# GLOBAL INNOVATION INDEX 2019

# THE CZECH REPUBLIC

**26th** The Czech Republic ranks 26th 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 the Czech Republic 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 the Czech Republic's ranking in the GII 2019 is between 21 and 27.

**Rankings of the Czech Republic, 2017 - 2019**

| | GII | Innovation Inputs | Innovation Outputs |
|---|---|---|---|
| **2019** | 26 | 29 | 21 |
| **2018** | 27 | 30 | 20 |
| **2017** | 24 | 27 | 16 |

- The Czech Republic performs better in Innovation Outputs than Inputs.
- This year the Czech Republic ranks 29th in Innovation Inputs, better than last year but worse compared to 2017.
- As for Innovation Outputs, the Czech Republic ranks 21st. This position is worse than last year and compared to 2017.

**25th** The Czech Republic ranks 25th among the 50 high-income economies.

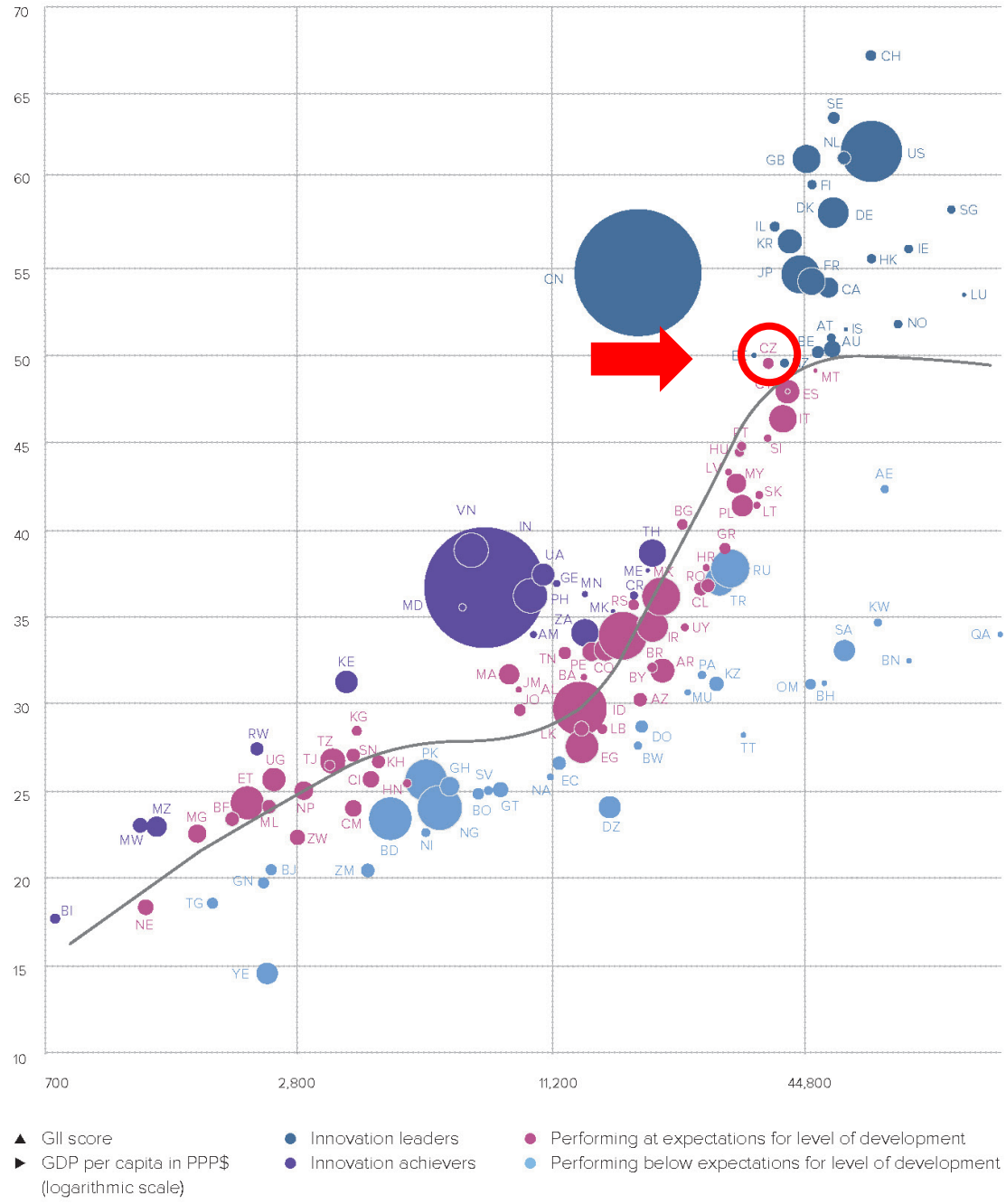
**16th** The Czech Republic ranks 16th among the 39 economies in Europe.

