# GLOBAL INNOVATION INDEX 2020


# SERBIA

**53rd** Serbia ranks 53rd among the 131 economies featured in the GII 2020.

**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.**

The following table shows the rankings of Serbia over the past three years, noting that 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 Serbia in the GII 2020 is between ranks 52 and 56.

**Rankings of Serbia (2018–2020)**

| | GII | Innovation inputs | Innovation outputs |
|---|---|---|---|
| **2020** | 53 | 58 | 56 |
| **2019** | 57 | 62 | 57 |
| **2018** | 55 | 56 | 58 |

- Serbia performs better in innovation outputs than innovation inputs in 2020.
- This year Serbia ranks 58th in innovation inputs, higher than last year and lower compared to 2018.
- As for innovation outputs, Serbia ranks 56th. This position is higher than last year and higher compared to 2018.

**10th** Serbia ranks 10th among the 37 upper middle-income group economies.

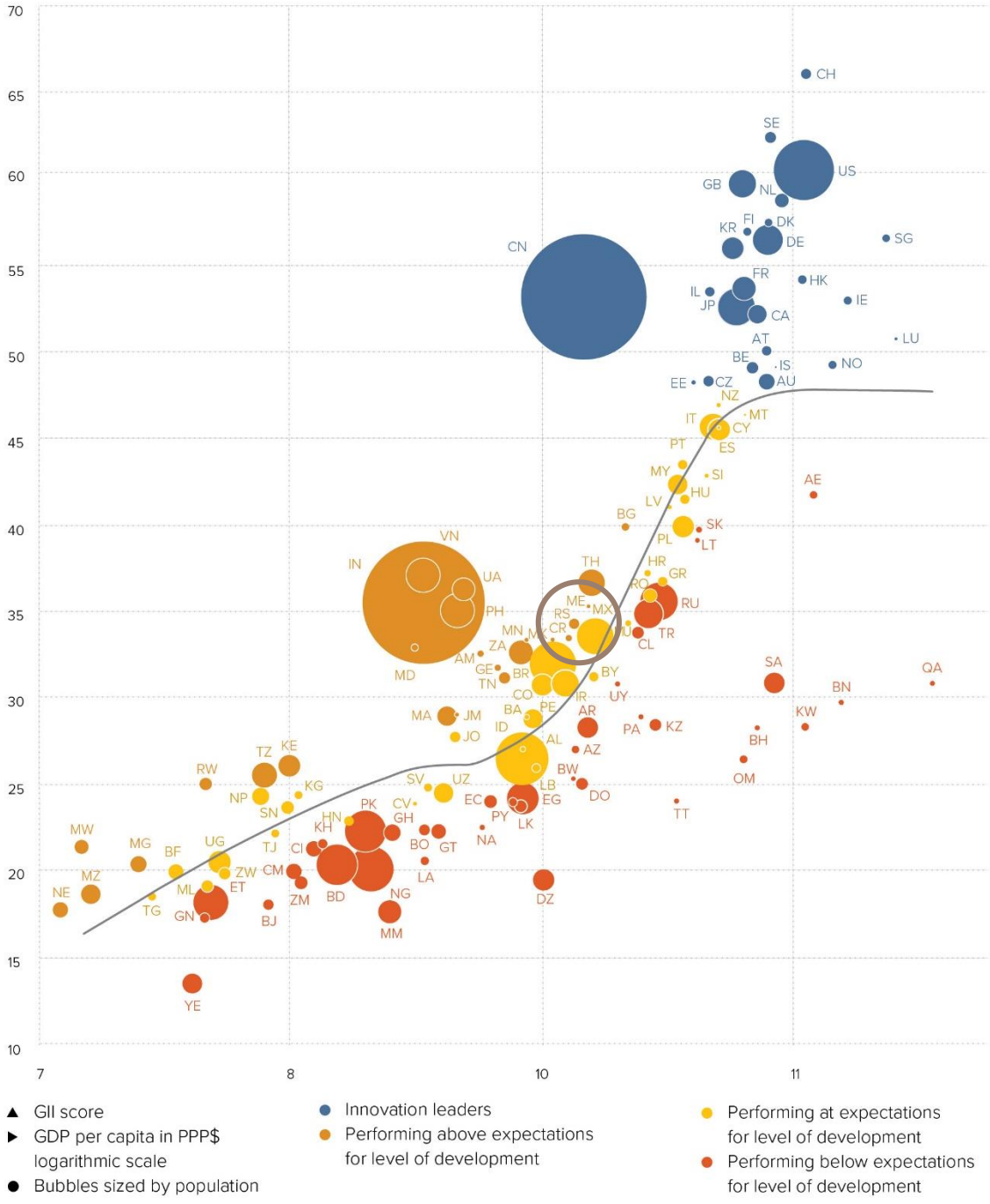
**34th** Serbia ranks 34th among the 39 economies in Europe.

