Global Innovation Index 2022

CZECH REPUBLIC

30th Czech Republic ranks 30th among the 132 economies featured in the GII 2022.

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 Czech Republic 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 Czech Republic in the GII 2022 is between ranks 29 and 31.

Rankings for Czech Republic (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	24	28	17
2021	24	30	15
2022	30	33	27

- Czech Republic performs better in innovation outputs than innovation inputs in 2022.
- This year Czech Republic ranks 33rd in innovation inputs, lower than both 2021 and 2020.
- As for innovation outputs, Czech Republic ranks 27th. This position is lower than both 2021 and 2020.

29th Czech Republic ranks 29th among the 48 high-income group economies.

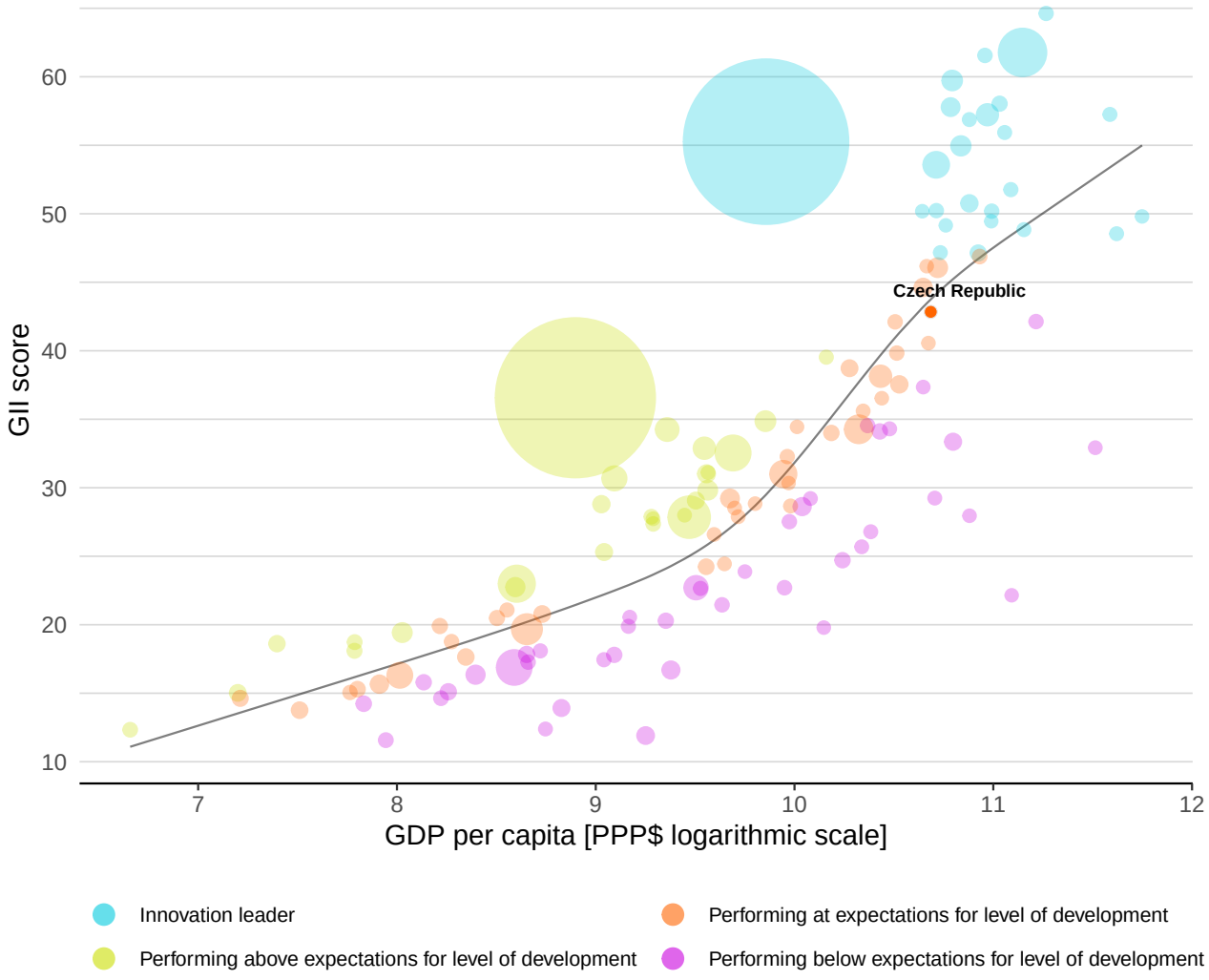
19th Czech Republic ranks 19th among the 39 economies in Europe.

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, Czech Republic's performance is at expectations for its level of development.

