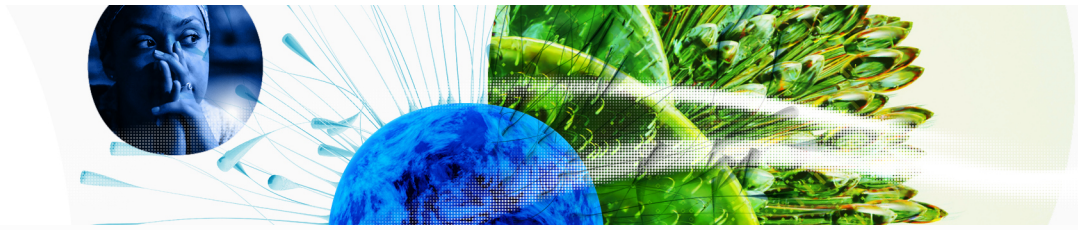
Global Innovation Index 2023



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**.

Croatia ranking in the Global Innovation Index 2023

> Croatia ranks 44th among the 132 economies featured in the GII 2023.

> Croatia ranks 38th among the 50 high-income group economies.

> Croatia ranks 28th among the 39 economies in Europe.

> Croatia GII Ranking (2020-2023)

The table shows the rankings of Croatia 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 Croatia in the GII 2023 is between ranks 42 and 44.

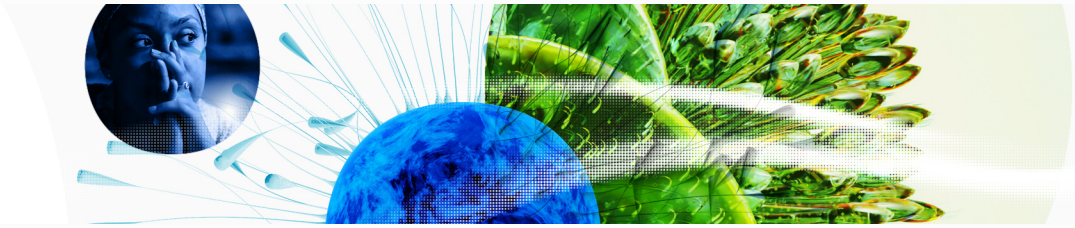
	GII Position	Innovation Inputs	Innovation Outputs
2020	41st	44th	43rd
2021	42nd	41st	48th
2022	42nd	45th	40th
2023	44th	43rd	44th

Croatia performs worse in innovation outputs than innovation inputs in 2023.

This year **Croatia ranks 43rd in innovation inputs.** This position is higher than last year.

Croatia ranks 44th in innovation outputs. This position is lower than last year.

Global Innovation Index 2023

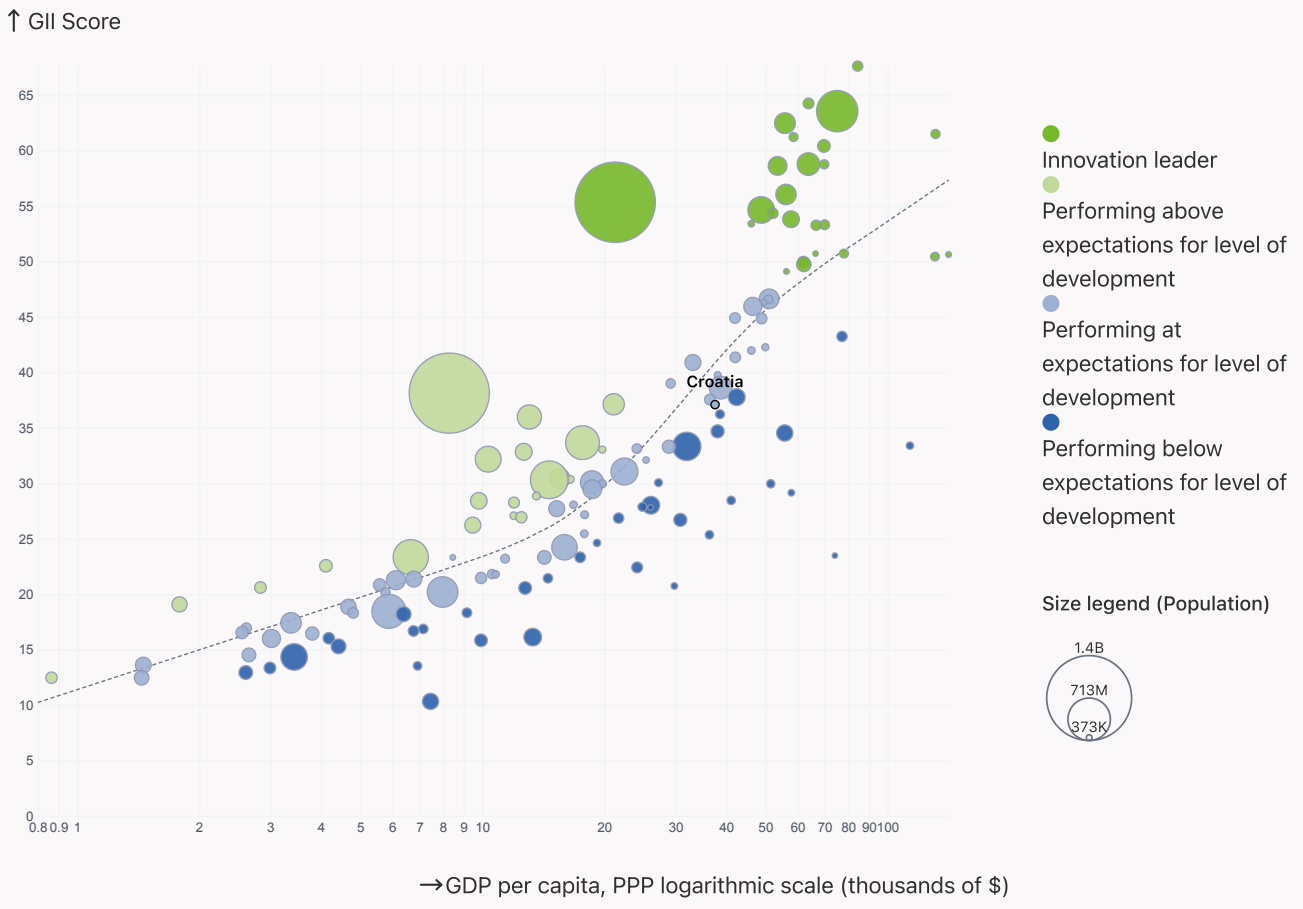


→ Expected vs. observed innovation performance

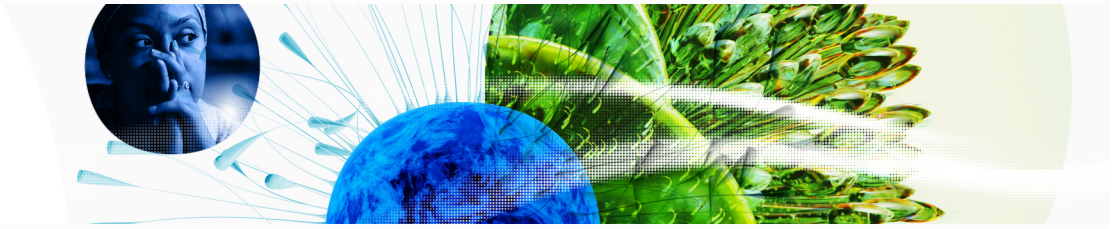
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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

> Relative to GDP, Croatia's performance is at expectations for its level of development.