# 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 performing below expectations.

Relative to GDP, Serbia's performance is above expectations for its level of development.

## The positive relationship between innovation and development

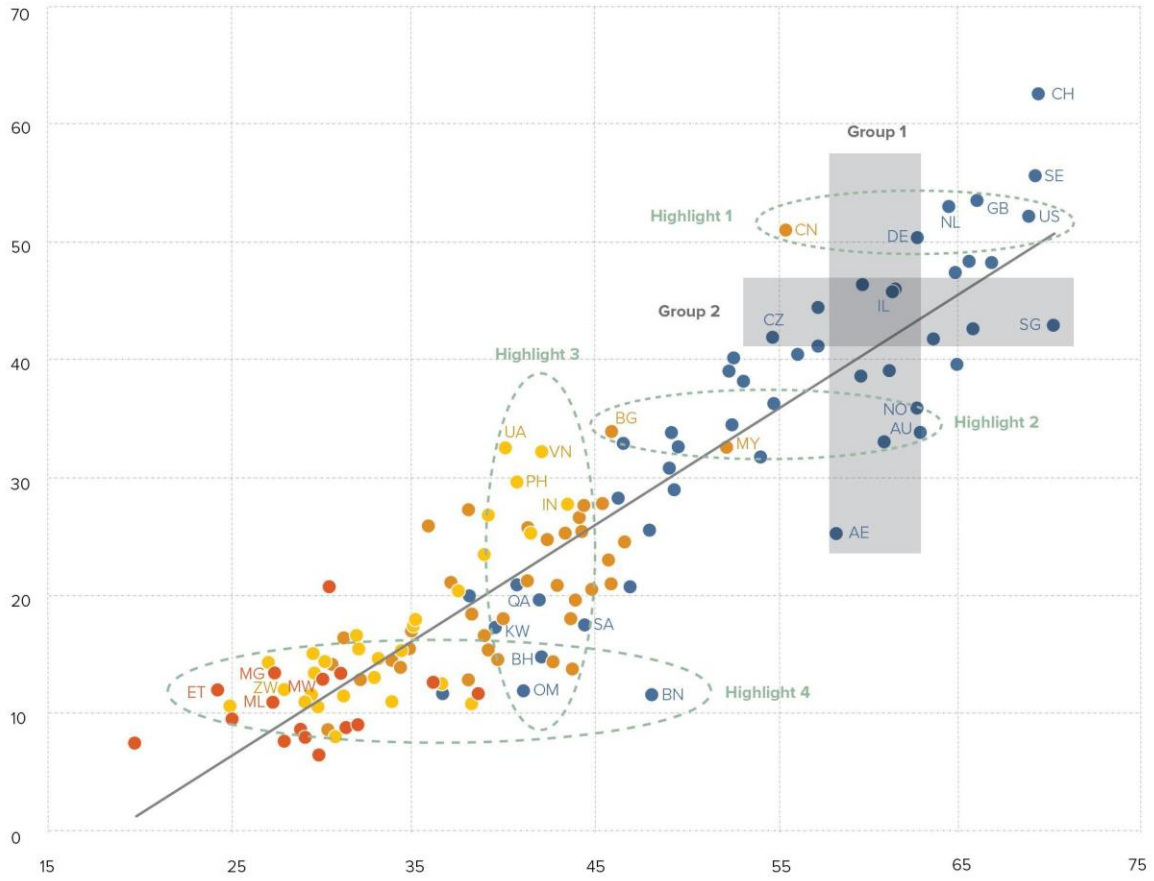


# EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

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

## Innovation input to output performance, 2020




▲ Output score
► Input score

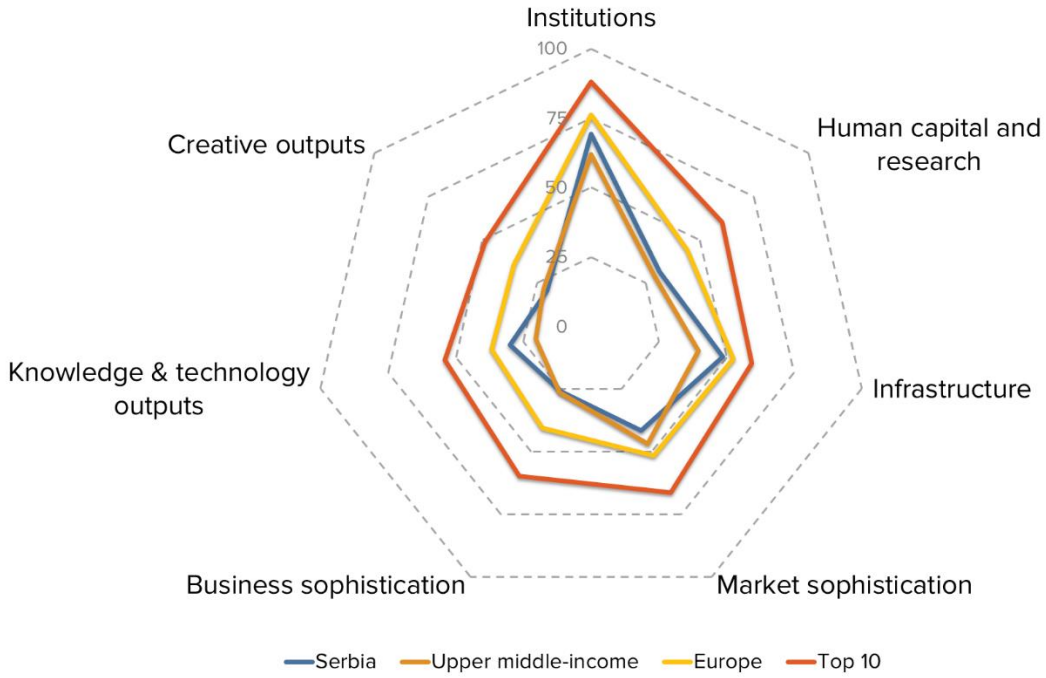
● High income group
● Upper middle-income group
● Lower middle-income group
● Low income group

— Fitted values

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AU | Australia | IN | India | NL | Netherlands | CH | Switzerland |
| BH | Bahrain | IL | Israel | NO | Norway | UA | Ukraine |
| BN | Brunei Darussalam | KW | Kuwait | OM | Oman | AE | United Arab Emirates |
