



GLOBAL INNOVATION INDEX 2019

MONTENEGRO

45th

Montenegro ranks 45th among the 129 economies featured in the GII 2019.

The Global Innovation Index (GII) is a ranking of world economies based on innovation capabilities. Consisting of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation.

The following table shows the rankings of Montenegro over the past three years, noting that data availability and the GII model influence year-on-year comparisons of the GII ranks. The confidence interval for Montenegro's ranking in the GII 2019 is between 44 and 60.

Montenegro's Rankings, 2017 - 2019

| | GII | Innovation Inputs | Innovation Outputs |
|-------------|-----|----------------------|-----------------------|
| 2019 | 45 | 55 | 46 |
| 2018 | 52 | 51 | 55 |
| 2017 | 48 | 50 | 52 |

- Montenegro performs better in Innovation Outputs than Inputs in 2019.
- This year Montenegro ranks 55th in Innovation Inputs, worse than last year and compared to 2017.
- As for Innovation Outputs, Montenegro ranks 46th. This position is better than last year and compared to 2017.

5th

Montenegro ranks 5th among the 34 upper middle-income economies.

30th

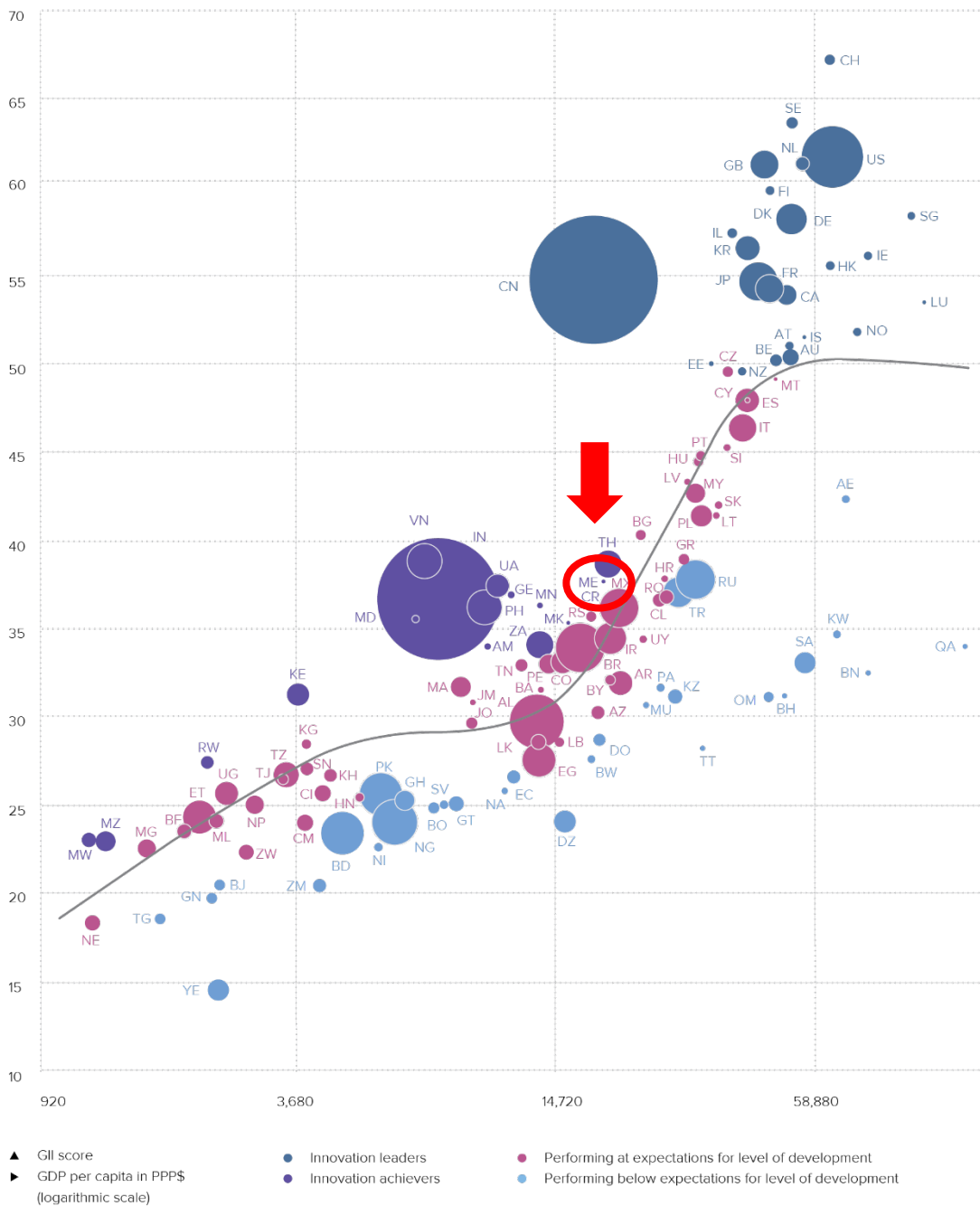
Montenegro ranks 30th among the 39 economies in Europe.