> Innovation overperformers relative to their economic development



Global Innovation Index 2023

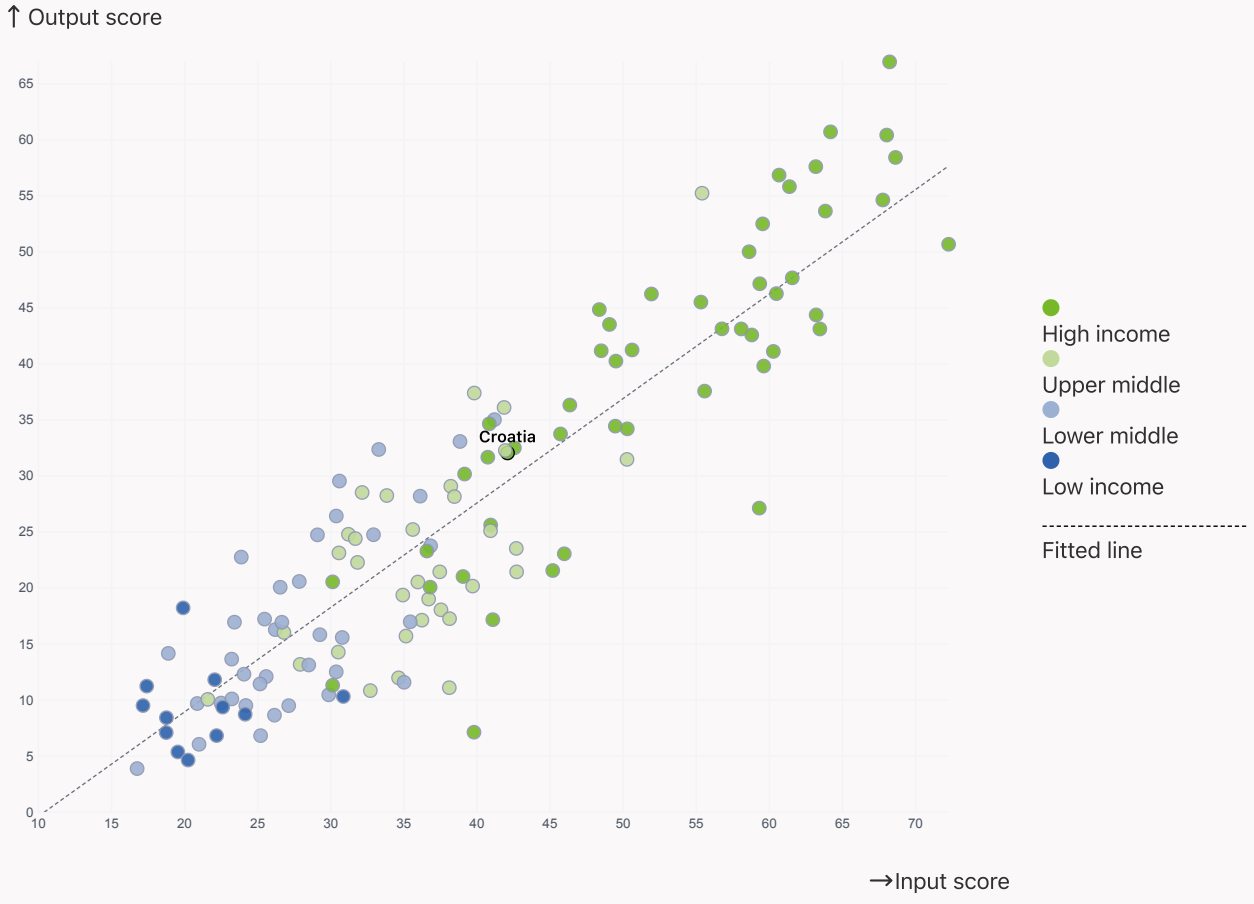


→ Effectively translating innovation investments into innovation outputs

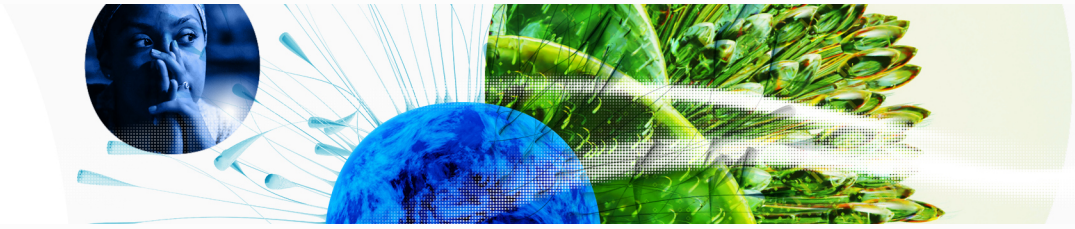
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

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

> Relationship between innovation inputs and outputs

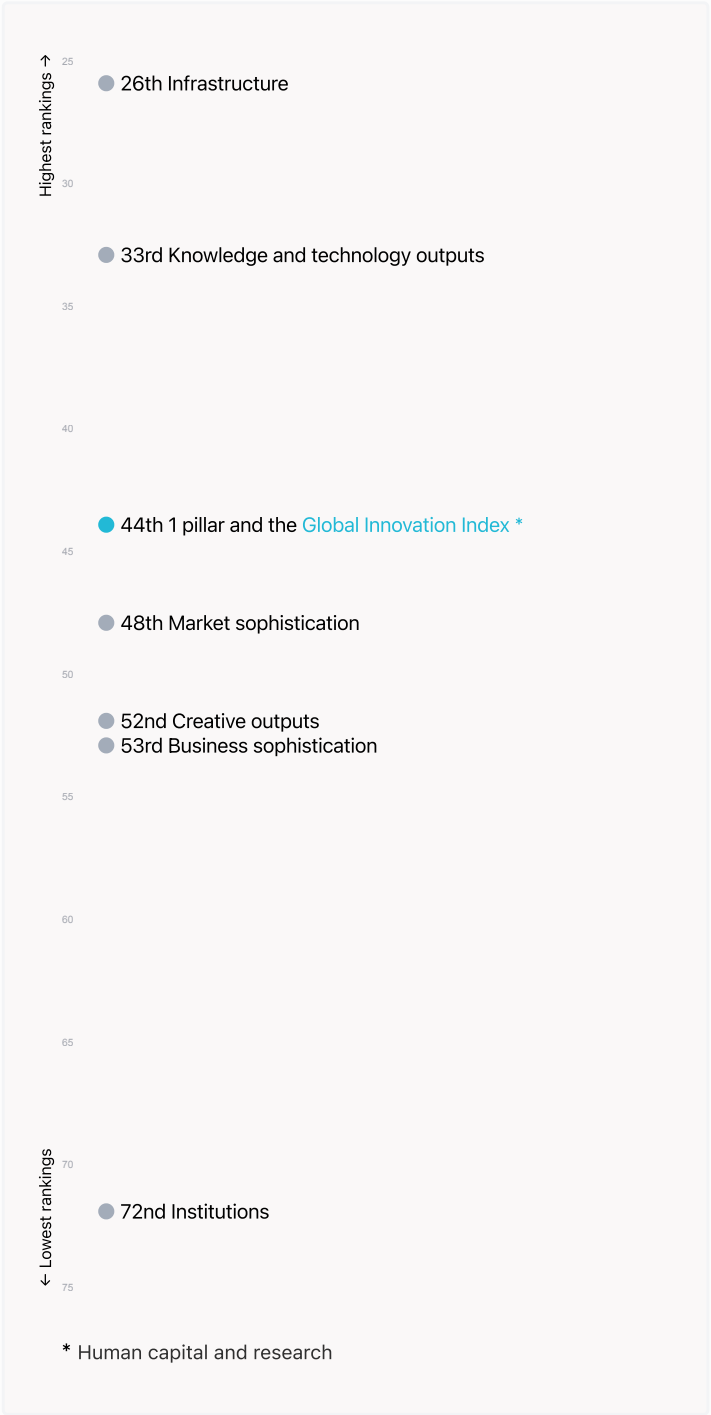


Global Innovation Index 2023



→ Overview of Croatia'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 Croatia are those that rank above the GII (shown in blue) and the weakest are those that rank below.



