



## SERBIA

**55th** Serbia ranks 55th 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 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 2022 is between ranks 51 and 58.

### Rankings for Serbia (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	53	58	56
2021	54	50	57
2022	55	55	58

- Serbia performs better in innovation inputs than innovation outputs in 2022.
- This year Serbia ranks 55th in innovation inputs, lower than last year but higher than 2020.
- As for innovation outputs, Serbia ranks 58th. This position is lower than both 2021 and 2020.

**10th** Serbia ranks 10th among the 36 upper-middle-income group economies.

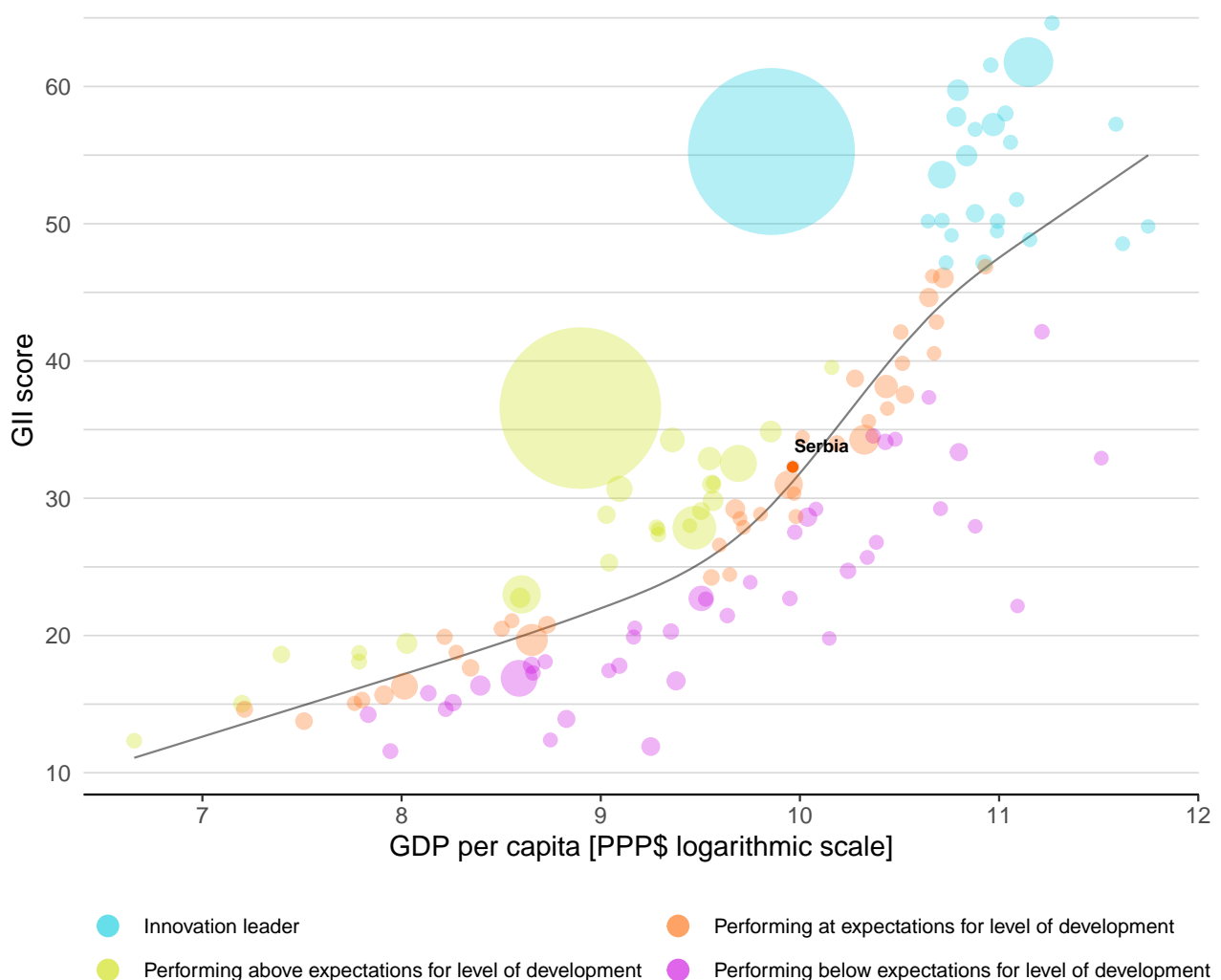
**32nd** Serbia ranks 32nd among the 39 economies in Europe.

