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.

<table>
<thead>
<tr>
<th>Year</th>
<th>GII Position</th>
<th>Innovation Inputs</th>
<th>Innovation Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>41st</td>
<td>44th</td>
<td>43rd</td>
</tr>
<tr>
<td>2021</td>
<td>42nd</td>
<td>41st</td>
<td>48th</td>
</tr>
<tr>
<td>2022</td>
<td>42nd</td>
<td>45th</td>
<td>40th</td>
</tr>
<tr>
<td>2023</td>
<td>44th</td>
<td>43rd</td>
<td>44th</td>
</tr>
</tbody>
</table>

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.
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

GII Score

→GDP per capita, PPP logarithmic scale (thousands of $)
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 less innovation outputs relative to its level of innovation investments.

Relationship between innovation inputs and outputs
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**
  - 26th Infrastructure
  - 33rd Knowledge and technology outputs
  - 44th 1 pillar and the Global Innovation Index
  - 48th Market sophistication
  - 52nd Creative outputs
  - 53rd Business sophistication

- **Lowest rankings**
  - 72nd Institutions

* Human capital and research

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

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

The charts show 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.

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### 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**
## 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).

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>Rank</td>
<td>Code</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>2.1.5</td>
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<tr>
<td>5</td>
<td>3.3.3</td>
</tr>
<tr>
<td>8</td>
<td>6.3.5</td>
</tr>
<tr>
<td>11</td>
<td>6.2.2</td>
</tr>
<tr>
<td>13</td>
<td>5.2.3</td>
</tr>
<tr>
<td>14</td>
<td>4.2.4</td>
</tr>
<tr>
<td>15</td>
<td>7.2.1</td>
</tr>
<tr>
<td>16</td>
<td>3.3.2</td>
</tr>
<tr>
<td>18</td>
<td>6.1.4</td>
</tr>
<tr>
<td>19</td>
<td>5.3.4</td>
</tr>
</tbody>
</table>
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.
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.
> 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.
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.
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.
Croatia's innovation top performers

2.3.4 QS university ranking of Croatia’s top universities

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>801-1000</td>
<td>UNIVERSITY OF ZAGREB</td>
<td>13.60</td>
</tr>
<tr>
<td>1001-1200</td>
<td>THE JOSIP JURAJ STROSSMAYER UNIVERSITY OF OSJEK</td>
<td>8.40</td>
</tr>
<tr>
<td>1001-1200</td>
<td>UNIVERSITY OF RIJEKA</td>
<td>7.90</td>
</tr>
</tbody>
</table>

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=x" or a range "x-y".

6.2.2 Top Unicorn Companies in Croatia

<table>
<thead>
<tr>
<th>Rank</th>
<th>Unicorn Company</th>
<th>Industry</th>
<th>City</th>
<th>Valuation, bn USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RIMAC AUTOMOBILI</td>
<td>Auto &amp; transportation</td>
<td>Sveta Nedelja</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>INFOBIP</td>
<td>Mobile &amp; telecommunications</td>
<td>Vodnjan</td>
<td>1</td>
</tr>
</tbody>
</table>


7.1.1 Top 15 intangible-asset intensive companies in Croatia

<table>
<thead>
<tr>
<th>Rank</th>
<th>Firm</th>
<th>Intensity, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INA INDUSTRIJA NAFTEDD</td>
<td>60.96</td>
</tr>
<tr>
<td>2</td>
<td>ATLANTIC GRUPA DD</td>
<td>56.75</td>
</tr>
<tr>
<td>3</td>
<td>ERICSSON-NIKOLA TESLA DD</td>
<td>58.89</td>
</tr>
</tbody>
</table>


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

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Industry</th>
<th>Brand Value, mn USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ZAGREBACKA BANKA</td>
<td>Banking</td>
<td>154.3</td>
</tr>
</tbody>
</table>

Source: Brand Finance (https://brandirectory.com). Note: Rank corresponds to within economy ranks.
Global Innovation Index 2023

Croatia

<table>
<thead>
<tr>
<th>Output rank</th>
<th>Input rank</th>
<th>Income</th>
<th>Region</th>
<th>Population (mn)</th>
<th>GDP, PPP$ (bn)</th>
<th>GDP per capita, PPP$</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>43</td>
<td>High</td>
<td>EUR</td>
<td>4.0</td>
<td>150.4</td>
<td>37,549.8</td>
</tr>
</tbody>
</table>

### Institutions

<table>
<thead>
<tr>
<th>Score</th>
<th>Output Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>48.0</td>
<td>72</td>
</tr>
</tbody>
</table>

#### 1.1 Institutional environment

- 1.1.1 Operational stability for businesses
- 1.1.2 Government effectiveness

#### 1.2 Regulatory environment

- 1.2.1 Rule of law
- 1.2.2 Cost of redundancy dismissal

#### 1.3 Business environment

- 1.3.1 Policies for doing business
- 1.3.2 Entrepreneurship policies and culture