The positive relationship between innovation and development

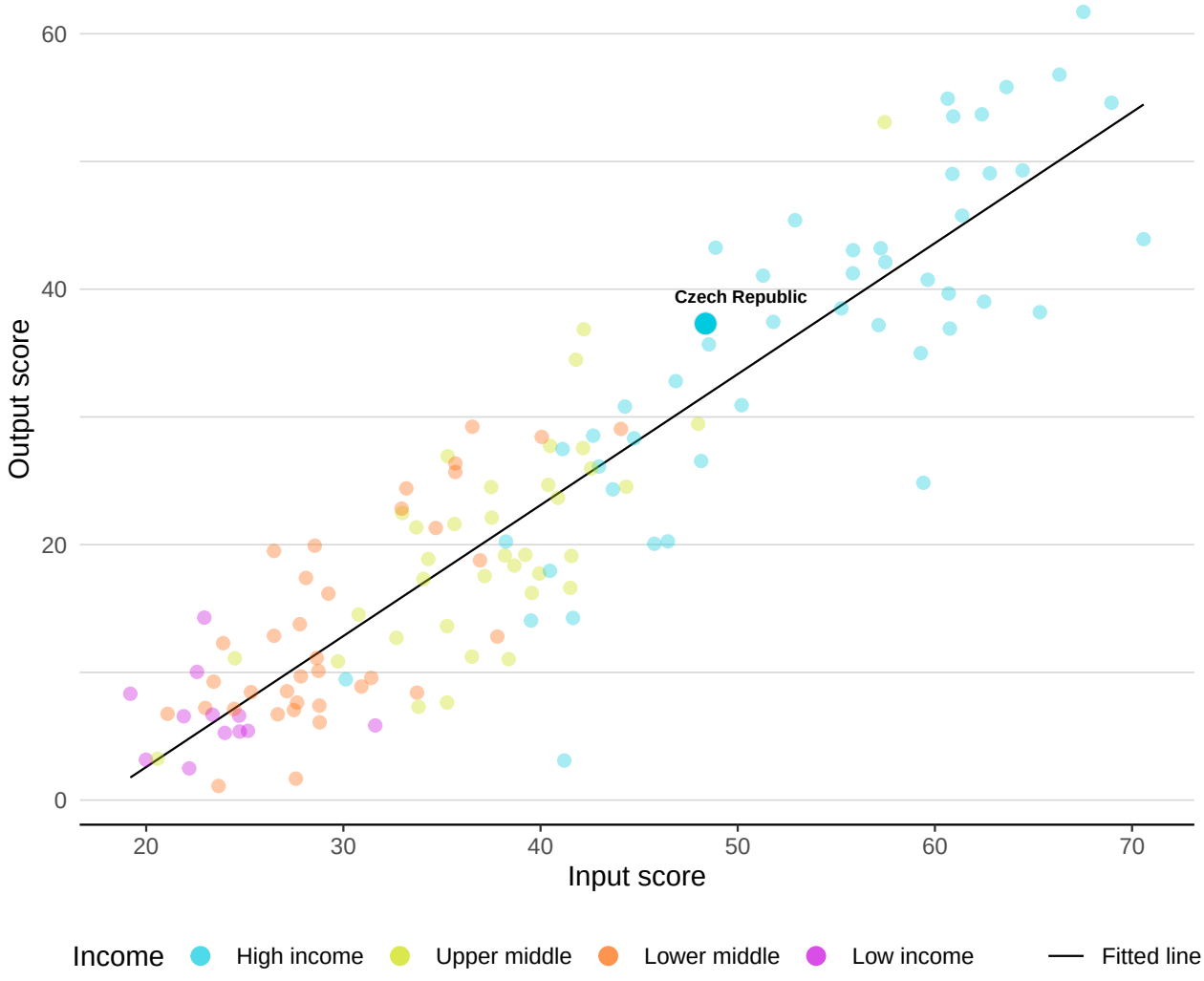


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

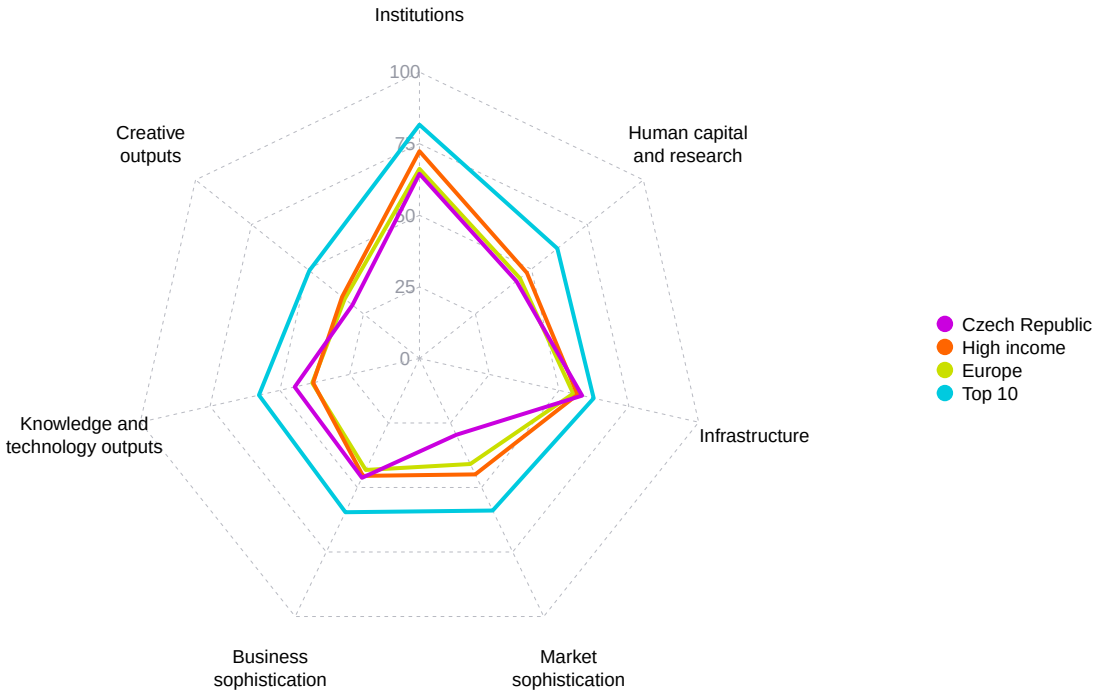
Czech Republic produces more innovation outputs relative to its level of innovation investments.

Innovation input to output performance



BENCHMARKING AGAINST OTHER HIGH-INCOME GROUP ECONOMIES AND EUROPE

The seven GII pillar scores for Czech Republic



High-income group economies

Czech Republic performs above the high-income group average in three pillars, namely: Infrastructure; Business sophistication; and, Knowledge and technology outputs.

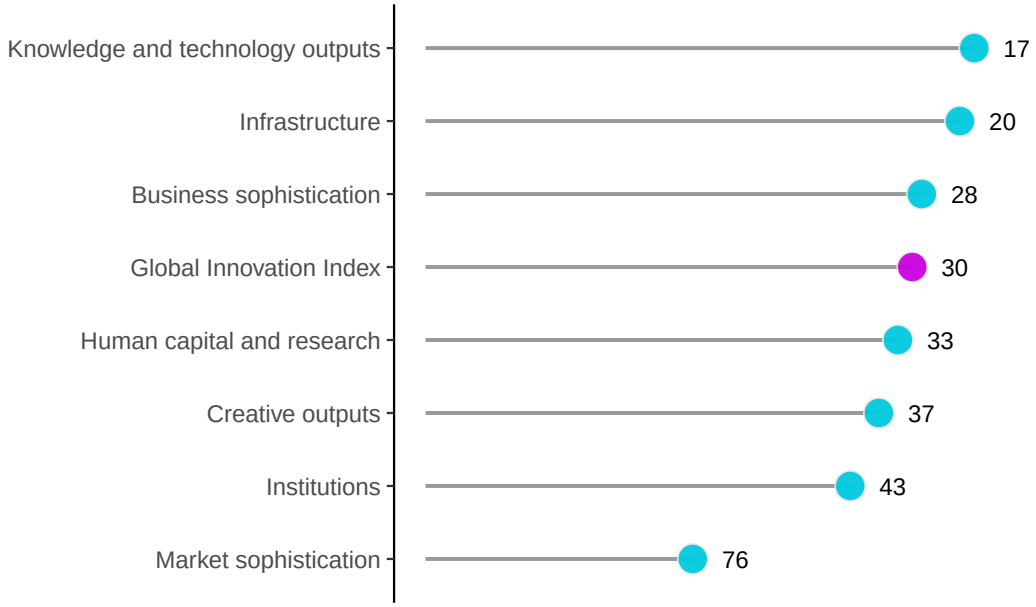
Europe

Czech Republic performs above the regional average in three pillars, namely: Infrastructure; Business sophistication; and, Knowledge and technology outputs.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

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

The seven GII pillar ranks for Czech Republic



Note: The highest possible ranking in each pillar is 1.

The full WIPO Intellectual Property Statistics profile for Czech Republic can be found at:

https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=CZ.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the indicator strengths and weaknesses of Czech Republic in the GII 2022.

