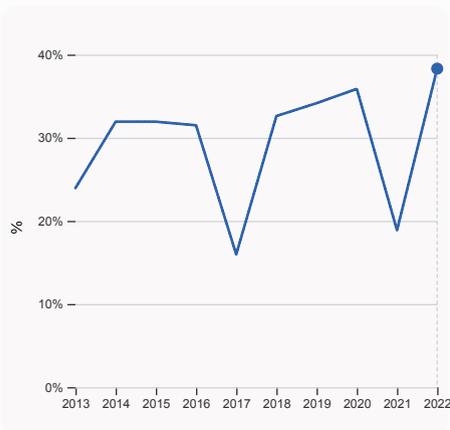
4.1.1 Finance for startups and scaleups was equal to an average perception score of 4.72 in 2022, equivalent to an indicator rank of 42.



4.2.4 VC received, value, % GDP was equal to 0.00007% GDP in 2022, down by 0.00013 percentage points from the year prior – and equivalent to an indicator rank of 83.



4.3.2 Domestic industry diversification was equal to an index score of 0.204 in 2020, up by 0.0086% from the year prior – and equivalent to an indicator rank of 69.

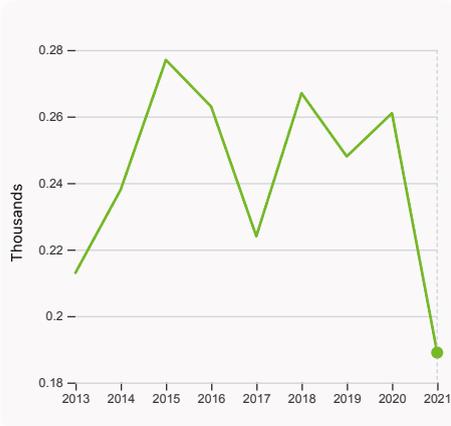


5.1.1 Knowledge-intensive employment, % was equal to 38.31% in 2022, up by 19.43 percentage points from the year prior – and equivalent to an indicator rank of 34.

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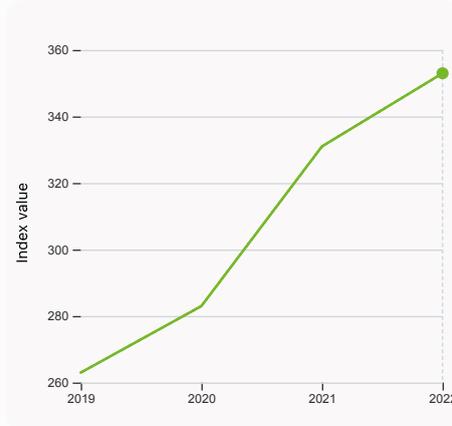


> Innovation outputs in Slovakia



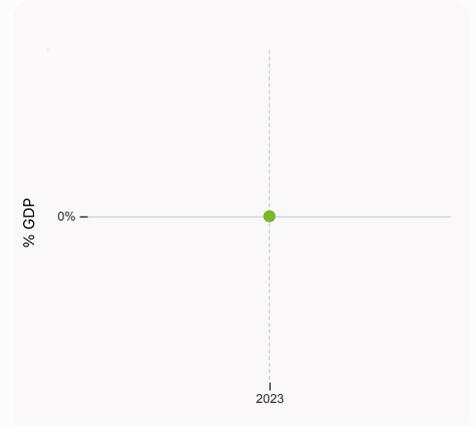
6.1.1 Patents by origin

was equal to 0.19 Thousands in 2021, down by 27.59% from the year prior – and equivalent to an indicator rank of 58.



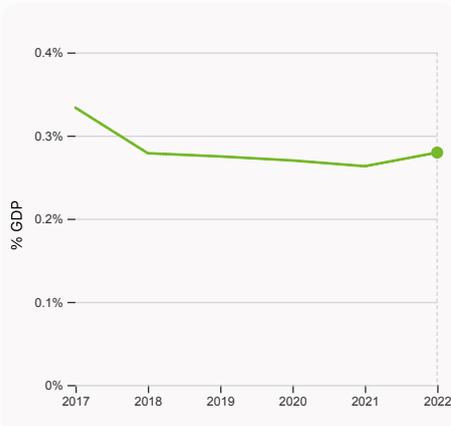
6.1.5 Citable documents H-index

was equal to an index value of 353 in 2022, up by 6.65% from the year prior – and equivalent to an indicator rank of 50.