| BG | Bulgaria | MG | Madagascar | PH | Philippines | GB | United Kingdom |
| CN | China | MW | Malawi | QA | Qatar | US | United States of America |
| CZ | Czech Republic | ML | Mali | SA | Saudi Arabia | VN | Viet Nam |
| ET | Ethiopia | MY | Malaysia | SG | Singapore | ZW | Zimbabwe |
| DE | Germany | | | SE | Sweden | | |

# BENCHMARKING SERBIA AGAINST OTHER UPPER MIDDLE-INCOME GROUP ECONOMIES AND EUROPE

**Serbia's scores in the seven GII pillars**




**Upper middle-income group economies**

Serbia has high scores in four out of the seven GII pillars: Institutions, Human capital & research, Infrastructure and Knowledge & technology outputs, which are above average for the upper middle-income group.

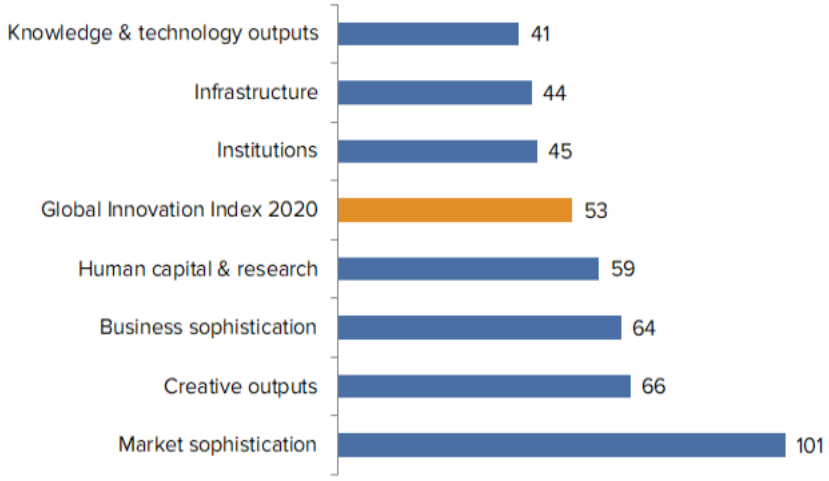
Conversely, Serbia scores below average for its income group in three pillars: Market sophistication, Business sophistication and Creative outputs.