Strengths and weaknesses for Czech Republic

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9	1.2.3	Cost of redundancy dismissal	86
5.2.3	GERD financed by abroad, % GDP	1	1.3.1	Policies for doing business	89
5.3.2	High-tech imports, % total trade	7	2.3.3	Global corporate R&D investors, top 3, mn USD	38
6.1.3	Utility models by origin/bn PPP$ GDP	7	3.3.1	GDP/unit of energy use	74
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5	4.2.1	Market capitalization, % GDP	72
6.2.5	High-tech manufacturing, %	4	4.2.3	Venture capital recipients, deals/bn PPP$ GDP	77
6.3.2	Production and export complexity	6	4.2.4	Venture capital received, value, % GDP	58
6.3.3	High-tech exports, % total trade	7	5.1.4	GERD financed by business, %	54
7.2.2	National feature films/mn pop. 15–69	5	5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	83
7.2.5	Creative goods exports, % total trade	1	7.2.4	Printing and other media, % manufacturing	57

GII 2022 rank

Czech Republic

30

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
27	33	High	EUR	10.7	469.1	43,714

		Score/ Value	Rank
Institutions		**64.5**	**43**
1.1	**Political environment**	76.1	30
1.1.1	Political and operational stability*	81.8	24
1.1.2	Government effectiveness*	70.3	33
1.2	**Regulatory environment**	75.3	36
1.2.1	Regulatory quality*	75.9	23
1.2.2	Rule of law*	73.6	27
1.2.3	Cost of redundancy dismissal	20.2	86 ○
1.3	**Business environment**	42.1	[82]
1.3.1	Policies for doing business†	42.1	89 ○ ◇
1.3.2	Entrepreneurship policies and culture*	n/a	n/a
Human capital and research		**43.3**	**33**
2.1	**Education**	60.0	37
2.1.1	Expenditure on education, % GDP 🕘	4.3	66
2.1.2	Government funding/pupil, secondary, % GDP/cap	25.5	20
2.1.3	School life expectancy, years	16.2	32
2.1.4	PISA scales in reading, maths and science	495.5	23
2.1.5	Pupil-teacher ratio, secondary 🕘	11.5	46
2.2	**Tertiary education**	45.4	24
2.2.1	Tertiary enrolment, % gross	65.6	44
2.2.2	Graduates in science and engineering, % 🕘	25.9	36
2.2.3	Tertiary inbound mobility, %	14.4	14
2.3	**Research and development (R&D)**	24.5	39
2.3.1	Researchers, FTE/mn pop.	4,127.9	25
2.3.2	Gross expenditure on R&D, % GDP	2.0	18
2.3.3	Global corporate R&D investors, top 3, mn USD	0.0	38 ○ ◇
2.3.4	QS university ranking, top 3*	31.5	38
Infrastructure		**58.3**	**20**
3.1	**Information and communication technologies (ICTs)**	77.1	54 ◇
3.1.1	ICT access*	89.7	49
3.1.2	ICT use*	73.8	45
3.1.3	Government's online service*	72.4	61
3.1.4	E-participation*	72.6	65
3.2	**General infrastructure**	50.4	24
3.2.1	Electricity output, GWh/mn pop.	7,490.7	26
3.2.2	Logistics performance*	75.8	22
3.2.3	Gross capital formation, % GDP	27.1	35
3.3	**Ecological sustainability**	47.3	18
3.3.1	GDP/unit of energy use	9.6	74 ○
3.3.2	Environmental performance*	59.9	19
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.3	9 ● ◆
Market sophistication		**29.6**	**76 ○ ◇**
4.1	**Credit**	18.8	[88]
4.1.1	Finance for startups and scaleups*	n/a	n/a
4.1.2	Domestic credit to private sector, % GDP	53.2	67
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	5.3	72 ○ ◇
4.2.1	Market capitalization, % GDP	10.6	72 ○ ◇
4.2.2	Venture capital investors, deals/bn PPP$ GDP	0.1	40
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	0.0	77 ○
4.2.4	Venture capital received, value, % GDP	0.0	58 ○
4.3	**Trade, diversification, and market scale**	64.6	29
4.3.1	Applied tariff rate, weighted avg., %	1.5	20
4.3.2	Domestic industry diversification	93.1	35
4.3.3	Domestic market scale, bn PPP$	469.1	46