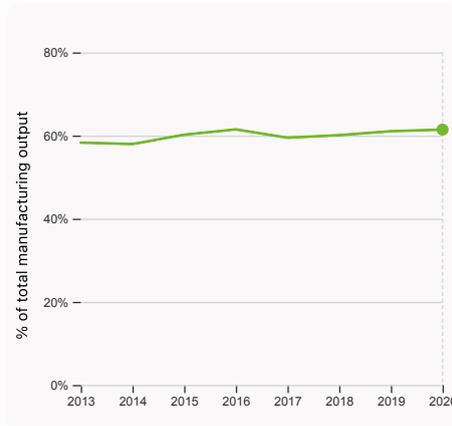
6.2.2 Unicorn valuation, % GDP

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



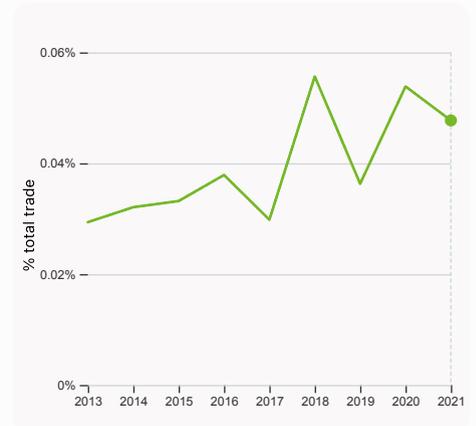
6.2.3 Software spending, % GDP

was equal to 0.28% GDP in 2022, up by 0.016 percentage points from the year prior – and equivalent to an indicator rank of 49.



6.2.4 High-tech manufacturing, %

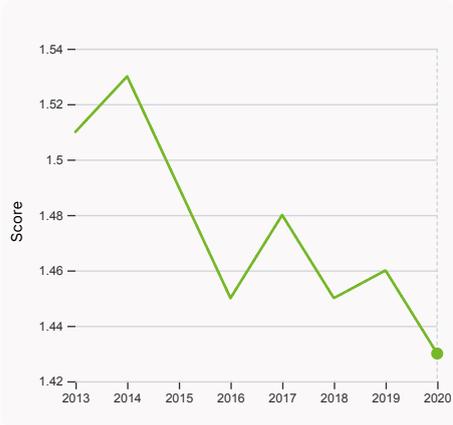
was equal to 61.44% of total manufacturing output in 2020, up by 0.39 percentage points from the year prior – and equivalent to an indicator rank of 3.



6.3.1 Intellectual property receipts, % total trade

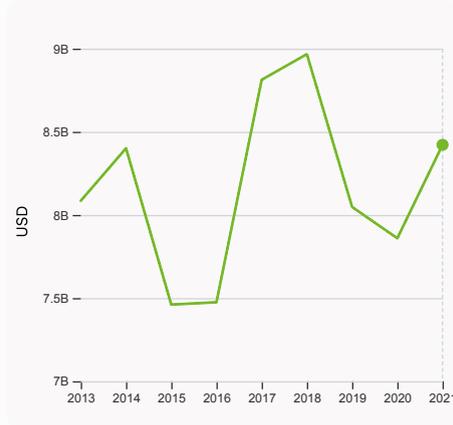
was equal to 0.048% total trade in 2021, down by 0.0061 percentage points from the year prior – and equivalent to an indicator rank of 71.

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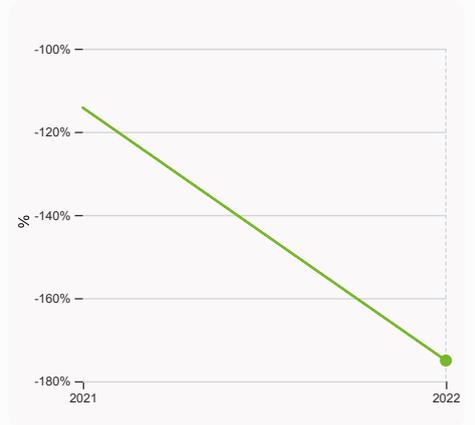
6.3.2 Production and export complexity

was equal to a score of 1.43 in 2020, down by 2.055% from the year prior – and equivalent to an indicator rank of 13.