### Human capital and research

<table>
<thead>
<tr>
<th>Score</th>
<th>Output Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.6</td>
<td>44</td>
</tr>
</tbody>
</table>

#### 2.1 Education

- 2.1.1 Expenditure on education, % GDP
- 2.1.3 School life expectancy, years
- 2.1.4 PISA scales in reading, maths and science

#### 2.2 Tertiary education

- 2.2.1 Tertiary enrolment, %
- 2.2.2 Graduates in science and engineering, %

### Infrastructure

<table>
<thead>
<tr>
<th>Score</th>
<th>Output Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>56.7</td>
<td>26</td>
</tr>
</tbody>
</table>

#### 3.1 Information and communication technologies (ICTs)

- 3.1.1 ICT use
- 3.1.3 Government’s online service
- 3.1.4 E-participation

#### 3.2 General infrastructure

- 3.2.1 Electricity output, GWh/mn pop.
- 3.2.2 Logistics performance
- 3.2.3 Grass capital formation, % GDP

#### 3.3 Ecological sustainability

- 3.3.1 GDP/unit of energy use
- 3.3.2 Environmental performance
- 3.3.3 ISO 14001 environment/bn PPP$ GDP

### Market sophistication

<table>
<thead>
<tr>
<th>Score</th>
<th>Output Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.8</td>
<td>48</td>
</tr>
</tbody>
</table>

#### 4.1 Credit

- 4.1.1 Finance for startups and scaleups
- 4.1.2 Domestic credit to private sector, % GDP

#### 4.2 Investment

- 4.2.1 Market capitalization, % GDP
- 4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP

#### 4.3 Trade, diversification, and market scale

- 4.3.1 Applied tariff rate, weighted avg., %
- 4.3.2 Domestic industry diversification

### Business sophistication

<table>
<thead>
<tr>
<th>Score</th>
<th>Output Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.6</td>
<td>53</td>
</tr>
</tbody>
</table>

#### 5.1 Knowledge workers

- 5.1.1 Knowledge intensive employment, %
- 5.1.2 Firms offering formal training, %

#### 5.2 Innovation linkages

- 5.2.1 University-industry R&D collaboration
- 5.2.2 State of cluster development

#### 5.3 Knowledge absorption

- 5.3.1 Intellectual property payments, % total trade

### Knowledge and technology outputs

<table>
<thead>
<tr>
<th>Score</th>
<th>Output Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.0</td>
<td>33</td>
</tr>
</tbody>
</table>

#### 6.1 Knowledge creation

- 6.1.1 Patents by origin/bn PPP$ GDP

#### 6.2 Knowledge impact

- 6.2.1 Labor productivity growth, %

### Creative outputs

<table>
<thead>
<tr>
<th>Score</th>
<th>Output Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.0</td>
<td>52</td>
</tr>
</tbody>
</table>

#### 7.1 Intangible assets

- 7.1.1 Intangible asset intensity, %

#### 7.2 Creative goods and services

- 7.2.1 Cultural and creative services exports, % total trade

#### 7.3 Online creativity

- 7.3.1 Generic top-level domains (TLDs)% pop. 15-69

### 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 Croatia.

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

### Missing data for Croatia

<table>
<thead>
<tr>
<th>Code</th>
<th>Indicator name</th>
<th>Economy Year</th>
<th>Model Year</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>2.1.2</td>
<td>Government funding/pupil, secondary, % GDP/cap</td>
<td>n/a</td>
<td>2019</td>
<td>UNESCO Institute for Statistics</td>
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<tr>
<td>4.1.3</td>
<td>Loans from microfinance institutions, % GDP</td>
<td>n/a</td>
<td>2021</td>
<td>International Monetary Fund, Financial Access Survey (FAS)</td>
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<tr>
<td>7.2.3</td>
<td>Entertainment and media market &amp; pop. 15-69</td>
<td>n/a</td>
<td>2022</td>
<td>PwC, GEMD; United Nations, World Population Prospects; International Monetary Fund</td>
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### Outdated data for Croatia

<table>
<thead>
<tr>
<th>Code</th>
<th>Indicator name</th>
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<th>Model Year</th>
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<td>1.3.1</td>
<td>Policies for doing business</td>
<td>2021</td>
<td>2022</td>
<td>World Economic Forum, Executive Opinion Survey (EOS)</td>
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<tr>
<td>2.1.1</td>
<td>Expenditure on education, % GDP</td>
<td>2019</td>
<td>2021</td>
<td>UNESCO Institute for Statistics</td>
</tr>
<tr>
<td>5.2.1</td>
<td>University-industry R&amp;D collaboration</td>
<td>2021</td>
<td>2022</td>
<td>World Economic Forum, Executive Opinion Survey (EOS)</td>
</tr>
<tr>
<td>5.2.2</td>
<td>State of cluster development</td>
<td>2021</td>
<td>2022</td>
<td>World Economic Forum, Executive Opinion Survey (EOS)</td>
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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.