		Score/ Value	Rank
Business sophistication		**46.2**	**28**
5.1	**Knowledge workers**	45.6	41
5.1.1	Knowledge-intensive employment, %	40.6	31
5.1.2	Firms offering formal training, %	43.6	26
5.1.3	GERD performed by business, % GDP	1.2	20
5.1.4	GERD financed by business, %	35.6	54 ○
5.1.5	Females employed w/advanced degrees, %	13.8	55 ◇
5.2	**Innovation linkages**	45.4	23
5.2.1	University-industry R&D collaboration†	59.1	24
5.2.2	State of cluster development and depth†	48.2	67
5.2.3	GERD financed by abroad, % GDP	0.6	1 ● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	83 ○ ◇
5.2.5	Patent families/bn PPP$ GDP	0.5	32
5.3	**Knowledge absorption**	47.7	19
5.3.1	Intellectual property payments, % total trade	0.8	52
5.3.2	High-tech imports, % total trade	23.7	7 ● ◆
5.3.3	ICT services imports, % total trade	1.7	53
5.3.4	FDI net inflows, % GDP	3.4	38
5.3.5	Research talent, % in businesses	51.0	24
Knowledge and technology outputs		**44.7**	**17**
6.1	**Knowledge creation**	35.4	27
6.1.1	Patents by origin/bn PPP$ GDP	2.0	36
6.1.2	PCT patents by origin/bn PPP$ GDP	0.6	32
6.1.3	Utility models by origin/bn PPP$ GDP	2.9	7 ● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	37.6	25
6.1.5	Citable documents H-index	30.4	32
6.2	**Knowledge impact**	48.0	11 ◆
6.2.1	Labor productivity growth, %	1.4	50
6.2.2	New businesses/th pop. 15–64	3.8	37
6.2.3	Software spending, % GDP	0.3	43
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	23.6	5 ● ◆
6.2.5	High-tech manufacturing, %	60.1	4 ● ◆
6.3	**Knowledge diffusion**	50.6	16
6.3.1	Intellectual property receipts, % total trade	0.4	30
6.3.2	Production and export complexity	83.9	6 ● ◆
6.3.3	High-tech exports, % total trade	23.8	7 ● ◆
6.3.4	ICT services exports, % total trade	3.1	38
Creative outputs		**29.9**	**37**
7.1	**Intangible assets**	24.1	70 ○
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a
7.1.2	Trademarks by origin/bn PPP$ GDP	59.2	39
7.1.3	Global brand value, top 5,000, % GDP	23.0	45
7.1.4	Industrial designs by origin/bn PPP$ GDP	3.4	33
7.2	**Creative goods and services**	40.6	7 ● ◆
7.2.1	Cultural and creative services exports, % total trade	0.7	42
7.2.2	National feature films/mn pop. 15–69	9.1	5 ●
7.2.3	Entertainment and media market/th pop. 15–69	24.2	25
7.2.4	Printing and other media, % manufacturing	0.9	57 ○
7.2.5	Creative goods exports, % total trade	12.5	1 ● ◆
7.3	**Online creativity**	30.9	24
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	54.5	16
7.3.3	GitHub commit pushes received/mn pop. 15–69	38.5	16
7.3.4	Mobile app creation/bn PPP$ GDP	13.3	28

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/global_innovation_index/en/2022. 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 Czech Republic.

Missing data for Czech Republic

Code	Indicator name	Economy year	Model year	Source
1.3.2	Entrepreneurship policies and culture	n/a	2021	Global Entrepreneurship Monitor
4.1.1	Finance for startups and scaleups	n/a	2021	Global Entrepreneurship Monitor
4.1.3	Loans from microfinance institutions, % GDP	n/a	2020	International Monetary Fund, Financial Access Survey (FAS)
7.1.1	Intangible asset intensity, top 15, %	n/a	2021	Brand Finance

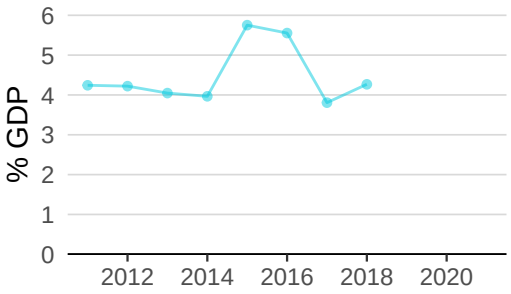
Outdated data for Czech Republic

Code	Indicator name	Economy year	Model year	Source
2.1.1	Expenditure on education, % GDP	2018	2020	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2013	2019	UNESCO Institute for Statistics
2.2.2	Graduates in science and engineering, %	2019	2020	UNESCO Institute for Statistics