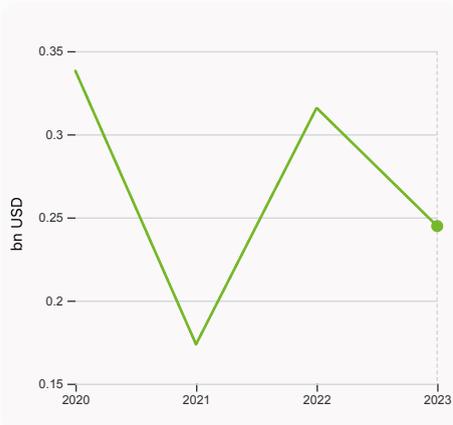
6.3.3 High-tech exports

was equal to 8,421,816,669 USD in 2021, up by 7.15% from the year prior – and equivalent to an indicator rank of 24.



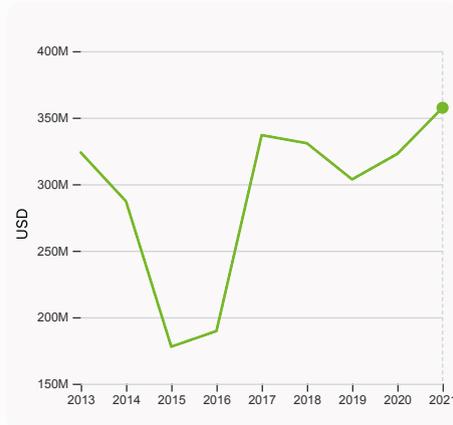
7.1.1 Intangible asset intensity, top 15, %

was equal to -175.016% in 2022, down by 60.81 percentage points from the year prior – and equivalent to an indicator rank of 79.



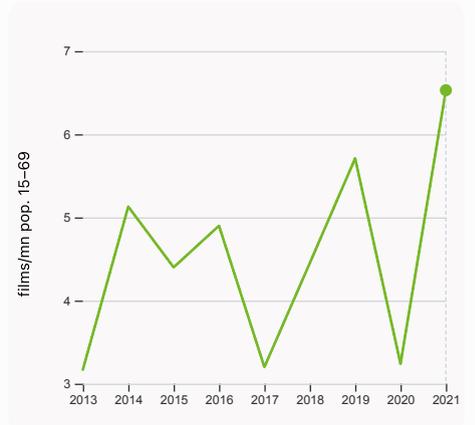
7.1.3 Global brand value, top 5,000

was equal to 0.245 bn USD in 2023, down by 22.5% from the year prior – and equivalent to an indicator rank of 72.



7.2.1 Cultural and creative services exports

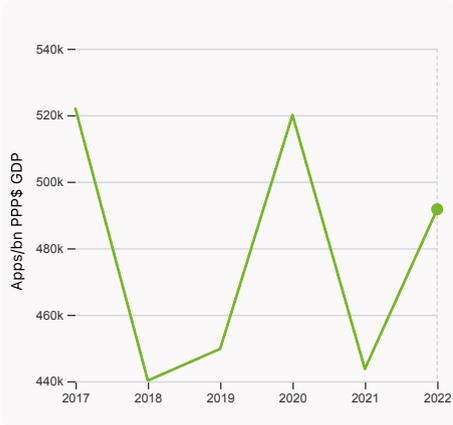
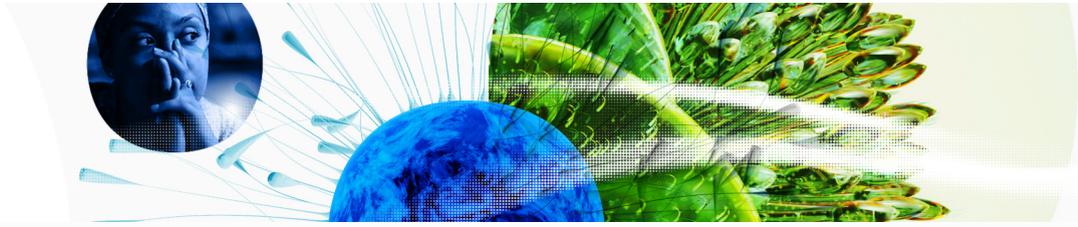
was equal to 357,448,000 USD in 2021, up by 10.74% from the year prior – and equivalent to an indicator rank of 63.