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 considered Innovation under-performers relative to GDP.

Relative to GDP, Montenegro performs above its expected level of development.

GII scores and GDP per capita in PPP US\$ (bubbles sized by population)

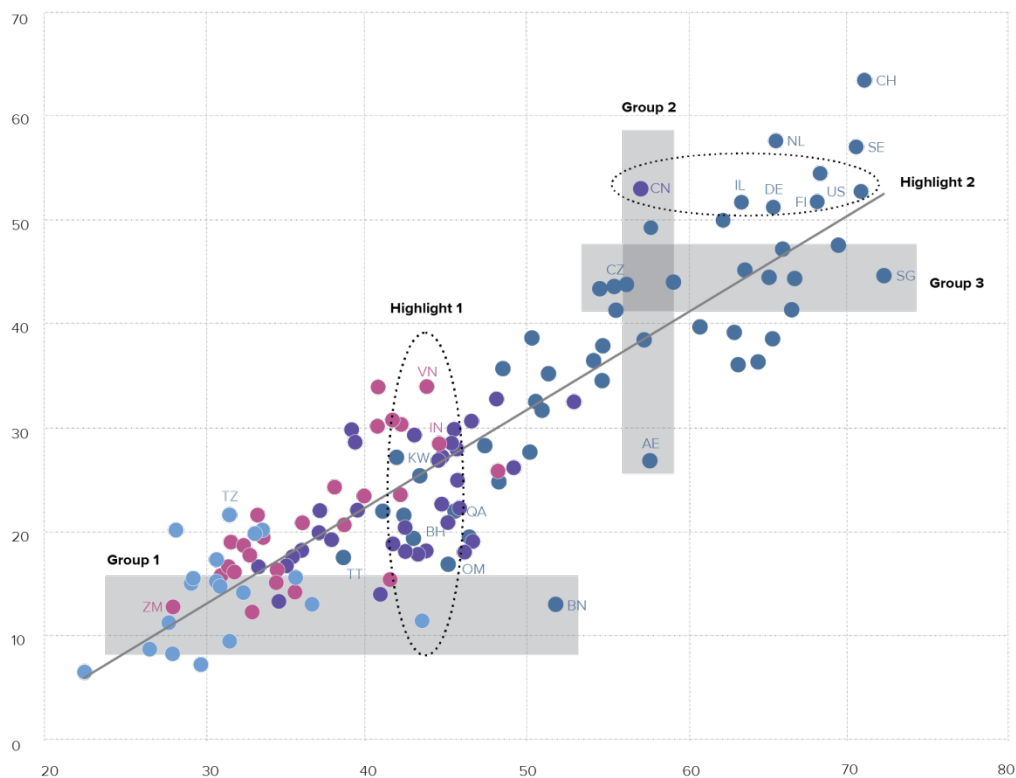


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs, indicating which economies best translate innovation inputs into innovation outputs. Economies appearing above the line are effectively translating their costly innovation investments into more and higher-quality outputs. In contrast, those below the line are not effectively translating innovation inputs into outputs.

Montenegro produces more innovation outputs relative to its level of innovation investments.