**Europe**

Serbia performs below the regional average in all GII pillars.

# OVERVIEW OF SERBIA RANKINGS IN THE SEVEN GII AREAS

Serbia performs best in Knowledge & technology outputs and its weakest performance is in Market sophistication.




*The highest possible ranking in each pillar is 1.

# INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Serbia in the GII 2020.

**Strengths**

| Code | Indicator name | Rank |
|---|---|---|
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 1 |
| 2.1.5 | Pupil-teacher ratio, secondary | 10 |
| 3.3 | Ecological sustainability | 20 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP$ GDP | 4 |
| 5.2.3 | GERD financed by abroad, % GDP | 17 |
| 5.3.3 | ICT services imports, % total trade | 23 |
| 5.3.4 | FDI net inflows, % GDP | 17 |
| 6.1.4 | Scientific & technical articles/bn PPP$ GDP | 7 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 15 |
| 6.3.3 | ICT services exports, % total trade | 12 |
| 7.2.1 | Cultural & creative services exports, % total trade | 12 |

**Weaknesses**

| Code | Indicator name | Rank |
|---|---|---|
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 90 |
| 2.3.3 | Global R&D companies, top 3, mn US$ | 42 |
| 3.3.1 | GDP/unit of energy use | 101 |
| 4 | Market sophistication | 101 |
| 4.2.2 | Market capitalization, % GDP | 72 |
| 5.1.4 | GERD financed by business, % | 77 |
| 5.2.2 | State of cluster development† | 98 |
| 5.3.2 | High-tech imports, % total trade | 98 |
| 5.3.5 | Research talent, % in business enterprise | 65 |
| 6.2.3 | Computer software spending, % GDP | 105 |
| 7.1.2 | Global brand value, top 5000, % GDP | 80 |

## STRENGTHS

GII strengths for Serbia are found in six of the seven GII pillars.

- Institutions (45): exhibits strengths in the indicator Cost of redundancy dismissal (1).
- Human capital & research (59): shows strengths in the indicator Pupil-teacher ratio (10).
- Infrastructure (44): demonstrates strengths in the sub-pillar Ecological sustainability (20) and in the indicator ISO 14001 environmental certificates (4).
- Business sophistication (64): displays strengths in the indicators GERD financed by abroad (17), ICT services imports (23) and FDI net inflows (17).
- Knowledge & technology outputs (41): reveals strengths in the indicators Scientific & technical articles (7), ISO 9001 quality certificates (15) and ICT services exports (12).
- Creative outputs (66): shows strengths in the indicator Cultural & creative services exports (12).

## WEAKNESSES

GII weaknesses for Serbia are found in six of the seven GII pillars.

- Human capital & research (59): exhibits weaknesses in the indicators Government funding/pupil (90) and Global R&D companies (42).
- Infrastructure (44): displays weaknesses in the indicator GDP/unit of energy use (101).
- Market sophistication (101): shows weaknesses in the indicator Market capitalization (72).
- Business sophistication (64): demonstrates weaknesses in the indicators GERD financed by business (77), State of cluster development (98), High-tech imports (98) and Research talent (65).
- Knowledge & technology outputs (41): reveals weaknesses in the indicator Computer software spending (105).
- Creative outputs (66): shows weaknesses in the indicator Global brand value (80).