> Highest rankings

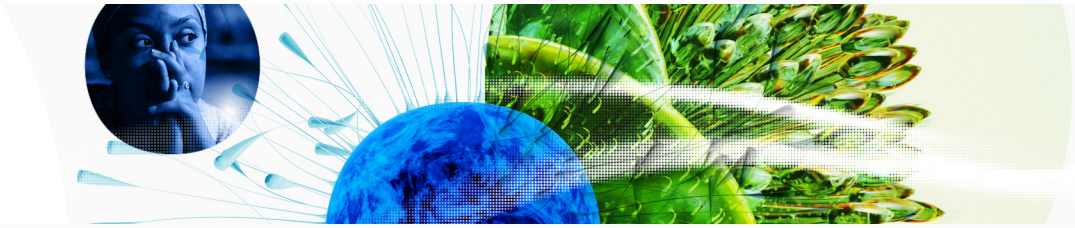
Croatia ranks highest in Infrastructure (26th), Knowledge and technology outputs (33rd) and Human capital and research (44th).

> Lowest rankings

Croatia ranks lowest in Institutions (72nd), Business sophistication (53rd) and Creative outputs (52nd).

The full WIPO Intellectual Property Statistics profile for Croatia can be found on this link.

Global Innovation Index 2023



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

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

> High-Income economies

Croatia performs below the high-income group average in Knowledge and technology outputs, Creative outputs, Business sophistication, Market sophistication, Human capital and research, Institutions.

> Europe

Croatia performs below the regional average in Knowledge and technology outputs, Creative outputs, Business sophistication, Market sophistication, Human capital and research, Institutions.

Knowledge and technology outputs

- Top 10 | Score: 58.96
- Europe | Score: 38.80
- High income | Score: 38.62
- Croatia | Score: 34.03

Creative outputs

- Top 10 | 56.09
- High income | 40.27
- Europe | 39.87
- Croatia | 29.99

Business sophistication

- Top 10 | 64.39
- High income | 46.38
- Europe | 44.61
- Croatia | 30.61

Market sophistication

- Top 10 | 61.93
- High income | 46.42
- Europe | 43.65
- Croatia | 38.84

Human capital and research

- Top 10 | 60.28
- High income | 46.30
- Europe | 44.05
- Croatia | 36.57

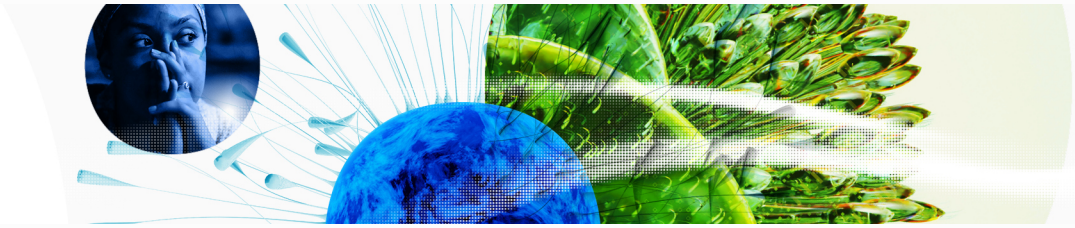
Infrastructure

- Top 10 | 62.83
- Croatia | 56.67
- High income | 55.85
- Europe | 54.69

Institutions

- Top 10 | 79.85
- High income | 68.16
- Europe | 61.69
- Croatia | 47.97

Global Innovation Index 2023



→ Innovation strengths and weaknesses in Croatia

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

> Croatia's main innovation strengths are **Pupil-teacher ratio, secondary** (rank 1), **ISO 14001 environment/bn PPP$ GDP** (rank 5) and **ISO 9001 quality/bn PPP$ GDP** (rank 8).

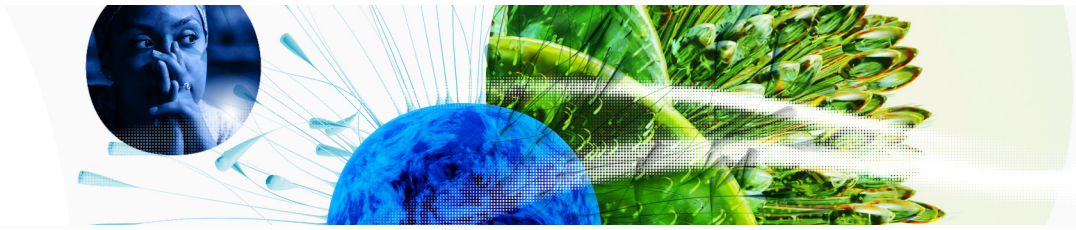
Strengths

Rank	Code	Indicator name
1	2.1.5	Pupil-teacher ratio, secondary
5	3.3.3	ISO 14001 environment/bn PPP$ GDP
8	6.3.5	ISO 9001 quality/bn PPP$ GDP
11	6.2.2	Unicorn valuation, % GDP
13	5.2.3	GERD financed by abroad, % GDP
14	4.2.4	VC received, value, % GDP
15	7.2.1	Cultural and creative services exports, % total trade
16	3.3.2	Environmental performance
18	6.1.4	Scientific and technical articles/bn PPP$ GDP
19	5.3.4	FDI net inflows, % GDP

Weaknesses

Rank	Code	Indicator name
125	5.2.2	State of cluster development
113	5.2.1	University-industry R&D collaboration
112	1.3.1	Policies for doing business
108	6.2.3	Software spending, % GDP
85	3.2.3	Gross capital formation, % GDP
84	1.3.2	Entrepreneurship policies and culture
81	4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP
64	7.1.1	Intangible asset intensity, top 15, %
64	5.1.2	Firms offering formal training, %
40	2.3.3	Global corporate R&D investors, top 3, mn US$

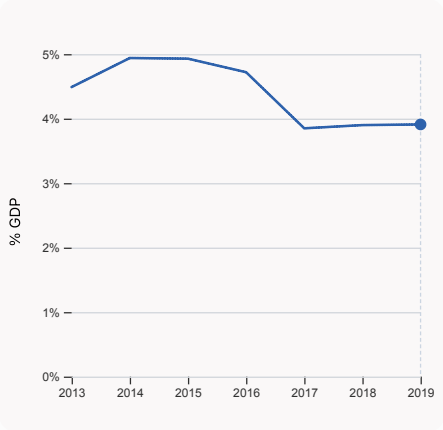
Global Innovation Index 2023



→ Croatia's innovation system

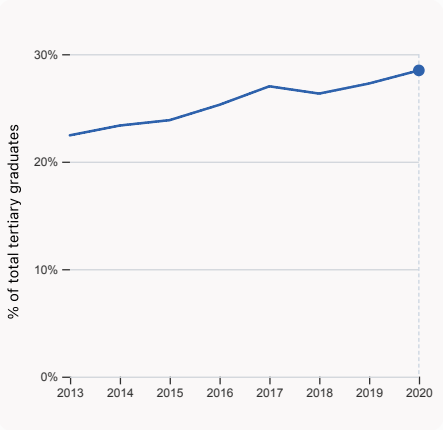
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Croatia



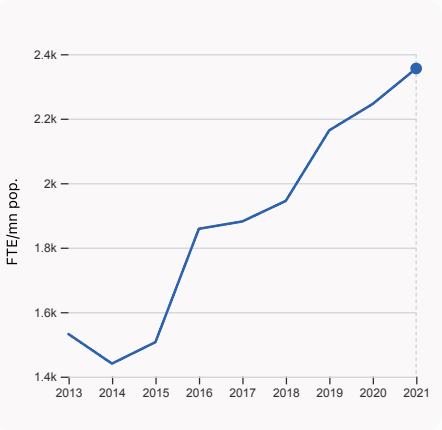
2.1.1 Expenditure on education, % GDP

was equal to 3.91% GDP in 2019, up by 0.01 percentage points from the year prior – and equivalent to an indicator rank of 76.