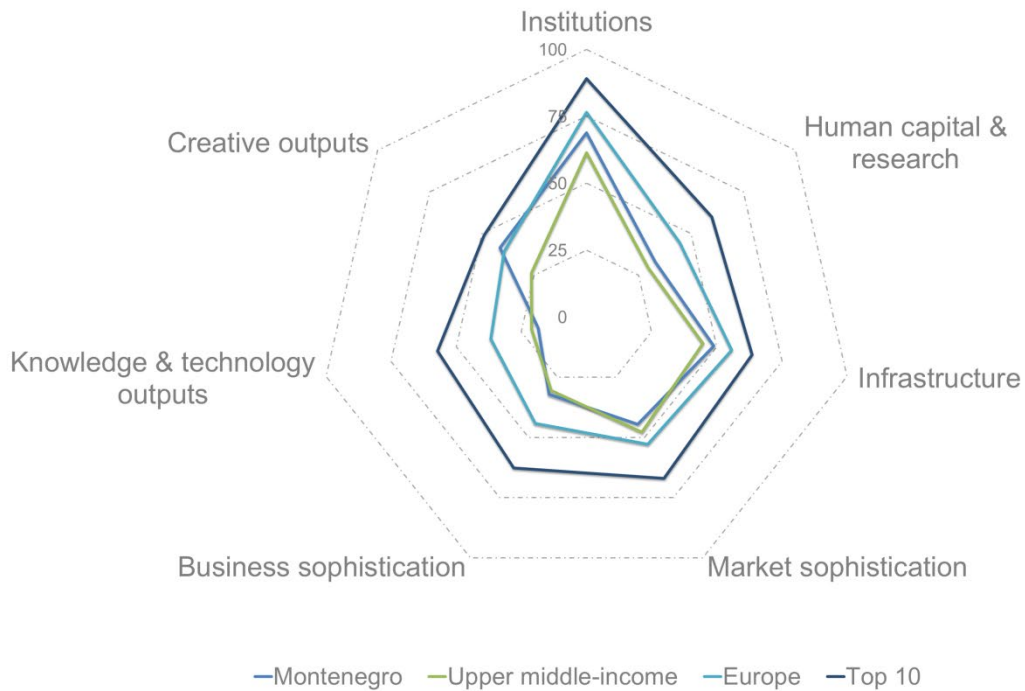
Innovation input/output performance by income group, 2019



- ▲ Output score
 - ▶ Input score
 - High income
 - Upper-middle income
 - Lower-middle income
 - Low income
 - Fitted values
-
- | | | | |
|-------------------------|-------------------|------------------------|--------------------------------|
| AE United Arab Emirates | CZ Czech Republic | NL Netherlands | TZ United Republic of Tanzania |
| BH Bahrain | DE Germany | OM Oman | US United States of America |
| BN Brunei Darussalam | FI Finland | QA Qatar | VN Viet Nam |
| CH Switzerland | IL Israel | SE Sweden | ZM Zambia |
| CN China | IN India | SG Singapore | |
| | KW Kuwait | TT Trinidad and Tobago | |

BENCHMARKING MONTENEGRO TO OTHER UPPER MIDDLE-INCOME ECONOMIES AND THE EUROPE REGION

Montenegro's scores in the seven GII pillars



Upper middle-income economies

Montenegro has high scores in five out of the seven GII pillars: Institutions, Human capital & research, Infrastructure, Business sophistication, and Creative outputs, which are above the average of the upper middle-income group.