7.2.2 National feature films/mn pop. 15-69

was equal to 6.53 films/mn pop. 15-69 in 2021, up by 101.54% from the year prior – and equivalent to an indicator rank of 15.

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7.3.4 Mobile app creation/bn PPP\$ GDP

was equal to 491,715.49 Apps/bn PPP\$ GDP in 2022, up by 10.82% from the year prior – and equivalent to an indicator rank of 44.



→ Slovakia's innovation top performers

> 2.3.4 QS university ranking of Slovakia's top universities

Rank	University	Score
651-700	COMENIUS UNIVERSITY IN BRATISLAVA	18.50
701-750	PAVOL JOZEF SAFARIK UNIVERSITY IN KOSICE	17.40
801-1000	UNIVERSITY OF ZILNA	13.90

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 Slovakia

Rank	Firm	Intensity, %
1	TATRY MOUNTAIN RESORTS AS	25.09
2	REAL ZA AS	22.02
3	ANACOTT ACQUISITION CORP	47.00

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 Slovakia with highest global brand value

Rank	Brand	Industry	Brand Value, mn USD
1	SLOVNAFT	Oil & Gas	244.8

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

Note: Rank corresponds to within economy ranks.

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GII 2023 rank

45

Slovakia

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
45	51	High	EUR	5.6	211.1	38,620.2
Score / Value Rank				Score / Value Rank		
Institutions 49.9 65 ◇				Business sophistication 33.4 47		
1.1 Institutional environment 61.1 41				5.1 Knowledge workers 47.5 37		
1.1.1 Operational stability for businesses* 70.8 27				5.1.1 Knowledge-intensive employment, % 38.3 34		
1.1.2 Government effectiveness* 51.4 45				5.1.2 Firms offering formal training, % 43.3 28		
1.2 Regulatory environment 70.6 42				5.1.3 GERD performed by business, % GDP 0.5 38		
1.2.1 Regulatory quality* 64.8 33				5.1.4 GERD financed by business, % 43.7 38		
1.2.2 Rule of law* 60.4 38				5.1.5 Females employed w/advanced degrees, % 18.8 36		
1.2.3 Cost of redundancy dismissal 18.8 82				5.2 Innovation linkages 18.9 82 ◇		
1.3 Business environment 17.9 124 ○ ◇				5.2.1 University-industry R&D collaboration+ 28.2 101 ○ ◇		
1.3.1 Policies for doing business+ 28.2 109 ○ ◇				5.2.2 State of cluster development+ 38.6 74 ◇		
1.3.2 Entrepreneurship policies and culture+ 7.6 81 ○ ◇				5.2.3 GERD financed by abroad, % GDP 0.1 30		
Human capital and research 33.9 53 ◇				5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP 0.0 93		
2.1 Education 53.5 61				5.2.5 Patent families/bn PPP\$ GDP 0.2 48		
2.1.1 Expenditure on education, % GDP ● 4.3 61				5.3 Knowledge absorption 33.9 63		
2.1.2 Government funding/pupil, secondary, % GDP/cap 21.7 42				5.3.1 Intellectual property payments, % total trade 0.7 54		
2.1.3 School life expectancy, years 14.6 65 ◇				5.3.2 High-tech imports, % total trade 11.4 23 ● ◆		
2.1.4 PISA scales in reading, maths and science 469.4 38				5.3.3 ICT services imports, % total trade 1.2 70		
2.1.5 Pupil-teacher ratio, secondary 11.1 42				5.3.4 FDI net inflows, % GDP 0.6 109 ○		
2.2 Tertiary education 31.7 62				5.3.5 Research talent, % in businesses 27.2 47		
2.2.1 Tertiary enrolment, % gross 47.6 68 ◇				Knowledge and technology outputs 34.7 31		