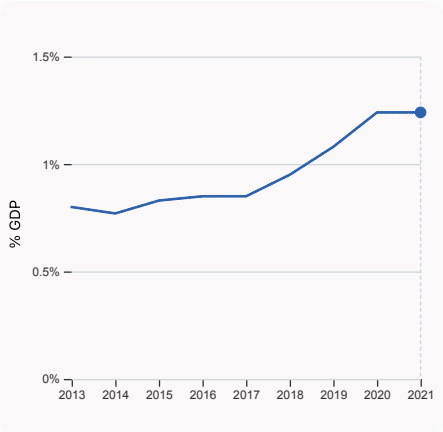
2.2.2 Graduates in science and engineering, %

was equal to 28.49% of total tertiary graduates in 2020, up by 1.22 percentage points from the year prior – and equivalent to an indicator rank of 26.



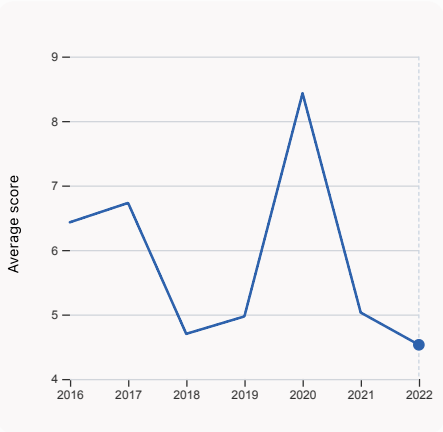
2.3.1 Researchers, FTE/mn pop.

was equal to 2,355.59 FTE/mn pop. in 2021, up by 4.9% from the year prior – and equivalent to an indicator rank of 36.



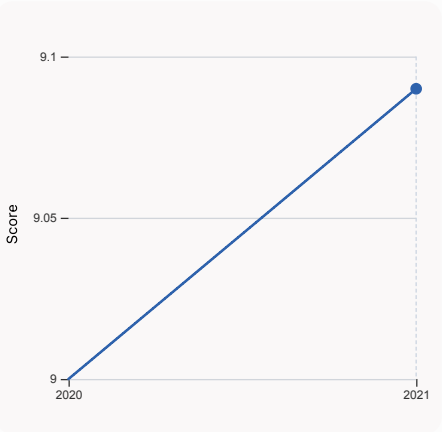
2.3.2 Gross expenditure on R&D, % GDP

was equal to 1.24% GDP in 2021, with no change from the year prior – and equivalent to an indicator rank of 33.



2.3.4 QS university ranking, top 3

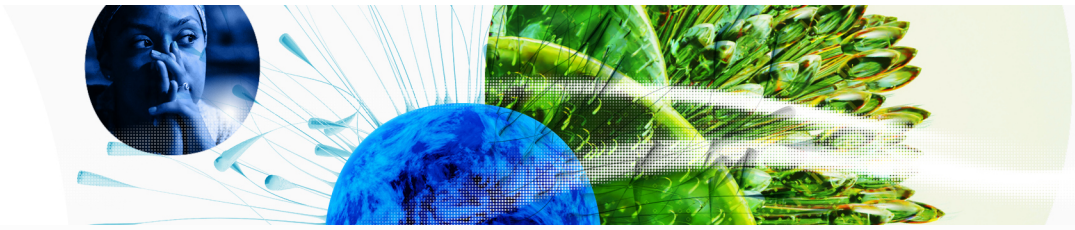
was equal to an average score of 4.53 for the top 3 universities in 2022, down by 9.94% from the year prior – and equivalent to an indicator rank of 70.

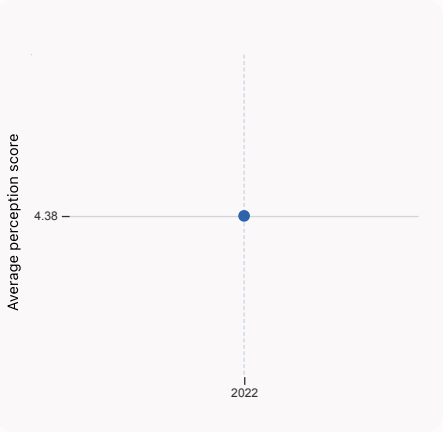


3.1.1 ICT access

was equal to a score of 9.09 in 2021, up by 1% from the year prior – and equivalent to an indicator rank of 43.

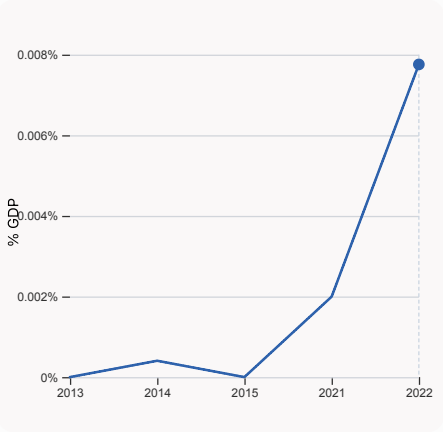
Global Innovation Index 2023





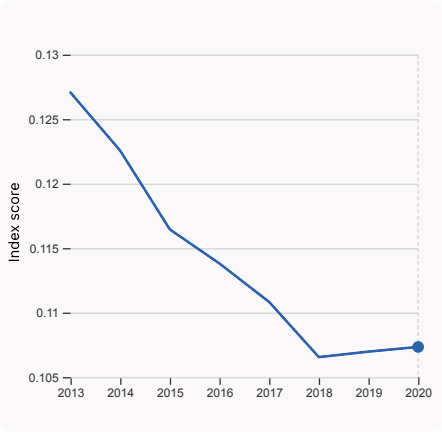
4.1.1 Finance for startups and scaleups

was equal to an average perception score of 4.38 in 2022, equivalent to an indicator rank of 52.



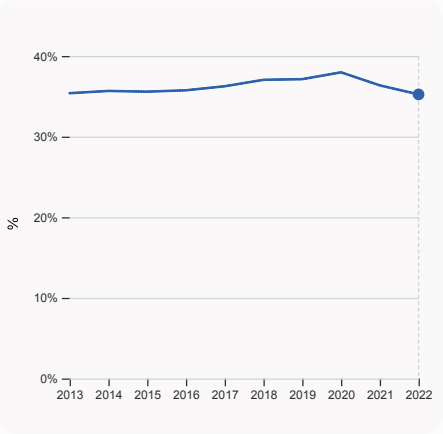
4.2.4 VC received, value, % GDP

was equal to 0.00776% GDP in 2022, up by 0.0058 percentage points from the year prior – and equivalent to an indicator rank of 14.