# 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, the Czech Republic performs at its expected level of development.

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




▲ GII score
► GDP per capita in PPP$ (logarithmic scale)

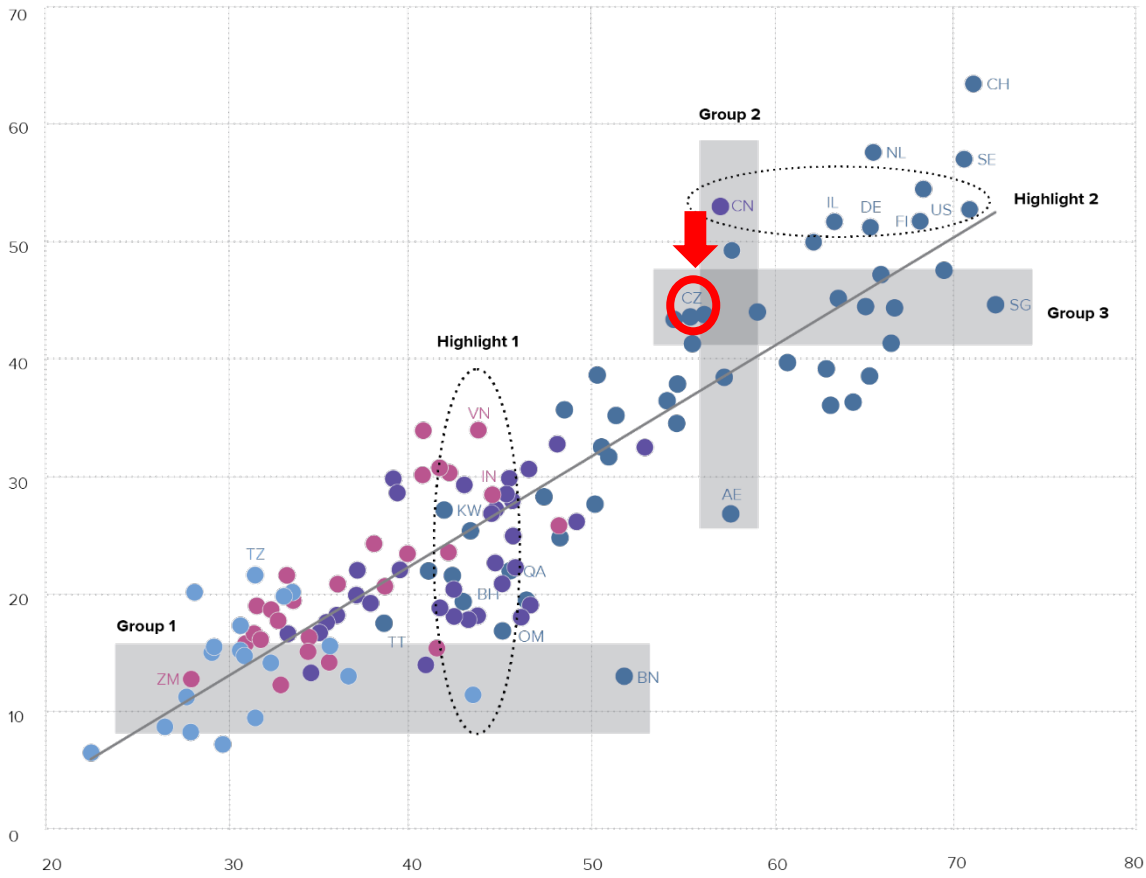
- Innovation leaders
- Innovation achievers
- Performing at expectations for level of development
- Performing below expectations for level of development