2.2.2 Graduates in science and engineering, % 22.2 60				6.1 Knowledge creation 22.1 48		
2.2.3 Tertiary inbound mobility, % 10.3 25				6.1.1 Patents by origin/bn PPP\$ GDP 1.0 58		
2.3 Research and development (R&D) 16.7 47				6.1.2 PCT patents by origin/bn PPP\$ GDP 0.2 46		
2.3.1 Researchers, FTE/mn pop. 3,220.0 31				6.1.3 Utility models by origin/bn PPP\$ GDP 1.3 18 ◆		
2.3.2 Gross expenditure on R&D, % GDP 0.9 44				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 17.3 50		
2.3.4 QS university ranking, top 3* 16.8 58				6.2 Knowledge impact 39.7 30		
Infrastructure 53.2 41				6.2.1 Labor productivity growth, % 1.1 60		
3.1 Information and communication technologies (ICTs) 71.7 61 ◇				6.2.2 Unicorn valuation, % GDP 0.0 48 ○ ◇		
3.1.1 ICT access* 87.9 35				6.2.3 Software spending, % GDP 0.3 49		
3.1.2 ICT use* 83.7 46				6.2.4 High-tech manufacturing, % 61.4 3 ● ◆		
3.1.3 Government's online service* 69.7 62				6.3 Knowledge diffusion 42.3 28		
3.1.4 E-participation* 45.3 81 ◇				6.3.1 Intellectual property receipts, % total trade 0.0 71		
3.2 General infrastructure 32.0 50				6.3.2 Production and export complexity 82.5 13 ● ◆		
3.2.1 Electricity output, GWh/mn pop. 5,397.2 44				6.3.3 High-tech exports, % total trade 7.9 24 ● ◆		
3.2.2 Logistics performance* 54.5 42				6.3.4 ICT services exports, % total trade 1.8 62		
3.2.3 Gross capital formation, % GDP 20.5 96				6.3.5 ISO 9001 quality/bn PPP\$ GDP 21.2 9 ● ◆		
3.3 Ecological sustainability 55.8 11 ● ◆				Creative outputs 28.6 56		
3.3.1 GDP/unit of energy use 10.1 64				7.1 Intangible assets 19.2 87 ◇		
3.3.2 Environmental performance* 69.7 18 ● ◆				7.1.1 Intangible asset intensity, top 15, % -175.0 79 ○ ◇		
3.3.3 ISO 14001 environment/bn PPP\$ GDP 9.5 7 ● ◆				7.1.2 Trademarks by origin/bn PPP\$ GDP 61.7 36		
Market sophistication 33.5 72				7.1.3 Global brand value, top 5,000 0.2 72 ◇		
4.1 Credit 38.6 43				7.1.4 Industrial designs by origin/bn PPP\$ GDP 2.5 39		
4.1.1 Finance for startups and scaleups+ 53.3 42				7.2 Creative goods and services 43.2 10 ● ◆		
4.1.2 Domestic credit to private sector, % GDP 66.2 56				7.2.1 Cultural and creative services exports, % total trade 0.3 63		
4.1.3 Loans from microfinance institutions, % GDP n/a n/a				7.2.2 National feature films/mn pop. 15-69 6.5 15 ● ◆		
4.2 Investment 2.7 95 ○ ◇				7.2.3 Entertainment and media market/th pop. 15-69 n/a n/a		
4.2.1 Market capitalization, % GDP ● 5.6 74				7.2.4 Creative goods exports, % total trade 6.9 8 ● ◆		
4.2.2 Venture capital (VC) investors, deals/bn PPP\$ GDP 0.0 58				7.3 Online creativity 32.6 37		
4.2.3 VC recipients, deals/bn PPP\$ GDP 0.0 82 ○				7.3.1 Generic top-level domains (TLDs)/th pop. 15-69 3.7 63 ◇		
4.2.4 VC received, value, % GDP 0.0 83 ○ ◇				7.3.2 Country-code TLDs/th pop. 15-69 32.6 23 ● ◆		
4.3 Trade, diversification, and market scale 59.2 60				7.3.3 GitHub commits/mn pop. 15-69 22.4 40		
4.3.1 Applied tariff rate, weighted avg., % 1.5 20				7.3.4 Mobile app creation/bn PPP\$ GDP 71.9 44		
4.3.2 Domestic industry diversification 82.8 69						
4.3.3 Domestic market scale, bn PPP\$ 211.1 67						

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 Slovakia.