4.3.2 Domestic industry diversification

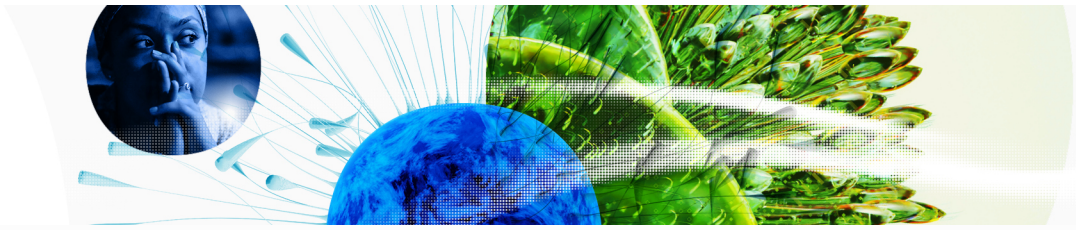
was equal to an index score of 0.107 in 2020, up by 0.34% from the year prior – and equivalent to an indicator rank of 24.



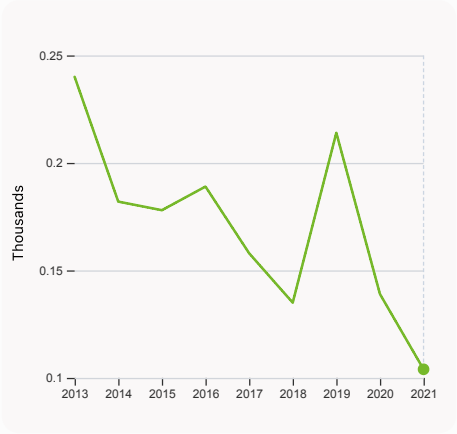
5.1.1 Knowledge-intensive employment, %

was equal to 35.24% in 2022, down by 1.12 percentage points from the year prior – and equivalent to an indicator rank of 41.

Global Innovation Index 2023

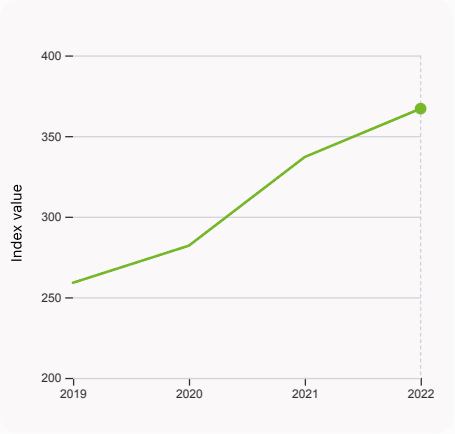


> Innovation outputs in Croatia



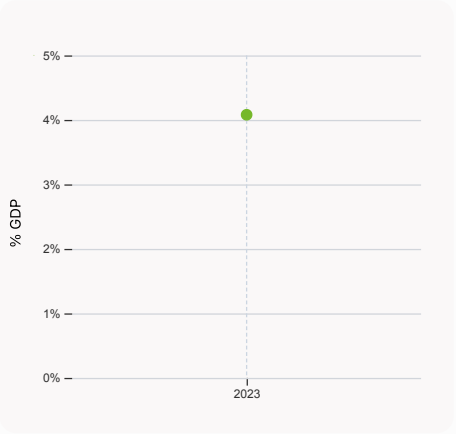
6.1.1 Patents by origin

was equal to 0.1 Thousands in 2021, down by 25.18% from the year prior – and equivalent to an indicator rank of 67.



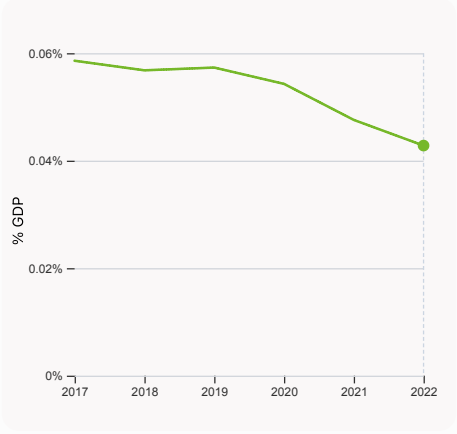
6.1.5 Citable documents H-index

was equal to an index value of 367 in 2022, up by 8.9% from the year prior – and equivalent to an indicator rank of 49.



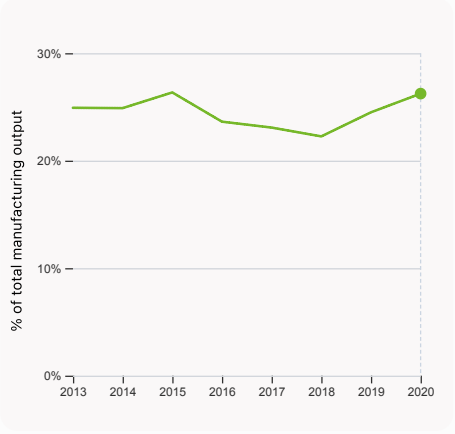
6.2.2 Unicorn valuation, % GDP

was equal to 4.08 % GDP in 2023 – and equivalent to an indicator rank of 11.



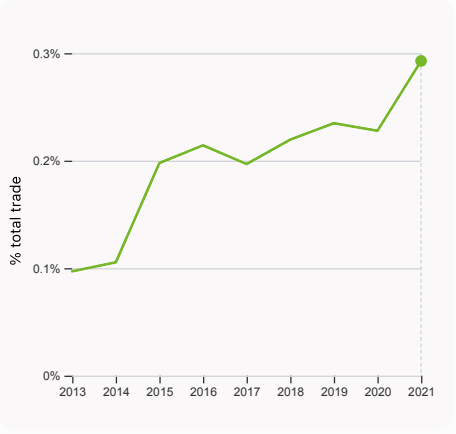
6.2.3 Software spending, % GDP

was equal to 0.043% GDP in 2022, down by 0.0048 percentage points from the year prior – and equivalent to an indicator rank of 108.



6.2.4 High-tech manufacturing, %

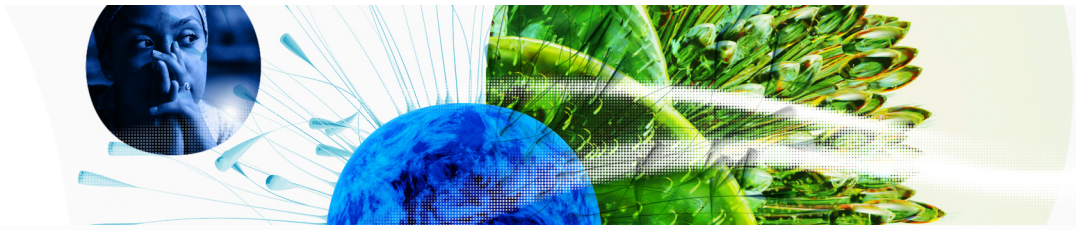
was equal to 26.24% of total manufacturing output in 2020, up by 1.74 percentage points from the year prior – and equivalent to an indicator rank of 48.