# SERBIA

GII 2020 rank

**53**

| Output rank | Input rank | Income | Region | Population (mn) | GDP, PPP$ | GDP per capita, PPP$ | GII 2019 rank |
|---|---|---|---|---|---|---|---|
| 56 | 58 | Upper middle | EUR | 8.8 | 129.3 | 16,207.3 | 57 |

| | | Score/Value | Rank | |
|---|---|---|---|---|
| **INSTITUTIONS** | | **69.4** | **45** | |
| **1.1** | **Political environment** | **58.9** | **64** | |
| 1.1.1 | Political and operational stability* | 71.4 | 59 | |
| 1.1.2 | Government effectiveness* | 52.6 | 65 | |
| **1.2** | **Regulatory environment** | **71.2** | **44** | |
| 1.2.1 | Regulatory quality* | 42.0 | 68 | |
| 1.2.2 | Rule of law* | 42.8 | 70 | |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.0 | 1 | ● ◆ |
| **1.3** | **Business environment** | **78.1** | **38** | |
| 1.3.1 | Ease of starting a business* | 89.3 | 60 | |
| 1.3.2 | Ease of resolving insolvency* | 67.0 | 38 | |
| **HUMAN CAPITAL & RESEARCH** | | **31.7** | **59** | |
| **2.1** | **Education** | **39.8** | **81** | |
| 2.1.1 | Expenditure on education, % GDP | 3.7 | 85 | |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 11.1 | 90 | ○ |
| 2.1.3 | School life expectancy, years | 14.7 | 57 | |
| 2.1.4 | PISA scales in reading, maths, & science | 442.5 | 44 | |
| 2.1.5 | Pupil-teacher ratio, secondary | 7.9 | 10 | ● ◆ |
| **2.2** | **Tertiary education** | **43.7** | **34** | |
| 2.2.1 | Tertiary enrolment, % gross | 67.2 | 35 | |
| 2.2.2 | Graduates in science & engineering, % | 28.1 | 23 | |
| 2.2.3 | Tertiary inbound mobility, % | 4.4 | 52 | |
| **2.3** | **Research & development (R&D)** | **11.6** | **54** | |
| 2.3.1 | Researchers, FTE/mn pop | 2,087.2 | 39 | ◆ |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.9 | 40 | |
| 2.3.3 | Global R&D companies, avg. exp. top 3, mn $US | 0.0 | 42 | ○ ◇ |
| 2.3.4 | QS university ranking, average score top 3* | 3.0 | 76 | |
| **INFRASTRUCTURE** | | **48.6** | **44** | ◆ |
| **3.1** | **Information & communication technologies (ICTs)** | **70.7** | **56** | |
| 3.1.1 | ICT access* | 71.4 | 57 | |
| 3.1.2 | ICT use* | 56.3 | 64 | |
| 3.1.3 | Government's online service* | 73.6 | 58 | |
| 3.1.4 | E-participation* | 81.5 | 48 | |
| **3.2** | **General infrastructure** | **25.0** | **74** | |
| 3.2.1 | Electricity output, kWh/mn pop | 5,191.8 | 39 | ◆ |
| 3.2.2 | Logistics performance* | 36.2 | 64 | |
| 3.2.3 | Gross capital formation, % GDP | 23.4 | 65 | |
| **3.3** | **Ecological sustainability** | **50.0** | **20** | ● ◆ |
| 3.3.1 | GDP/unit of energy use | 6.0 | 101 | ○ ◇ |
| 3.3.2 | Environmental performance* | 55.2 | 43 | ◆ |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP$ GDP | 10.1 | 4 | ● ◆ |
| **MARKET SOPHISTICATION** | | **41.6** | **101** | ○ |
| **4.1** | **Credit** | **33.5** | **96** | |
| 4.1.1 | Ease of getting credit* | 65.0 | 61 | |
| 4.1.2 | Domestic credit to private sector, % GDP | 41.5 | 78 | |
| 4.1.3 | Microfinance gross loans, % GDP | 0.2 | 45 | |
| **4.2** | **Investment** | **35.8** | **71** | |
| 4.2.1 | Ease of protecting minority investors* | 70.0 | 36 | |
| 4.2.2 | Market capitalization, % GDP | 3.7 | 72 | ○ |
| 4.2.3 | Venture capital deals/bn PPP$ GDP | n/a | n/a | |
| **4.3** | **Trade, competition, and market scale** | **55.7** | **96** | |
| 4.3.1 | Applied tariff rate, weighted avg., % | n/a | n/a | |
| 4.3.2 | Intensity of local competition+ | 64.1 | 84 | |
| 4.3.3 | Domestic market scale, bn PPP$ | 129.3 | 75 | |