# 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.

The Czech Republic 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

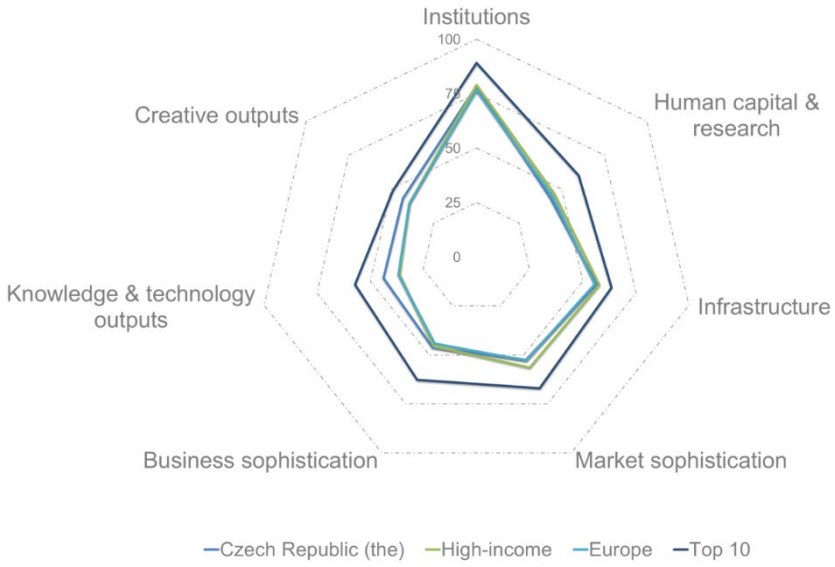
— Fitted values

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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 | | |

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2019.

# BENCHMARKING THE CZECH REPUBLIC TO OTHER HIGH-INCOME ECONOMIES AND THE EUROPE REGION

**The Czech Republic's scores in the seven GII pillars**




**High-income economies**

The Czech Republic has high scores in 3 out of the 7 GII pillars: Business sophistication, Knowledge & technology outputs, and Creative outputs, which are above the average of the high-income group.

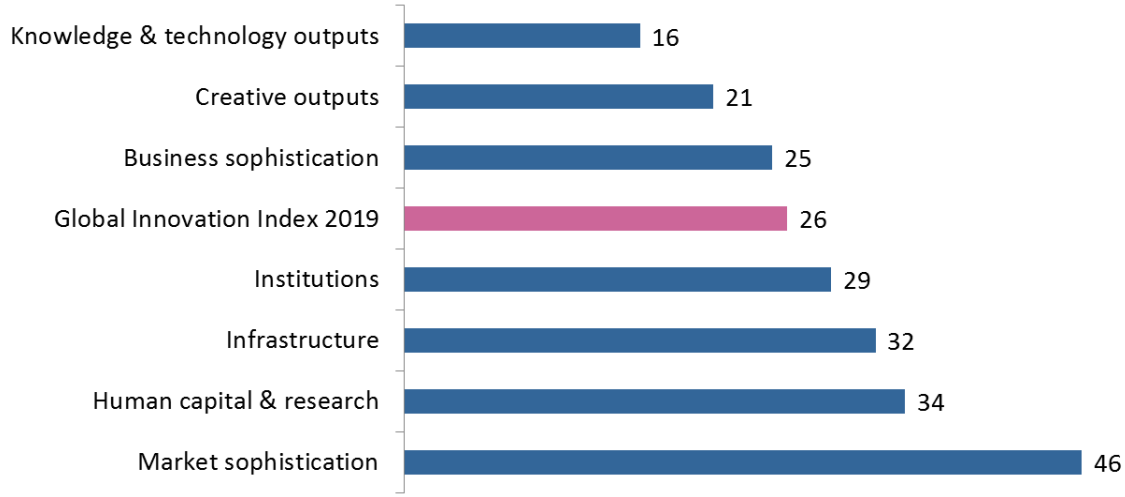
**Europe Region**

Compared to other economies in Europe, the Czech Republic performs above average in 5 out of the 7 GII pillars: Institutions, Infrastructure, Business sophistication, Knowledge & technology outputs, and Creative outputs.