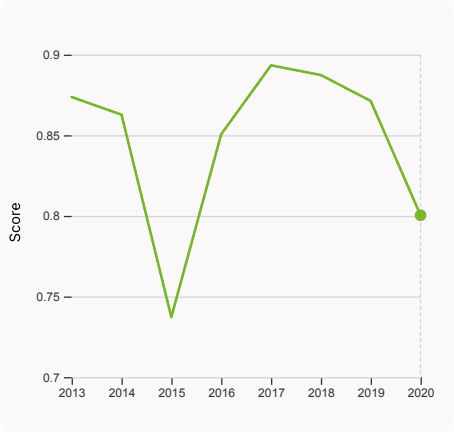


6.3.1 Intellectual property receipts, % total trade

was equal to 0.293% total trade in 2021, up by 0.065 percentage points from the year prior – and equivalent to an indicator rank of 40.

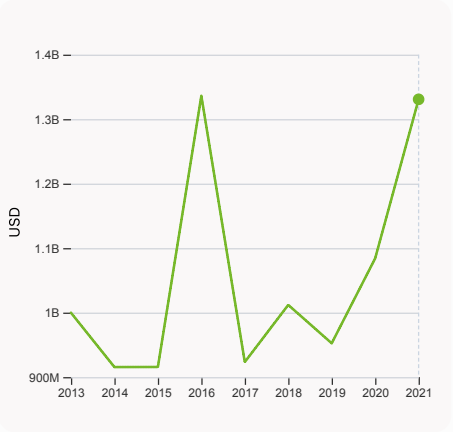
Global Innovation Index 2023





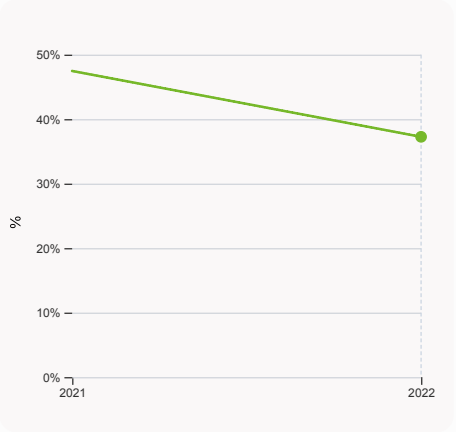
6.3.2 Production and export complexity

was equal to a score of 0.8 in 2020, down by 8.14% from the year prior – and equivalent to an indicator rank of 32.



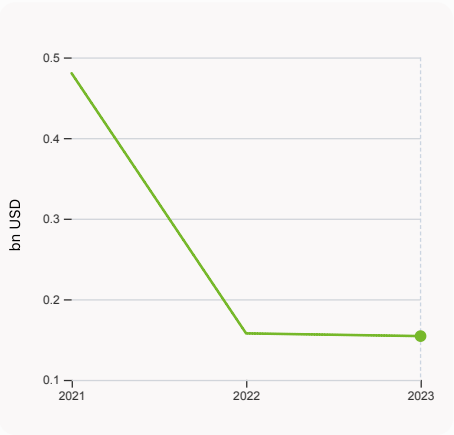
6.3.3 High-tech exports

was equal to 1,330,713,429 USD in 2021, up by 22.75% from the year prior – and equivalent to an indicator rank of 42.



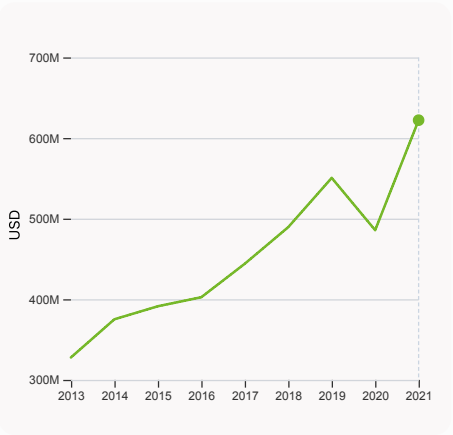
7.1.1 Intangible asset intensity, top 15, %

was equal to 37.26% in 2022, down by 10.21 percentage points from the year prior – and equivalent to an indicator rank of 64.



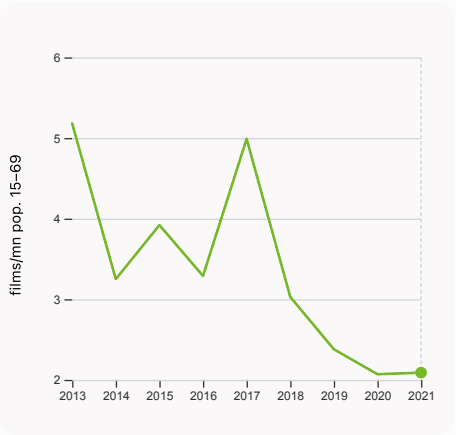
7.1.3 Global brand value, top 5,000

was equal to 0.154 bn USD in 2023, down by 2.14% from the year prior – and equivalent to an indicator rank of 71.



7.2.1 Cultural and creative services exports

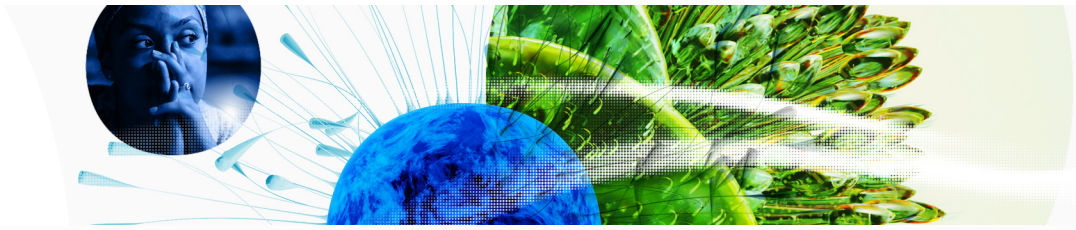
was equal to 622,151,000 USD in 2021, up by 28.077% from the year prior – and equivalent to an indicator rank of 15.

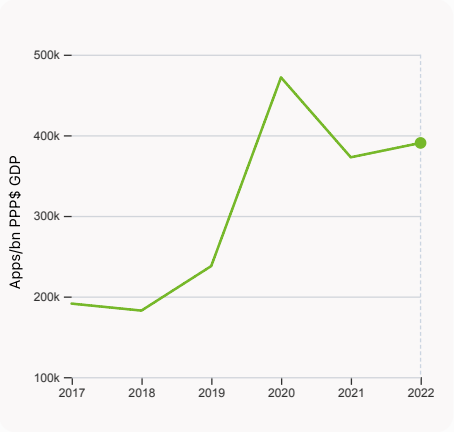


7.2.2 National feature films/mn pop. 15-69

was equal to 2.09 films/mn pop. 15–69 in 2021, up by 0.97% from the year prior – and equivalent to an indicator rank of 47.

Global Innovation Index 2023

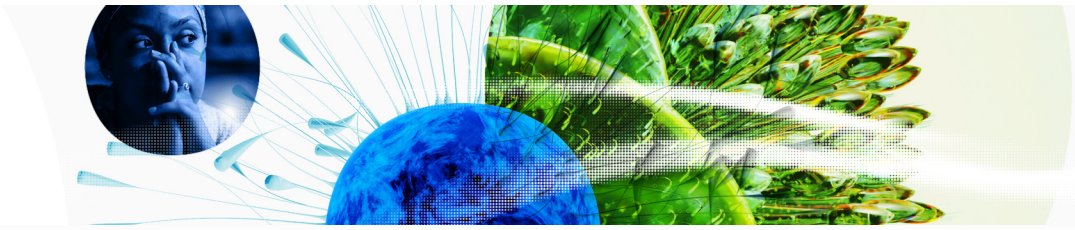




7.3.4 Mobile app creation/bn PPP$ GDP

was equal to 390,504.99 Apps/bn PPP$ GDP in 2022, up by 4.78% from the year prior – and equivalent to an indicator rank of 50.