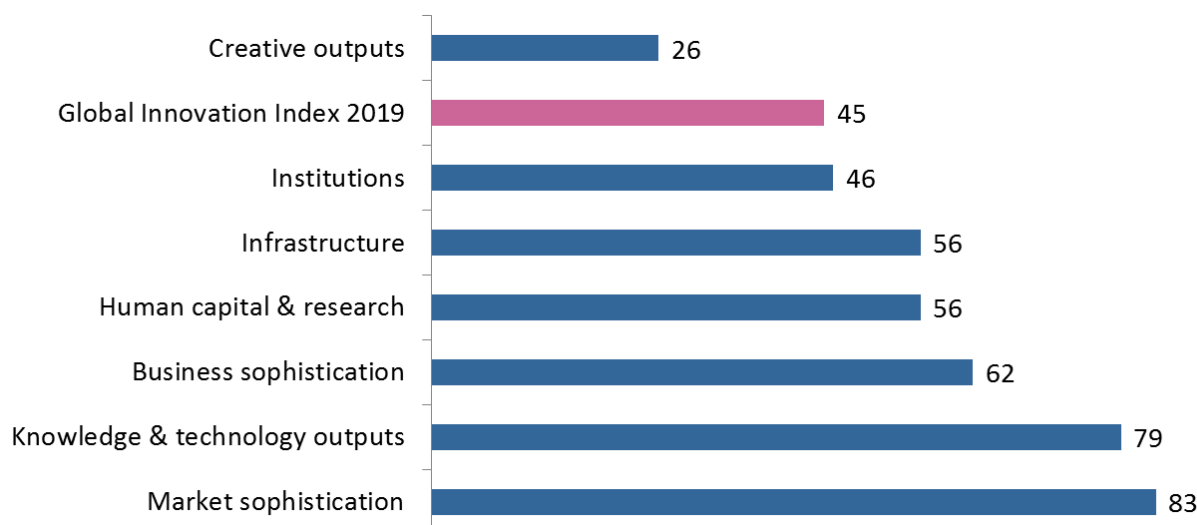
Europe Region

Compared to other economies in Europe, Montenegro performs above average in 1 out of the 7 GII pillars: Creative outputs.

Top ranks are found in sub-pillars Tertiary education, Investment, Creative goods & services, and Online creativity, where the country ranks in the top 10 worldwide.

OVERVIEW OF MONTENEGRO'S RANKINGS IN THE 7 GII AREAS

Montenegro performs the best in Creative outputs and its weakest performance is in Market sophistication.



*The highest possible ranking in each pillar is 1.

MONTENEGRO'S INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of Montenegro's strengths and weaknesses in the GII 2019.

| Strengths | | |
|-----------|---|------|
| Code | Indicator name | Rank |
| 3.2.3 | Gross capital formation, % GDP | 22 |
| 4.1.1 | Ease of getting credit* | 11 |
| 5.3.3 | ICT services imports, % total trade | 13 |
| 5.3.4 | FDI net inflows, % GDP, 3-year average | 12 |
| 6.2.2 | New businesses/th pop. 15–64 | 22 |
| 6.2.3 | Computer software spending, % GDP | 23 |
| 7 | Creative outputs | 26 |
| 7.2 | Creative goods & services | 14 |
| 7.2.1 | Cultural & creative services exports, % total trade | 14 |
| 7.2.2 | National feature films/mn pop. 15–69 | 10 |
| 7.2.4 | Printing & other media, % manufacturing | 6 |
| 7.3 | Online creativity | 18 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1 |

| Weaknesses | | |
|------------|--|------|
| Code | Indicator name | Rank |
| 2.3.3 | Global R&D companies, top 3, in mn US\$ | 43 |
| 2.3.4 | QS university ranking, average score top 3* | 78 |
| 4.3 | Trade, competition, & market scale | 121 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 128 |
| 5.1.3 | GERD performed by business, % GDP | 71 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 93 |
| 5.3.2 | High-tech imports, % total trade | 98 |
| 6.1.5 | Citable documents H index | 127 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, %, 3-year average | 86 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 88 |
| 6.3 | Knowledge diffusion | 107 |
| 6.3.4 | FDI net outflows, % GDP, 3-year average | 123 |

STRENGTHS

- GII strengths for Montenegro are found in five of the seven GII pillars, and mostly on the innovation output side of the GII.
- Pillar Creative outputs (26) is a notable strength of Montenegro.
- In Creative outputs (26), sub-pillars Creative goods & services (14) and Online creativity (18) are relative strengths. Moreover, strengths are four indicators: Cultural & creative services exports (14), National feature films (10), Printing & other media (6), and Country-code TLDs – where Montenegro positions 1st globally.
- In Knowledge & technology outputs (79), Montenegro's strengths are indicators New businesses (22) and Computer software spending (23).
- In Infrastructure (56), only one GII strength is found in indicator Gross capital formation (22).
- In Market sophistication (83), Montenegro has strength in indicator Ease of getting credit (11).
- In Business sophistication (62), strengths are indicators ICT services imports (13) and FDI inflows (12).