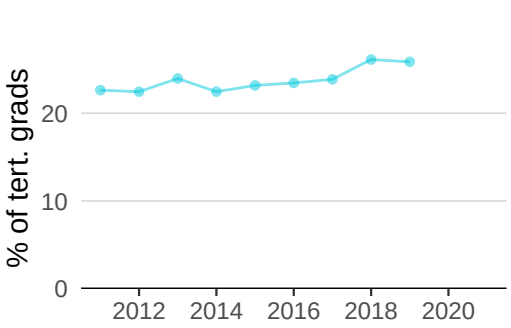
CZECH REPUBLIC'S INNOVATION SYSTEM

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

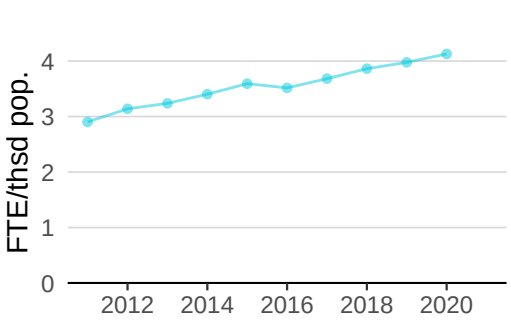
Innovation inputs



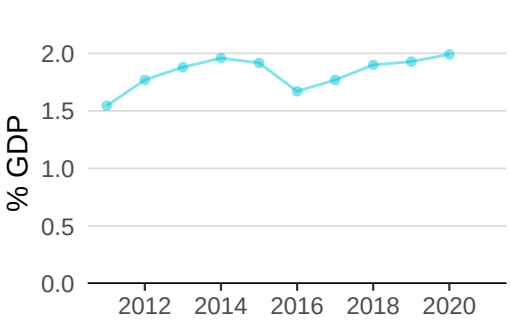
2.1.1 Expenditure on education was equal to 4.3% GDP in 2018–up by 12 percentage points from the year prior–and equivalent to an indicator rank of 66.



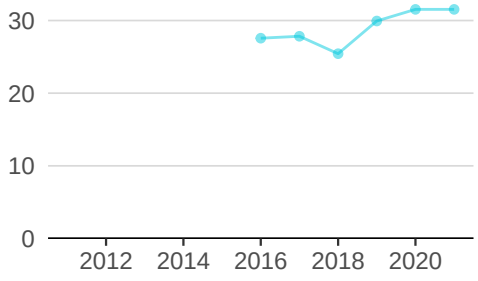
2.2.2 Graduates in science and engineering was equal to 25.9% of tert. grads in 2019–down by 1 percentage point from the year prior–and equivalent to an indicator rank of 36.



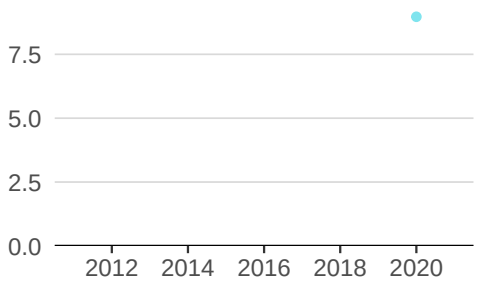
2.3.1 Researchers was equal to 4.1 FTE/thsd pop. in 2020–up by 4 percentage points from the year prior–and equivalent to an indicator rank of 25.



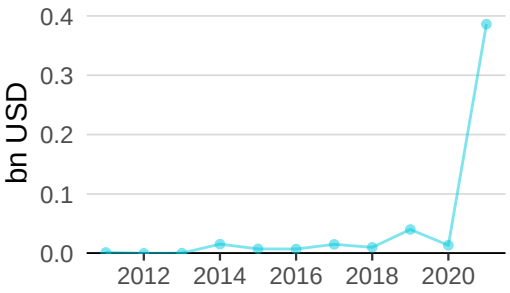
2.3.2 Gross expenditure on R&D was equal to 2.0% GDP in 2020–up by 3 percentage points from the year prior–and equivalent to an indicator rank of 18.



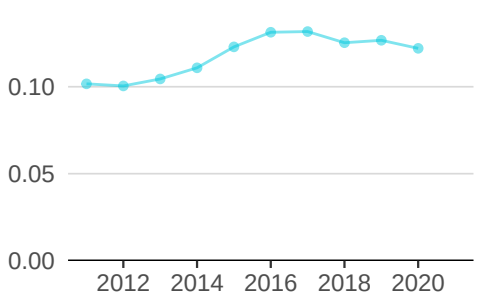
2.3.4 QS university ranking was equal to 31.5 in 2021–effectively unchanged from the year prior–and equivalent to an indicator rank of 38.



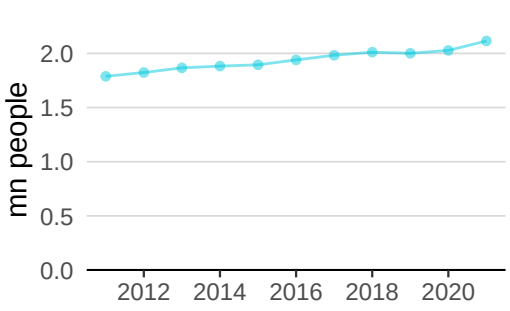
3.1.1 ICT access was equal to 9.0 in 2020 and equivalent to an indicator rank of 49.



4.2.4 Venture capital received was equal to 0.4 bn USD in 2021–up by 2762 percentage points from the year prior–and equivalent to an indicator rank of 58.

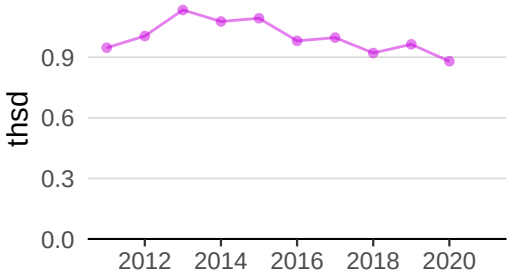


4.3.2 Domestic industry diversification was equal to 0.1 in 2020–down by 4 percentage points from the year prior–and equivalent to an indicator rank of 35.