Global Innovation Index 2023



→ Croatia's innovation top performers

> 2.3.4 QS university ranking of Croatia’s top universities

Rank	University	Score
801-1000	UNIVERSITY OF ZAGREB	13.60
1001-1200	THE JOSIP JURAJ STROSSMAYER UNIVERSITY OF OSIJEK	8.40
1001-1200	UNIVERSITY OF RIJEKA	7.90

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".

> 6.2.2 Top Unicorn Companies in Croatia

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	RIMAC AUTOMOBILI	Auto & transportation	Sveta Nedelja	2
2	INFOBIP	Mobile & telecommunications	Vodnjan	1

Source: CBInsights, Tracker – The Complete List of Unicorn Companies: https://www.cbinsights.com/research-unicorn-companies

> 7.1.1 Top 15 intangible-asset intensive companies in Croatia

Rank	Firm	Intensity, %
1	INA INDUSTRIJA NAFTE DD	60.96
2	ATLANTIC GRUPA DD	56.75
3	ERICSSON NIKOLA TESLA DD	58.89

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 Croatia with highest global brand value

Rank	Brand	Industry	Brand Value, mn USD
1	ZAGREBACKA BANKA	Banking	154.3

Source: Brand Finance (https://brandirectory.com).
Note: Rank corresponds to within economy ranks.

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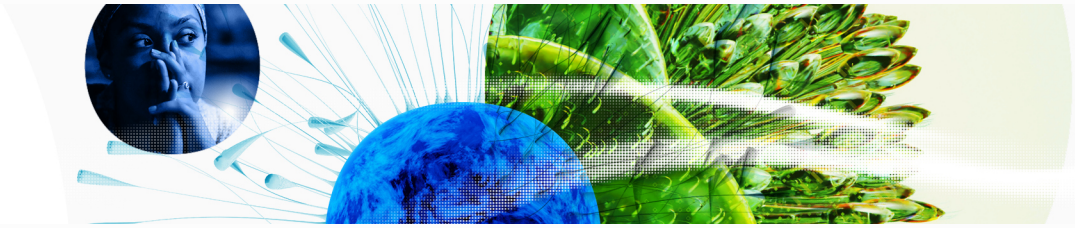

Croatia

GII 2023 rank **44**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
44	43	High	EUR	4.0	150.4	37,549.8

	Score / Value	Rank	
Institutions	**48.0**	**72**	◇
1.1 Institutional environment	**61.3**	**40**	
1.1.1 Operational stability for businesses*	69.4	29	
1.1.2 Government effectiveness*	53.1	44	
1.2 Regulatory environment	**68.9**	**46**	
1.2.1 Regulatory quality*	55.1	46	◇
1.2.2 Rule of law*	48.6	51	◇
1.2.3 Cost of redundancy dismissal	15.1	61	
1.3 Business environment	**13.8**	**127**	○ ◇
1.3.1 Policies for doing business†	26.5	112	○ ◇
1.3.2 Entrepreneurship policies and culture†	1.0	84	○ ◇
Human capital and research	**36.6**	**44**	
2.1 Education	**61.0**	**30**	
2.1.1 Expenditure on education, % GDP	3.9	76	
2.1.2 Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3 School life expectancy, years	15.1	52	
2.1.4 PISA scales in reading, maths and science	471.9	37	
2.1.5 Pupil-teacher ratio, secondary	6.1	1	● ◆
2.2 Tertiary education	**35.9**	**42**	
2.2.1 Tertiary enrolment, % gross	68.1	44	
2.2.2 Graduates in science and engineering, %	28.5	26	
2.2.3 Tertiary inbound mobility, %	3.0	67	
2.3 Research and development (R&D)	**12.8**	**52**	◇
2.3.1 Researchers, FTE/mn pop.	2,355.6	36	
2.3.2 Gross expenditure on R&D, % GDP	1.2	33	
2.3.3 Global corporate R&D investors, top 3, mn US$	0.0	40	○ ◇
2.3.4 QS university ranking, top 3*	4.6	70	◇
Infrastructure	**56.7**	**26**	
3.1 Information and communication technologies (ICTs)	**81.1**	**34**	
3.1.1 ICT access*	86.4	43	
3.1.2 ICT use*	85.5	37	
3.1.3 Government's online service*	79.1	36	
3.1.4 E-participation*	73.3	29	
3.2 General infrastructure	**30.0**	**55**	◇
3.2.1 Electricity output, GWh/mn pop.	3,890.7	57	
3.2.2 Logistics performance*	54.5	42	
3.2.3 Gross capital formation, % GDP	21.4	85	○
3.3 Ecological sustainability	**59.0**	**5**	● ◆
3.3.1 GDP/unit of energy use	12.5	41	
3.3.2 Environmental performance*	70.0	16	● ◆
3.3.3 ISO 14001 environment/bn PPP$ GDP	9.8	5	● ◆
Market sophistication	**38.8**	**48**	
4.1 Credit	**33.7**	**57**	
4.1.1 Finance for startups and scaleups†	46.0	52	
4.1.2 Domestic credit to private sector, % GDP	59.5	62	
4.1.3 Loans from microfinance institutions, % GDP	n/a	n/a	
4.2 Investment	**19.6**	**36**	
4.2.1 Market capitalization, % GDP	35.9	43	
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	0.0	81	○
4.2.3 VC recipients, deals/bn PPP$ GDP	0.0	54	
4.2.4 VC received, value, % GDP	0.0	14	● ◆
4.3 Trade, diversification, and market scale	**63.2**	**41**	
4.3.1 Applied tariff rate, weighted avg., %	1.5	20	
4.3.2 Domestic industry diversification	96.2	24	
4.3.3 Domestic market scale, bn PPP$	150.4	78	