Top ranks are found in areas such as Ecological sustainability. Knowledge impact, Knowledge diffusion, and Creative goods & services where the country ranks in the top 20 worldwide.

# OVERVIEW OF THE CZECH REPUBLIC'S RANKINGS IN THE 7 GII AREAS

The Czech Republic performs the best in Knowledge & technology outputs and its weakest performance is in Market sophistication.




*The highest possible ranking in each pillar is 1.

# THE CZECH REPUBLIC'S INNOVATION STRENGTHS AND WEAKNESSES

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

**Strengths**

| Code | Indicator name | Rank |
|---|---|---|
| 1.3.2 | Ease of resolving insolvency* | 14 |
| 3.3 | Ecological sustainability | 16 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP$ GDP | 3 |
| 5.2.3 | GERD financed by abroad, % | 13 |
| 5.3.2 | High-tech imports, % total trade | 8 |
| 6 | Knowledge & technology outputs | 16 |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | 6 |
| 6.2 | Knowledge impact | 10 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 3 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 5 |
| 6.3.2 | High-tech net exports, % total trade | 1 |
| 7.2 | Creative goods & services | 6 |
| 7.2.5 | Creative goods exports, % total trade | 1 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 15 |

**Weaknesses**

| Code | Indicator name | Rank |
|---|---|---|
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 83 |
| 1.3.1 | Ease of starting a business* | 89 |
| 2.3.3 | Global R&D companies, top 3, in mn US$ | 43 |
| 3.1.3 | Government's online service* | 82 |
| 3.1.4 | E-participation* | 88 |
| 3.3.1 | GDP/unit of energy use | 79 |
| 4.2 | Investment | 80 |
| 4.2.1 | Ease of protecting minority investors* | 68 |
| 4.2.3 | Venture capital deals/bn PPP$ GDP | 70 |
| 5.2.4 | JV–strategic alliance deals/bn PPP$ GDP | 62 |
| 7.2.4 | Printing & other media, % manufacturing | 66 |

## STRENGTHS

- GII strengths for the Czech Republic are found in five of the seven GII pillars, and mostly on the innovation output side of the GII.
- Pillar Knowledge & technology outputs (16) is a notable strength of this country. Most of the country's strengths are found in this pillar.
- In Knowledge & technology outputs (16), strengths are sub-pillar Knowledge impact (10) and four indicators: Utility models by origin (6), ISO 9001 quality certificates (3), High- & medium-high-tech manufactures (5), and High-tech exports, where the country ranks 1st worldwide.
- In Creative outputs (21), GII strengths are found in sub-pillar Creative goods & services (6) and indicators Country-code TLDs (15) and Creative goods exports, where the Czech Republic places 1st globally.
- The other relative strengths for this country are:
    - indicator Ease of resolving insolvency (14) in Institutions (29);
    - sub-pillar Ecological sustainability (16) and its indicator ISO 14001 environmental certificates (3) in Infrastructure (32); and
    - indicators R&D financed by abroad (13) and High-tech imports (8) in Business sophistication (25).

## WEAKNESSES

- The Czech Republic's weaknesses in the GII are found in six of the seven GII pillars, and mostly on the innovation input side of the GII.
- In Institutions (29), the Czech Republic's weaknesses are indicators Cost of redundancy dismissal (83) and Ease of starting a business (89).
- In Human capital & research (34), the only relative weakness is indicator Global R&D companies (43).
- In Infrastructure (32), indicators Government's online service (82), E-participation (88), and GDP per unit of energy use (79) are relative weaknesses of the Czech Republic.
- In Market sophistication (46), the Czech Republic's weaknesses are sub-pillar Investment (80) and indicators Ease of protecting minority investors (68) and Venture capital deals (70).
- In Business sophistication (25), one weakness is found in indicator Joint Venture strategic alliance deals (62).
- In Creative outputs (21), only one indicator – Printing & other media (66) – is a relative weakness for this country.