WEAKNESSES

- Montenegro's weaknesses in the GII are found in four of the seven GII pillars.
- Several of these relative weaknesses are in Knowledge & technology outputs (79). These are sub-pillar Knowledge diffusion (107) and indicators Quality of scientific publications (127), Labor productivity growth (86), High- & medium-high-tech manufactures (88), and FDI outflows (123).
- In Human capital & research (56), Montenegro's weaknesses are indicators Global R&D companies (43) and Quality of universities (78).
- In Market sophistication (83), sub-pillar Trade, competition, & market scale (121) and its indicator Domestic market scale (128) are GII weaknesses for this country.
- In Business sophistication (62), Montenegro has relative weaknesses in three indicators: R&D performed by business (71), Patent families in two or more offices (93), and High-tech imports (98).

| Output rank | Input rank | Income | Region | Population (mn) | GDP, PPP\$ | GDP per capita, PPP\$ | GII 2018 rank |
|--|--|--------------|---------|-----------------|------------|-----------------------|---------------|
| 46 | 55 | Upper middle | EUR | 0.6 | 11.8 | 19,043.3 | 52 |
| | | | | Score/Value | Rank | | |
| INSTITUTIONS | | | | 68.9 | 46 | | |
| 1.1 | Political environment | | 58.7 | 56 | | | |
| 1.1.1 | Political and operational stability*..... | | 75.4 | 46 | | | |
| 1.1.2 | Government effectiveness*..... | | 50.3 | 62 | | | |
| 1.2 | Regulatory environment | | 71.7 | 47 | | | |
| 1.2.1 | Regulatory quality*..... | | 50.0 | 56 | | | |
| 1.2.2 | Rule of law*..... | | 46.7 | 63 | | | |
| 1.2.3 | Cost of redundancy dismissal, salary weeks..... | | 11.2 | 35 | | | |
| 1.3 | Business environment | | 76.3 | 42 | | | |
| 1.3.1 | Ease of starting a business*..... | | 86.7 | 72 | | | |
| 1.3.2 | Ease of resolving insolvency*..... | | 66.0 | 40 | | | |
| HUMAN CAPITAL & RESEARCH | | | | 33.0 | [56] | | |
| 2.1 | Education | | 49.3 | [62] | | | |
| 2.1.1 | Expenditure on education, % GDP..... | | n/a | n/a | | | |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap... .. | | n/a | n/a | | | |
| 2.1.3 | School life expectancy, years..... | | 15.0 | 51 | | | |
| 2.1.4 | PISA scales in reading, maths, & science..... | | 418.7 | 52 | | | |
| 2.1.5 | Pupil-teacher ratio, secondary..... | | n/a | n/a | | | |
| 2.2 | Tertiary education | | 45.7 | [22] | | | |
| 2.2.1 | Tertiary enrolment, % gross..... | | 58.2 | 48 | | | |
| 2.2.2 | Graduates in science & engineering, %..... | | n/a | n/a | | | |
| 2.2.3 | Tertiary inbound mobility, %..... | | n/a | n/a | | | |
| 2.3 | Research & development (R&D) | | 3.8 | 83 | | | |
| 2.3.1 | Researchers, FTE/mn pop.Ⓞ..... | | 714.3 | 57 | | | |
| 2.3.2 | Gross expenditure on R&D, % GDP.Ⓞ..... | | 0.3 | 76 | | | |
| 2.3.3 | Global R&D companies, avg. exp. top 3, mn US\$..... | | 0.0 | 43 | ○ | ◇ | |
| 2.3.4 | QS university ranking, average score top 3*..... | | 0.0 | 78 | ○ | ◇ | |
| INFRASTRUCTURE | | | | 48.8 | 56 | | |
| 3.1 | Information & communication technologies (ICTs) | | 68.3 | 61 | | | |
| 3.1.1 | ICT access*..... | | 74.4 | 47 | ◆ | | |
| 3.1.2 | ICT use*..... | | 58.1 | 59 | | | |
| 3.1.3 | Government's online service*..... | | 66.7 | 75 | | | |
| 3.1.4 | E-participation*..... | | 74.2 | 62 | | | |
| 3.2 | General infrastructure | | 39.0 | 47 | | | |
| 3.2.1 | Electricity output, kWh/mn pop..... | | 5,066.1 | 42 | | | |
| 3.2.2 | Logistics performance*..... | | 31.9 | 76 | | | |
| 3.2.3 | Gross capital formation, % GDP..... | | 30.2 | 22 | ● | | |
| 3.3 | Ecological sustainability | | 39.0 | 63 | | | |
| 3.3.1 | GDP/unit of energy use..... | | 9.8 | 56 | | | |
| 3.3.2 | Environmental performance*..... | | 61.3 | 58 | | | |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP.. | | 1.5 | 56 | | | |
| MARKET SOPHISTICATION | | | | 44.4 | 83 | | |
| 4.1 | Credit | | 36.5 | 64 | | | |
| 4.1.1 | Ease of getting credit*..... | | 85.0 | 11 | ● ◆ | | |
| 4.1.2 | Domestic credit to private sector, % GDP.Ⓞ..... | | 48.9 | 71 | | | |
| 4.1.3 | Microfinance gross loans, % GDP..... | | 0.1 | 48 | | | |
| 4.2 | Investment | | 52.8 | 33 | | | |
| 4.2.1 | Ease of protecting minority investors*..... | | 61.7 | 54 | | | |