	Score / Value	Rank	
Business sophistication	**30.6**	**53**	◇
5.1 Knowledge workers	**39.3**	**49**	
5.1.1 Knowledge-intensive employment, %	35.2	41	
5.1.2 Firms offering formal training, %	26.2	64	○ ◇
5.1.3 GERD performed by business, % GDP	0.6	36	
5.1.4 GERD financed by business, %	37.6	50	
5.1.5 Females employed w/advanced degrees, %	17.8	41	
5.2 Innovation linkages	**16.6**	**91**	○ ◇
5.2.1 University-industry R&D collaboration†	22.0	113	○ ◇
5.2.2 State of cluster development†	8.4	125	○ ◇
5.2.3 GERD financed by abroad, % GDP	0.3	13	● ◆
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	68	
5.2.5 Patent families/bn PPP$ GDP	0.1	49	
5.3 Knowledge absorption	**35.9**	**55**	
5.3.1 Intellectual property payments, % total trade	1.1	34	
5.3.2 High-tech imports, % total trade	7.2	83	
5.3.3 ICT services imports, % total trade	1.7	46	
5.3.4 FDI net inflows, % GDP	5.1	19	● ◆
5.3.5 Research talent, % in businesses	26.4	49	
Knowledge and technology outputs	**34.0**	**33**	
6.1 Knowledge creation	**20.1**	**54**	
6.1.1 Patents by origin/bn PPP$ GDP	0.8	67	
6.1.2 PCT patents by origin/bn PPP$ GDP	0.1	55	
6.1.3 Utility models by origin/bn PPP$ GDP	0.2	43	
6.1.4 Scientific and technical articles/bn PPP$ GDP	n/a	n/a	
6.1.5 Citable documents H-index	18.0	49	
6.2 Knowledge impact	**41.9**	**25**	
6.2.1 Labor productivity growth, %	1.7	40	
6.2.2 Unicorn valuation, % GDP	4.1	11	● ◆
6.2.3 Software spending, % GDP	0.0	108	○ ◇
6.2.4 High-tech manufacturing, %	26.2	48	
6.3 Knowledge diffusion	**40.1**	**35**	
6.3.1 Intellectual property receipts, % total trade	0.3	40	
6.3.2 Production and export complexity	69.3	32	
6.3.3 High-tech exports, % total trade	3.7	42	
6.3.4 ICT services exports, % total trade	3.5	35	
6.3.5 ISO 9001 quality/bn PPP$ GDP	21.4	8	● ◆
Creative outputs	**30.0**	**52**	
7.1 Intangible assets	**34.3**	**56**	
7.1.1 Intangible asset intensity, top 15, %	37.3	64	○
7.1.2 Trademarks by origin/bn PPP$ GDP	32.1	73	
7.1.3 Global brand value, top 5,000	0.2	71	◇
7.1.4 Industrial designs by origin/bn PPP$ GDP	3.6	28	
7.2 Creative goods and services	**19.6**	**50**	
7.2.1 Cultural and creative services exports, % total trade	1.7	15	● ◆
7.2.2 National feature films/mn pop. 15-69	2.1	47	◇
7.2.3 Entertainment and media market/th pop. 15-69	n/a	n/a	
7.2.4 Creative goods exports, % total trade	0.9	49	
7.3 Online creativity	**31.9**	**38**	
7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	17.7	32	
7.3.2 Country-code TLDs/th pop. 15-69	12.8	37	
7.3.3 GitHub commits/mn pop. 15-69	26.3	38	
7.3.4 Mobile app creation/bn PPP$ GDP	70.8	50	

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.

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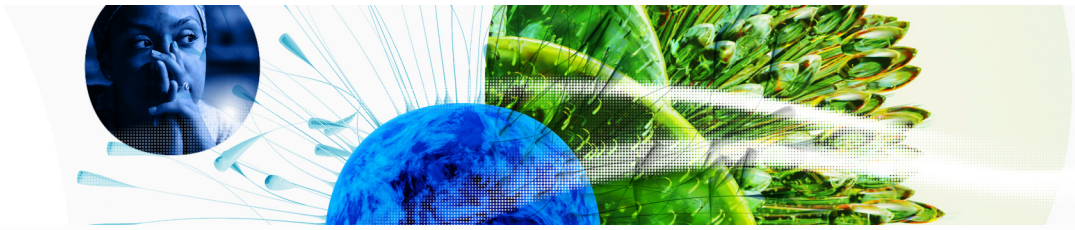

→ Data availability

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

> Croatia has missing data for three indicators and outdated data for four indicators.

> Missing data for Croatia

Code	Indicator name	Economy Year	Model Year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2019	UNESCO Institute for Statistics
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 Croatia

Code	Indicator name	Economy Year	Model Year	Source
1.3.1	Policies for doing business	2021	2022	World Economic Forum, Executive Opinion Survey (EOS)
2.1.1	Expenditure on education, % GDP	2019	2021	UNESCO Institute for Statistics
5.2.1	University-industry R&D collaboration	2021	2022	World Economic Forum, Executive Opinion Survey (EOS)
5.2.2	State of cluster development	2021	2022	World Economic Forum, Executive Opinion Survey (EOS)

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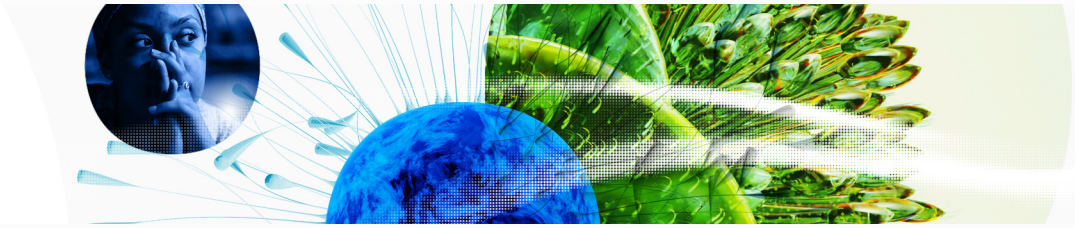
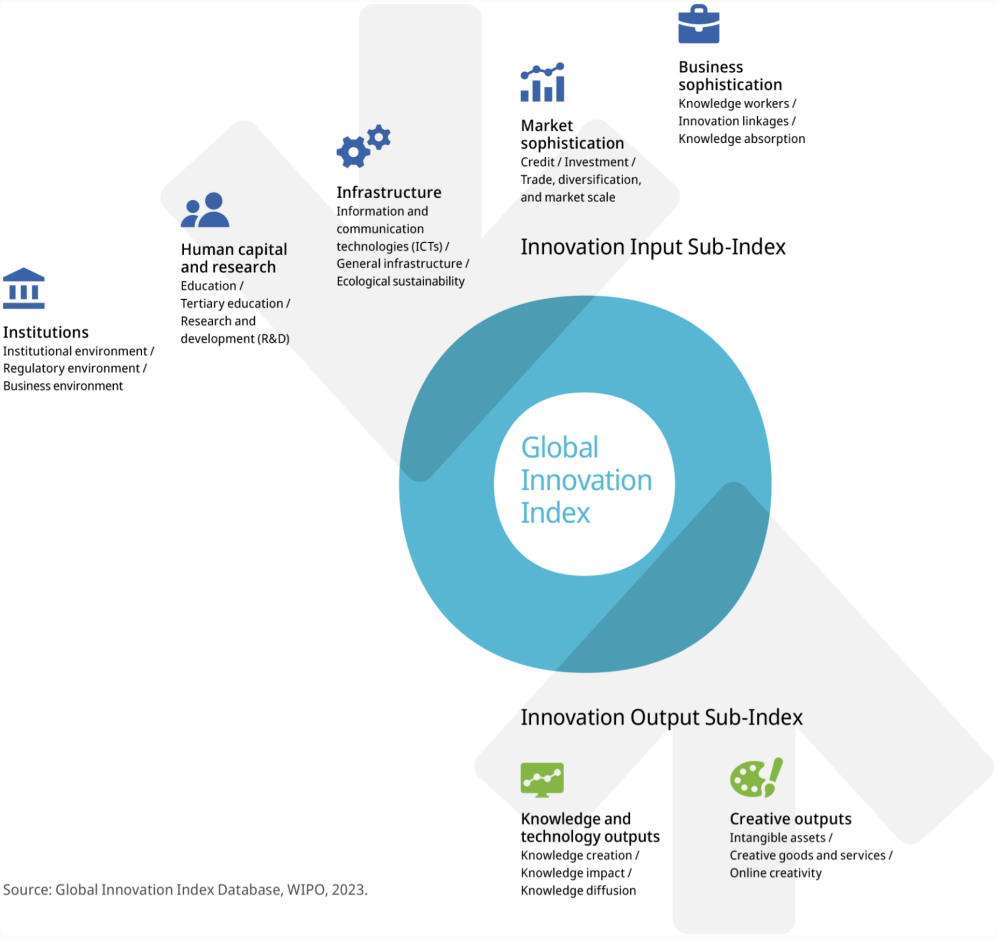


About the Global Innovation Index

- 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.