| | | Score/Value | Rank | |
|---|---|---|---|---|
| **BUSINESS SOPHISTICATION** | | **25.8** | **64** | |
| **5.1** | **Knowledge workers** | **29.3** | **68** | |
| 5.1.1 | Knowledge-intensive employment, % | 28.4 | 50 | |
| 5.1.2 | Firms offering formal training, % | 38.3 | 32 | |
| 5.1.3 | GERD performed by business, % GDP | 0.4 | 43 | |
| 5.1.4 | GERD financed by business, % | 10.0 | 77 | ○ |
| 5.1.5 | Females employed w/advanced degrees, % | 14.7 | 47 | |
| **5.2** | **Innovation linkages** | **22.6** | **56** | |
| 5.2.1 | University/industry research collaboration+ | 39.6 | 77 | |
| 5.2.2 | State of cluster development+ | 40.0 | 98 | ○ |
| 5.2.3 | GERD financed by abroad, % GDP | 0.2 | 17 | ● ◆ |
| 5.2.4 | JV-strategic alliance deals/bn PPP$ GDP | 0.0 | 61 | |
| 5.2.5 | Patent families 2+ offices/bn PPP$ GDP | 0.1 | 56 | |
| **5.3** | **Knowledge absorption** | **25.4** | **77** | |
| 5.3.1 | Intellectual property payments, % total trade | 1.0 | 36 | |
| 5.3.2 | High-tech imports, % total trade | 5.9 | 98 | ○ |
| 5.3.3 | ICT services imports, % total trade | 2.2 | 23 | ● ◆ |
| 5.3.4 | FDI net inflows, % GDP | 6.8 | 17 | ● ◆ |
| 5.3.5 | Research talent, % in business enterprise | 8.2 | 65 | ○ |
| **KNOWLEDGE & TECHNOLOGY OUTPUTS** | | **30.0** | **41** | ◆ |
| **6.1** | **Knowledge creation** | **27.8** | **36** | |
| 6.1.1 | Patents by origin/bn PPP$ GDP | 1.4 | 53 | |
| 6.1.2 | PCT patents by origin/bn PPP$ GDP | 0.3 | 41 | |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | 0.6 | 35 | |
| 6.1.4 | Scientific & technical articles/bn PPP$ GDP | 32.3 | 7 | ● ◆ |
| 6.1.5 | Citable documents H-index | 14.4 | 55 | |
| **6.2** | **Knowledge impact** | **29.1** | **43** | |
| 6.2.1 | Growth rate of PPP$ GDP/worker, % | 1.5 | 55 | |
| 6.2.2 | New businesses/th pop. 15-64 | 1.9 | 58 | |
| 6.2.3 | Computer software spending, % GDP | 0.0 | 105 | ○ ◇ |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 19.8 | 15 | ● ◆ |
| 6.2.5 | High- and medium-high-tech manufacturing, % | 24.2 | 46 | |
| **6.3** | **Knowledge diffusion** | **33.0** | **37** | |
| 6.3.1 | Intellectual property receipts, % total trade | 0.2 | 36 | ◆ |
| 6.3.2 | High-tech net exports, % total trade | 1.7 | 61 | |
| 6.3.3 | ICT services exports, % total trade | 4.9 | 12 | ● ◆ |
| 6.3.4 | FDI net outflows, % GDP | 0.6 | 75 | |
| **CREATIVE OUTPUTS** | | **20.5** | **66** | |
| **7.1** | **Intangible assets** | **19.4** | **94** | |
| 7.1.1 | Trademarks by origin/bn PPP$ GDP | 28.8 | 78 | |
| 7.1.2 | Global brand value, top 5,000, % GDP | 0.0 | 80 | ○ ◇ |
| 7.1.3 | Industrial designs by origin/bn PPP$ GDP | 1.6 | 55 | |
| 7.1.4 | ICTs & organizational model creation+ | 51.7 | 75 | |
| **7.2** | **Creative goods and services** | **19.0** | **56** | |
| 7.2.1 | Cultural & creative services exports, % total trade | 1.6 | 12 | ● ◆ |
| 7.2.2 | National feature films/mn pop. 15-69 | 5.6 | 39 | |
| 7.2.3 | Entertainment & Media market/th pop. 15-69 | n/a | n/a | |
| 7.2.4 | Printing and other media, % manufacturing | 1.1 | 50 | |
| 7.2.5 | Creative goods exports, % total trade | 0.6 | 58 | |
| **7.3** | **Online creativity** | **24.3** | **47** | |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15-69 | 1.3 | 91 | |
| 7.3.2 | Country-code TLDs/th pop. 15-69 | 5.2 | 52 | |
| 7.3.3 | Wikipedia edits/mn pop. 15-69 | 72.5 | 36 | ◆ |
| 7.3.4 | Mobile app creation/bn PPP$ GDP | 19.6 | 24 | |

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 either missing or outdated for Serbia.