| 4.2.2 | Market capitalization, % GDP.Ⓞ..... | | 82.6 | 19 | | | |
| 4.2.3 | Venture capital deals/bn PPP\$ GDP..... | | n/a | n/a | | | |
| 4.3 | Trade, competition, & market scale | | 43.9 | 121 | ○ | ◇ | |
| 4.3.1 | Applied tariff rate, weighted avg., %..... | | 3.1 | 64 | | | |
| 4.3.2 | Intensity of local competition*..... | | 62.9 | 92 | | | |
| 4.3.3 | Domestic market scale, bn PPP\$..... | | 11.8 | 128 | ○ | ◇ | |
| BUSINESS SOPHISTICATION | | | | 32.2 | 62 | | |
| 5.1 | Knowledge workers | | 39.9 | 57 | | | |
| 5.1.1 | Knowledge-intensive employment, %..... | | 37.6 | 32 | ◆ | | |
| 5.1.2 | Firms offering formal training, % firms..... | | 23.7 | 67 | | | |
| 5.1.3 | GERD performed by business, % GDP.Ⓞ..... | | 0.1 | 71 | ○ | | |
| 5.1.4 | GERD financed by business, %Ⓞ..... | | 29.8 | 61 | | | |
| 5.1.5 | Females employed w/advanced degrees, %..... | | 17.5 | 34 | | | |
| 5.2 | Innovation linkages | | 21.1 | 80 | | | |
| 5.2.1 | University/industry research collaboration*..... | | 41.6 | 61 | | | |
| 5.2.2 | State of cluster development*..... | | 41.8 | 86 | | | |
| 5.2.3 | GERD financed by abroad, %Ⓞ..... | | 5.9 | 60 | | | |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP..... | | n/a | n/a | | | |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP..... | | 0.0 | 93 | ○ | ◇ | |
| 5.3 | Knowledge absorption | | 35.5 | 53 | | | |
| 5.3.1 | Intellectual property payments, % total trade..... | | 0.2 | 85 | | | |
| 5.3.2 | High-tech imports, % total trade..... | | 5.5 | 98 | ○ | | |
| 5.3.3 | ICT services imports, % total trade..... | | 2.6 | 13 | ● ◆ | | |
| 5.3.4 | FDI net inflows, % GDP..... | | 11.3 | 12 | ◆ ◆ | | |
| 5.3.5 | Research talent, % in business enterprise...Ⓞ..... | | 12.2 | 62 | | | |
| KNOWLEDGE & TECHNOLOGY OUTPUTS | | | | 18.5 | 79 | | |
| 6.1 | Knowledge creation | | 12.9 | 62 | | | |
| 6.1.1 | Patents by origin/bn PPP\$ GDP.Ⓞ..... | | 1.0 | 62 | | | |
| 6.1.2 | PCT patents by origin/bn PPP\$ GDP..... | | 0.7 | 33 | ◆ | | |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP..... | | n/a | n/a | | | |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP..... | | 16.8 | 31 | ◆ | | |
| 6.1.5 | Citable documents H-index..... | | 0.6 | 127 | ○ ◇ | | |
| 6.2 | Knowledge impact | | 33.3 | 80 | | | |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, %..... | | 0.0 | 86 | ○ | | |
| 6.2.2 | New businesses/th pop. 15-64..... | | 6.7 | 22 | ● | | |
| 6.2.3 | Computer software spending, % GDP..... | | 0.4 | 23 | ● ◆ | | |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP..... | | 4.6 | 59 | | | |
| 6.2.5 | High- & medium-high-tech manufactures, %...Ⓞ..... | | 0.1 | 88 | ○ ◇ | | |
| 6.3 | Knowledge diffusion | | 9.3 | 107 | ○ | | |
| 6.3.1 | Intellectual property receipts, % total trade..... | | 0.0 | 77 | | | |
| 6.3.2 | High-tech net exports, % total trade..... | | 0.2 | 96 | | | |
| 6.3.3 | ICT services exports, % total trade..... | | 2.4 | 43 | | | |
| 6.3.4 | FDI net outflows, % GDP..... | | -1.2 | 123 | ○ ◇ | | |
| CREATIVE OUTPUTS | | | | 41.4 | 26 | ◆ ◆ | |
| 7.1 | Intangible assets | | 45.3 | 49 | | | |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP..... | | n/a | n/a | | | |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP.Ⓞ..... | | 0.8 | 79 | | | |
| 7.1.3 | ICTs & business model creation*..... | | 58.6 | 71 | | | |
| 7.1.4 | ICTs & organizational model creation*..... | | 52.6 | 70 | | | |
| 7.2 | Creative goods & services | | 35.8 | 14 | ● ◆ | | |
| 7.2.1 | Cultural & creative services exports, % total trade.Ⓞ..... | | 1.5 | 14 | ● ◆ | | |
| 7.2.2 | National feature films/mn pop. 15-69.Ⓞ..... | | 13.2 | 10 | ● ◆ | | |
| 7.2.3 | Entertainment & Media market/th pop. 15-69..... | | n/a | n/a | | | |
| 7.2.4 | Printing & other media, % manufacturing.Ⓞ..... | | 3.0 | 6 | ● ◆ | | |
| 7.2.5 | Creative goods exports, % total trade..... | | 0.1 | 94 | | | |
| 7.3 | Online creativity | | 39.3 | 18 | ● ◆ | | |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15-69..... | | 1.5 | 89 | | | |
| 7.3.2 | Country-code TLDs/th pop. 15-69..... | | 100.0 | 1 | ● ◆ | | |
| 7.3.3 | Wikipedia edits/mn pop. 15-69.Ⓞ..... | | 24.3 | 44 | | | |
| 7.3.4 | Mobile app creation/bn PPP\$ GDP..... | | n/a | n/a | | | |