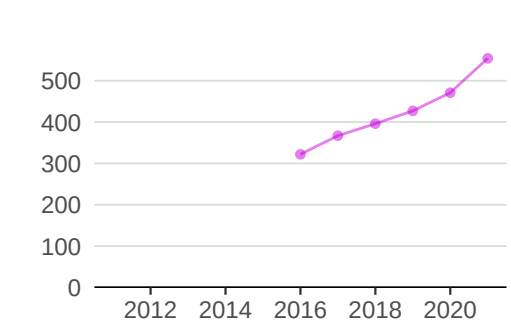


5.1.1 Knowledge-intensive employment was equal to 2.1 mn people in 2021–up by 4 percentage points from the year prior–and equivalent to an indicator rank of 31.

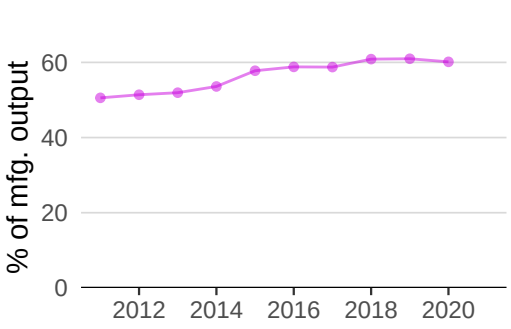
Innovation outputs



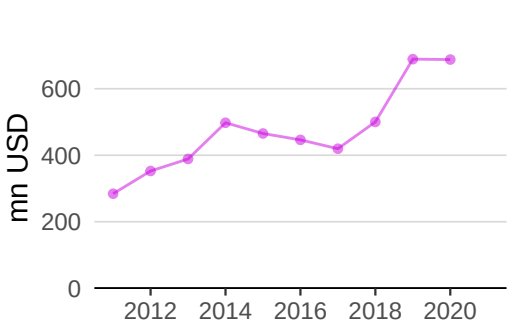
6.1.1 Patents by origin was equal to 0.9 thsd in 2020–down by 9 percentage points from the year prior–and equivalent to an indicator rank of 36.



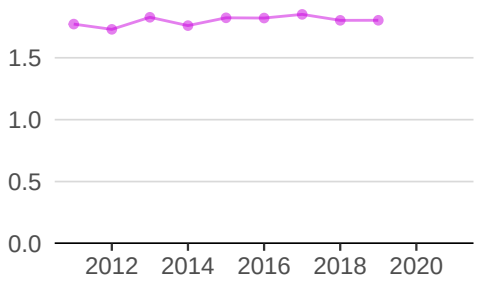
6.1.5 Citable documents H-index was equal to 554.0 in 2021–up by 18 percentage points from the year prior–and equivalent to an indicator rank of 32.



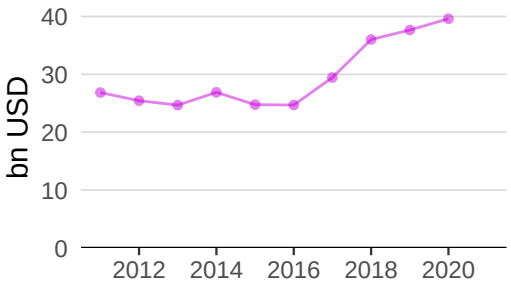
6.2.5 High-tech manufacturing was equal to 60.1% of mfg. output in 2020–down by 1 percentage point from the year prior–and equivalent to an indicator rank of 4.



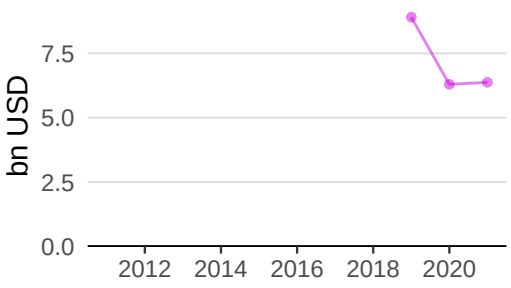
6.3.1 Intellectual property receipts was equal to 687.8 mn USD in 2020–effectively unchanged from the year prior–and equivalent to an indicator rank of 30.



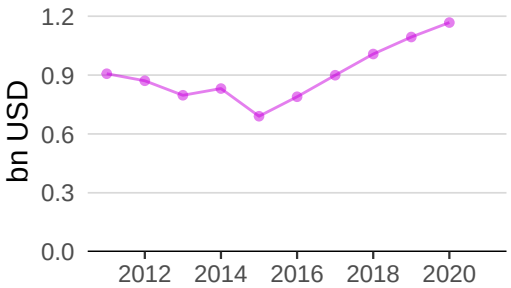
6.3.2 Production and export complexity was equal to 1.8 in 2019–effectively unchanged from the year prior–and equivalent to an indicator rank of 6.