# CZECH REPUBLIC (THE)

GII 2019 rank

**26**

| Output rank | Input rank | Income | Region | Population (mn) | GDP, PPP$ | GDP per capita, PPP$ | GII 2018 rank |
|---|---|---|---|---|---|---|---|
| **21** | **29** | **High** | **EUR** | **10.6** | **396.4** | **37,371.0** | **27** |

| | | Score/Value | Rank | |
|---|---|---|---|---|
| **INSTITUTIONS** | | **78.6** | **29** | |
| **1.1** | **Political environment** | **75.6** | **31** | |
| 1.1.1 | Political and operational stability* | 84.2 | 25 | |
| 1.1.2 | Government effectiveness* | 71.3 | 30 | |
| **1.2** | **Regulatory environment** | **78.4** | **33** | |
| 1.2.1 | Regulatory quality* | 75.0 | 25 | |
| 1.2.2 | Rule of law* | 75.9 | 26 | |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 20.2 | 83 | ○ |
| **1.3** | **Business environment** | **81.8** | **29** | |
| 1.3.1 | Ease of starting a business* | 83.6 | 89 | ○ ◇ |
| 1.3.2 | Ease of resolving insolvency* | 80.1 | 14 | ● |
| **HUMAN CAPITAL & RESEARCH** | | **43.4** | **34** | |
| **2.1** | **Education** | **59.7** | **26** | |
| 2.1.1 | Expenditure on education, % GDP | 5.8 | 23 | |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap... | 23.7 | 31 | |
| 2.1.3 | School life expectancy, years | 16.8 | 19 | |
| 2.1.4 | PISA scales in reading, maths, & science | 490.8 | 28 | |
| 2.1.5 | Pupil-teacher ratio, secondary | 11.5 | 44 | |
| **2.2** | **Tertiary education** | **43.2** | **26** | |
| 2.2.1 | Tertiary enrolment, % gross | 63.7 | 38 | |
| 2.2.2 | Graduates in science & engineering, % | 23.5 | 39 | |
| 2.2.3 | Tertiary inbound mobility, % | 11.5 | 15 | |
| **2.3** | **Research & development (R&D)** | **27.3** | **40** | |
| 2.3.1 | Researchers, FTE/mn pop | 3,689.9 | 25 | |
| 2.3.2 | Gross expenditure on R&D, % GDP | 1.8 | 20 | |
| 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* | 25.4 | 42 | |
| **INFRASTRUCTURE** | | **56.4** | **32** | |
| **3.1** | **Information & communication technologies(ICTs)** | **67.3** | **64** | ◇ |
| 3.1.1 | ICT access* | 71.9 | 60 | ◇ |
| 3.1.2 | ICT use* | 70.0 | 34 | |
| 3.1.3 | Government's online service* | 65.3 | 82 | ○ ◇ |
| 3.1.4 | E-participation* | 61.8 | 88 | ○ ◇ |
| **3.2** | **General infrastructure** | **48.6** | **22** | |
| 3.2.1 | Electricity output, kWh/mn pop | 8,107.8 | 21 | |
| 3.2.2 | Logistics performance* | 75.6 | 22 | |
| 3.2.3 | Gross capital formation, % GDP | 26.5 | 37 | |
| **3.3** | **Ecological sustainability** | **53.4** | **16** | ● |
| 3.3.1 | GDP/unit of energy use | 7.8 | 79 | ○ |
| 3.3.2 | Environmental performance* | 67.7 | 32 | |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP$ GDP.. | 11.7 | 3 | ● ◆ |
| **MARKET SOPHISTICATION** | | **52.4** | **46** | |
| **4.1** | **Credit** | **46.6** | **41** | |
| 4.1.1 | Ease of getting credit* | 70.0 | 40 | |
| 4.1.2 | Domestic credit to private sector, % GDP | 51.6 | 65 | |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a | |
| **4.2** | **Investment** | **39.2** | **80** | ○ |
| 4.2.1 | Ease of protecting minority investors* | 58.3 | 68 | ○ |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a | |
| 4.2.3 | Venture capital deals/bn PPP$ GDP | 0.0 | 70 | ○ |
| **4.3** | **Trade, competition, & market scale** | **71.5** | **31** | |
| 4.3.1 | Applied tariff rate, weighted avg., % | 1.8 | 23 | |
| 4.3.2 | Intensity of local competition† | 78.2 | 16 | |
| 4.3.3 | Domestic market scale, bn PPP$ | 396.4 | 46 | |