> Slovakia has missing data for two indicators and outdated data for two indicators.

> Missing data for Slovakia

Code	Indicator name	Economy Year	Model Year	Source
4.1.3	Loans from microfinance institutions, % GDP	n/a	2021	International Monetary Fund, Financial Access Survey (FAS)
7.2.3	Entertainment and media market/th pop. 15-69	n/a	2022	PwC, GEMO; United Nations, World Population Prospects; International Monetary Fund

> Outdated data for Slovakia

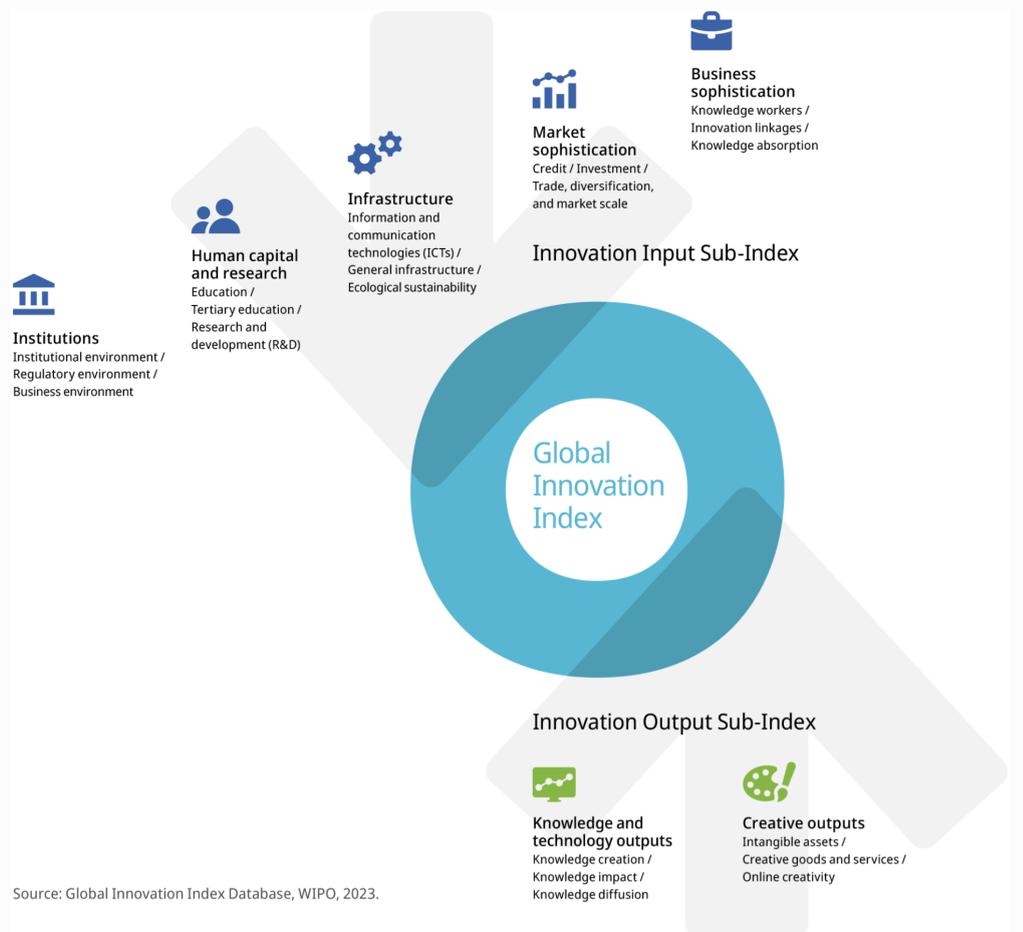
Code	Indicator name	Economy Year	Model Year	Source
2.1.1	Expenditure on education, % GDP	2019	2021	UNESCO Institute for Statistics
4.2.1	Market capitalization, % GDP	2014	2020	World Federation of Exchanges; World Bank

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.