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 Appendix II for details, including the year of the data, at <http://globalinnovationindex.org>. 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 data that are missing or are outdated for Montenegro.

Missing data

| Code | Indicator name | Country year | Model year | Source |
|-------|--|--------------|------------|--|
| 2.1.1 | Expenditure on education, % GDP | n/a | 2015 | UNESCO Institute for Statistics |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | n/a | 2015 | UNESCO Institute for Statistics |
| 2.1.5 | Pupil-teacher ratio, secondary | n/a | 2017 | UNESCO Institute for Statistics |
| 2.2.2 | Graduates in science & engineering, % | n/a | 2016 | UNESCO Institute for Statistics |
| 2.2.3 | Tertiary inbound mobility, % | n/a | 2016 | UNESCO Institute for Statistics |
| 4.2.3 | Venture capital deals/bn PPP\$ GDP | n/a | 2018 | Thomson Reuters |
| 5.2.4 | JV–strategic alliance deals/bn PPP\$ GDP | n/a | 2018 | Thomson Reuters |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | 2017 | World Intellectual Property Organization |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | n/a | 2017 | World Intellectual Property Organization |
| 7.2.3 | Entertainment & Media market/th pop. 15–69 | n/a | 2017 | PwC |
| 7.3.4 | Mobile app creation/bn PPP\$ GDP | n/a | 2018 | App Annie |