6.3.3 High-tech exports was equal to 39.6 bn USD in 2020–up by 5 percentage points from the year prior–and equivalent to an indicator rank of 7.



7.1.3 Global brand value was equal to 6.4 bn USD in 2021–up by 1 percentage point from the year prior–and equivalent to an indicator rank of 45.



7.2.1 Cultural and creative services exports was equal to 1.2 bn USD in 2020–up by 7 percentage points from the year prior–and equivalent to an indicator rank of 42.

CZECH REPUBLIC'S INNOVATION TOP PERFORMERS

2.3.3 Global corporate R&D investors

Firm	Industry	R&D	R&D Growth	R&D Intensity	Rank

No observations

Source: European Commission's Joint Research Centre (https://iri.jrc.ec.europa.eu/scoreboard/2021-eu-industrial-rd-investment-scoreboard).

2.3.4 QS university ranking

University	Score	Rank
CHARLES UNIVERSITY	37.1	266=
UNIVERSITY OF CHEMISTRY AND TECHNOLOGY, PRAGUE	29.6	373=
CZECH TECHNICAL UNIVERSITY IN PRAGUE	27.9	403=

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2022).
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".

7.1.1 Intangible asset intensity, top 15

Firm	Rank

No observations

Source: Brand Finance (https://brandirectory.com/reports/gift-2021).

7.1.3 Global brand value, top 5,000

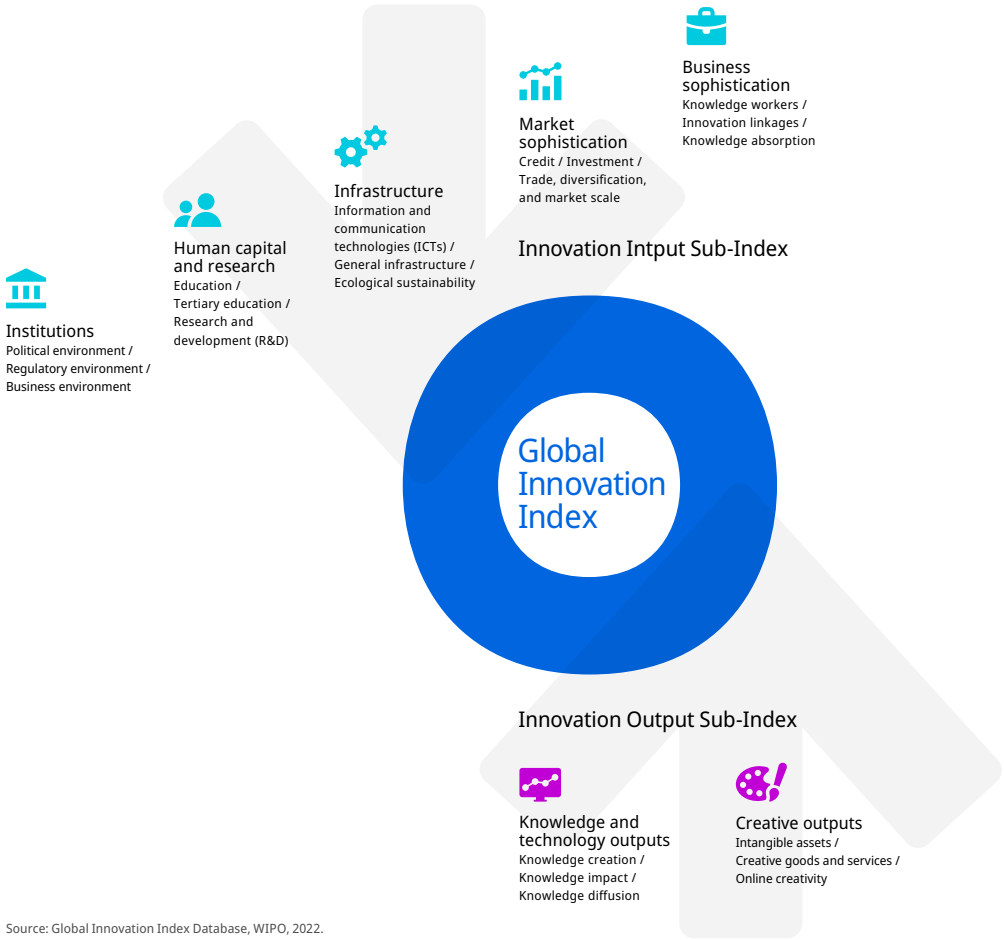
Brand	Industry	Rank
SKODA	Automobiles	1
KOMERČNÍ BANKA	Banking	2
VELKOPOPOVICKY KOZEL	Beers	3

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

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, 2022.

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.