| | | Score/Value | Rank | |
|---|---|---|---|---|
| **BUSINESS SOPHISTICATION** | | **46.3** | **25** | |
| **5.1** | **Knowledge workers** | **55.2** | **30** | |
| 5.1.1 | Knowledge-intensive employment, % | 38.0 | 31 | |
| 5.1.2 | Firms offering formal training, % firms | 55.1 | 13 | |
| 5.1.3 | GERD performed by business, % GDP | 1.1 | 19 | |
| 5.1.4 | GERD financed by business, % | 39.3 | 46 | |
| 5.1.5 | Females employed w/advanced degrees, % | 12.2 | 58 | ◇ |
| **5.2** | **Innovation linkages** | **34.5** | **40** | |
| 5.2.1 | University/industry research collaboration† | 50.9 | 39 | |
| 5.2.2 | State of cluster development† | 50.5 | 46 | |
| 5.2.3 | GERD financed by abroad, % | 25.0 | 13 | ● ◆ |
| 5.2.4 | JV-strategic alliance deals/bn PPP$ GDP | 0.0 | 62 | ○ |
| 5.2.5 | Patent families 2+ offices/bn PPP$ GDP | 0.7 | 30 | |
| **5.3** | **Knowledge absorption** | **49.1** | **21** | |
| 5.3.1 | Intellectual property payments, % total trade | 0.8 | 47 | |
| 5.3.2 | High-tech imports, % total trade | 17.4 | 8 | ● ◆ |
| 5.3.3 | ICT services imports, % total trade | 1.3 | 55 | |
| 5.3.4 | FDI net inflows, % GDP | 3.6 | 47 | |
| 5.3.5 | Research talent, % in business enterprise | 51.6 | 23 | |
| **KNOWLEDGE & TECHNOLOGY OUTPUTS** | | **43.8** | **16** | ● |
| **6.1** | **Knowledge creation** | **35.1** | **24** | |
| 6.1.1 | Patents by origin/bn PPP$ GDP | 2.7 | 34 | |
| 6.1.2 | PCT patents by origin/bn PPP$ GDP | 0.5 | 37 | |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | 3.2 | 6 | ● ◆ |
| 6.1.4 | Scientific & technical articles/bn PPP$ GDP | 23.4 | 17 | |
| 6.1.5 | Citable documents H-index | 28.8 | 31 | |
| **6.2** | **Knowledge impact** | **54.5** | **10** | ● ◆ |
| 6.2.1 | Growth rate of PPP$ GDP/worker, % | 1.7 | 47 | |
| 6.2.2 | New businesses/th pop. 15-64 | 4.0 | 31 | |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 35 | |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 29.7 | 3 | ● ◆ |
| 6.2.5 | High- & medium-high-tech manufactures, % | 0.6 | 5 | ● ◆ |
| **6.3** | **Knowledge diffusion** | **41.7** | **19** | |
| 6.3.1 | Intellectual property receipts, % total trade | 0.3 | 30 | |
| 6.3.2 | High-tech net exports, % total trade | 17.1 | 1 | ● ◆ |
| 6.3.3 | ICT services exports, % total trade | 2.3 | 45 | |
| 6.3.4 | FDI net outflows, % GDP | 1.7 | 35 | |
| **CREATIVE OUTPUTS** | | **43.1** | **21** | |
| **7.1** | **Intangible assets** | **50.0** | **36** | |
| 7.1.1 | Trademarks by origin/bn PPP$ GDP | 61.9 | 34 | |
| 7.1.2 | Industrial designs by origin/bn PPP$ GDP | 6.5 | 21 | |
| 7.1.3 | ICTs & business model creation† | 65.7 | 49 | |
| 7.1.4 | ICTs & organizational model creation† | 66.3 | 26 | |
| **7.2** | **Creative goods & services** | **42.2** | **6** | ● ◆ |
| 7.2.1 | Cultural & creative services exports, % total trade | 0.5 | 47 | |
| 7.2.2 | National feature films/mn pop. 15-69 | 7.1 | 29 | |
| 7.2.3 | Entertainment & Media market/th pop. 15-69 | 22.2 | 26 | |
| 7.2.4 | Printing & other media, % manufacturing | 1.0 | 66 | ○ |
| 7.2.5 | Creative goods exports, % total trade | 10.1 | 1 | ● ◆ |
| **7.3** | **Online creativity** | **30.1** | **26** | |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15-69 | 17.1 | 30 | |
| 7.3.2 | Country-code TLDs/th pop. 15-69 | 48.5 | 15 | ● |
| 7.3.3 | Wikipedia edits/mn pop. 15-69 | 56.1 | 18 | |
| 7.3.4 | Mobile app creation/bn PPP$ GDP | 17.2 | 27 | |

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 the Czech Republic.