Outdated data

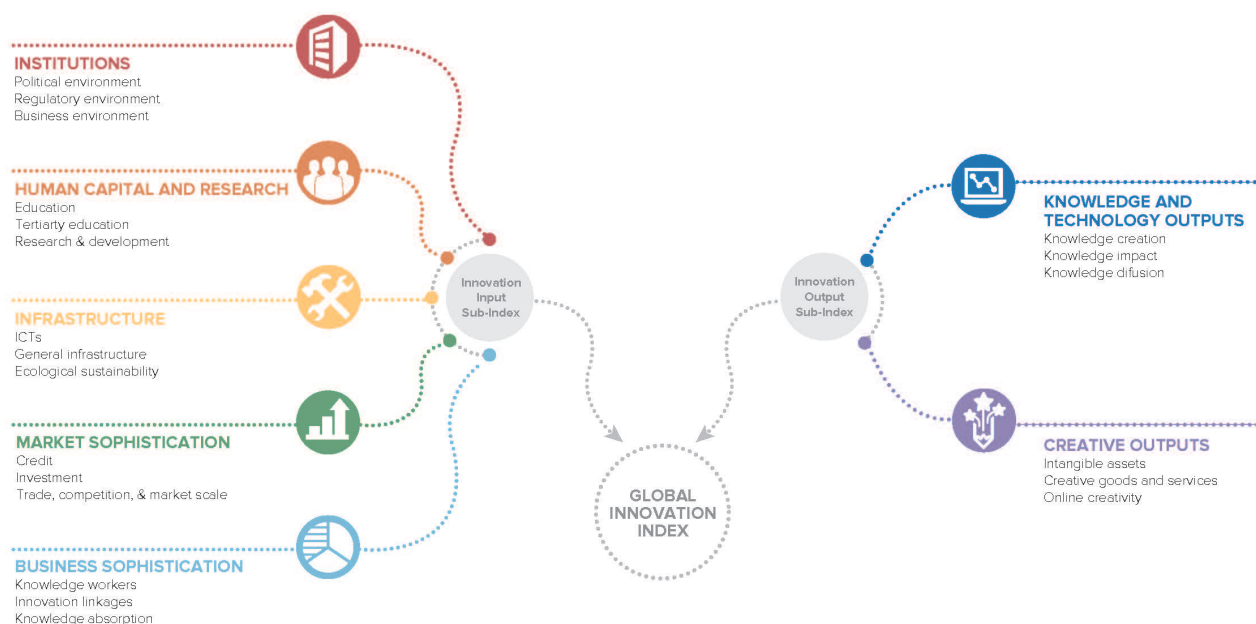
| Code | Indicator name | Country year | Model year | Source |
|-------|---|--------------|------------|--|
| 2.3.1 | Researchers, FTE/mn pop. | 2016 | 2017 | UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators |
| 2.3.2 | Gross expenditure on R&D, % GDP | 2016 | 2017 | UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators |
| 4.1.2 | Domestic credit to private sector, % GDP | 2016 | 2017 | International Monetary Fund |
| 4.2.2 | Market capitalization, % GDP | 2012 | 2017 | World Federation of Exchanges |
| 5.1.3 | GERD performed by business, % GDP | 2016 | 2017 | UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators |
| 5.1.4 | GERD financed by business, % | 2015 | 2016 | UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators |
| 5.2.3 | GERD financed by abroad, % | 2015 | 2016 | UNESCO Institute for Statistics |
| 5.3.5 | Research talent, % in business enterprise | 2016 | 2017 | UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 2016 | 2017 | World Intellectual Property Organization |
| 6.2.5 | High- & medium-high-tech manufactures, % | 2015 | 2016 | United Nations Industrial Development Organization |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 2016 | 2017 | World Intellectual Property Organization |
| 7.2.1 | Cultural & creative services exports, % total trade | 2016 | 2017 | World Trade Organization |
| 7.2.2 | National feature films/mn pop. 15–69 | 2015 | 2017 | UNESCO Institute for Statistics |
| 7.2.4 | Printing & other media, % manufacturing | 2015 | 2016 | United Nations Industrial Development Organization |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 2014 | 2017 | Wikimedia Foundation |

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations. In 2019, the GII presents its 12th edition devoted to the theme **Creating Healthy Lives—The Future of Medical Innovation**.

Recognizing that innovation is a key driver of economic development, the GII aims to provide a rich innovation ranking and 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 countries that incorporate the GII into their innovation agendas.

Framework of the Global Innovation Index 2019



The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that includes 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 containing three sub-pillars.