### Missing data

| Code | Indicator name | Country year | Model year | Source |
|---|---|---|---|---|
| 4.2.3 | Venture capital deals/bn PPP$ GDP | n/a | 2019 | Thomson Reuters |
| 4.3.1 | Applied tariff rate, weighted avg., % | n/a | 2018 | World Bank |
| 7.2.3 | Entertainment & Media market/th pop. 15–69 | n/a | 2018 | PwC |

### Outdated data

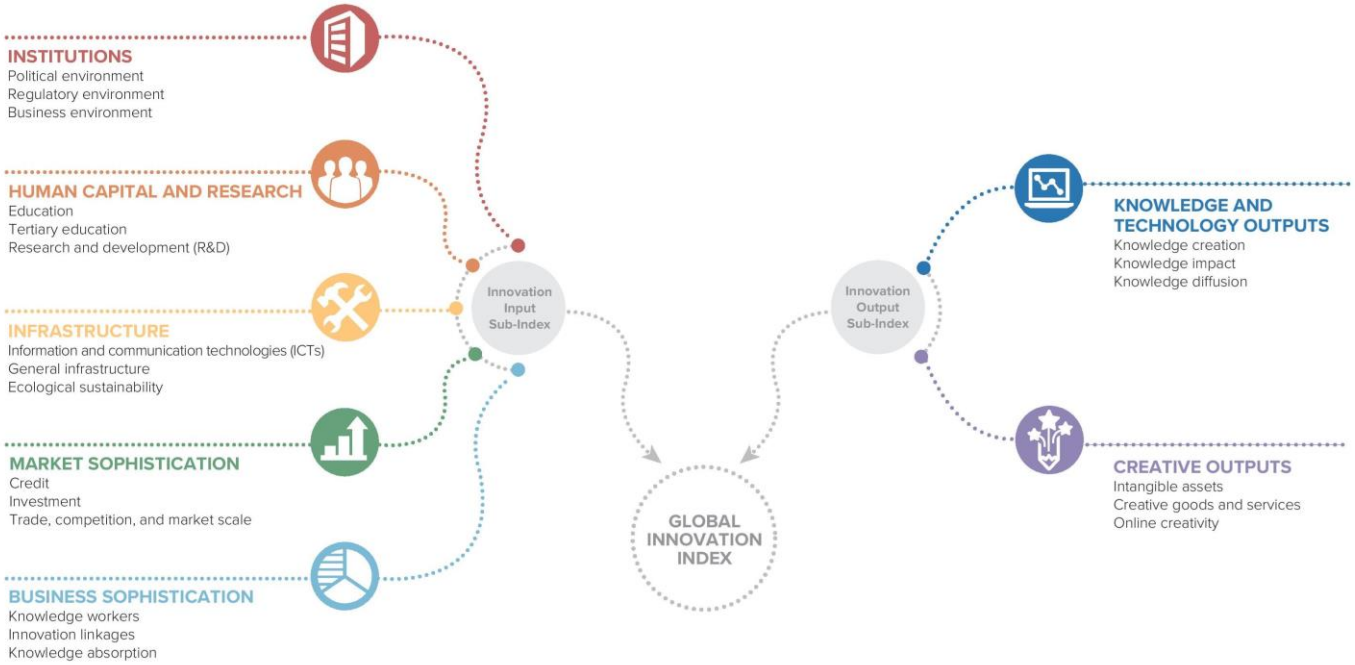
| Code | Indicator name | Country year | Model year | Source |
|---|---|---|---|---|
| 2.1.1 | Expenditure on education, % GDP | 2017 | 2018 | UNESCO Institute for Statistics |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 2015 | 2016 | UNESCO Institute for Statistics |
| 4.2.2 | Market capitalization, % GDP | 2011 | 2018 | World Federation of Exchanges |

# 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 2020, the GII presents its 13th edition devoted to the theme *Who Will Finance Innovation?*

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.

**Framework of the Global Innovation Index 2020**




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.