### Missing data

| Code | Indicator name | Country year | Model year | Source |
|---|---|---|---|---|
| 4.1.3 | Microfinance gross loans, % GDP | n/a | 2017 | Microfinance Information Exchange |
| 4.2.2 | Market capitalization, % GDP | n/a | 2017 | World Federation of Exchanges |

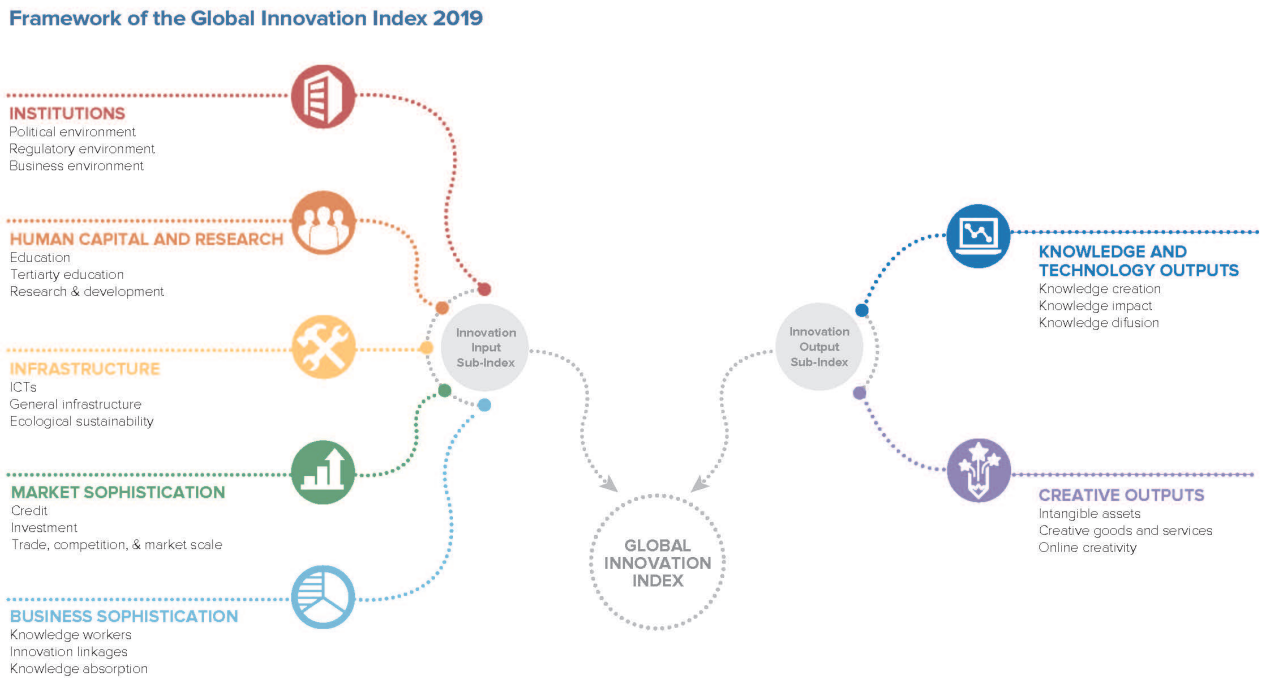
### Outdated data

| Code | Indicator name | Country year | Model year | Source |
|---|---|---|---|---|
| 2.1.5 | Pupil-teacher ratio, secondary | 2013 | 2017 | UNESCO Institute for Statistics |
| 2.2.1 | Tertiary enrolment, % gross | 2016 | 2017 | UNESCO Institute for Statistics |

# 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.




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.