## 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 at expectations for its level of development.

### The positive relationship between innovation and development

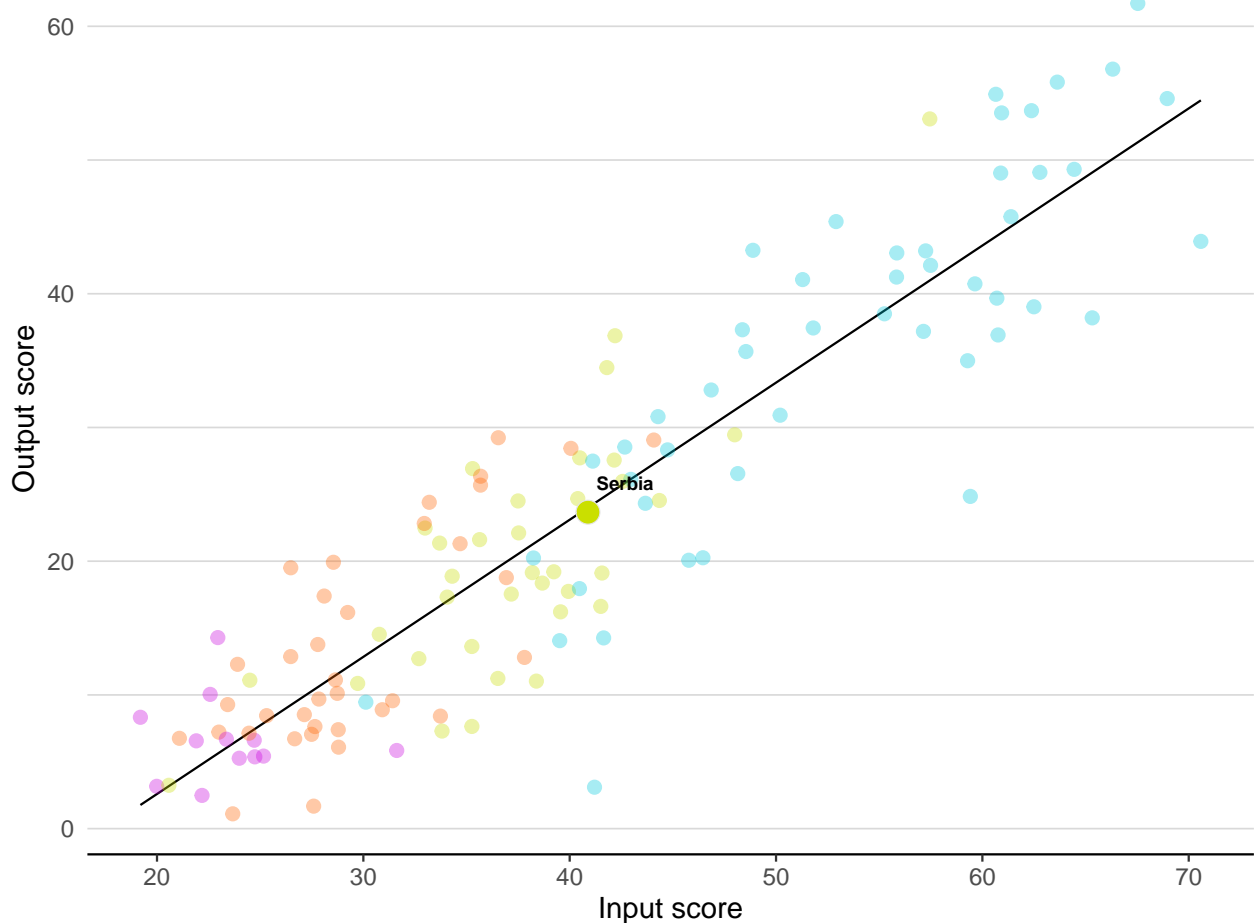


## EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

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

### Innovation input to output performance



Income    ● High income    ● Upper middle    ● Lower middle    ● Low income    — Fitted line

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

### The seven GII pillar scores for Serbia



### Upper-middle-income group economies

Serbia performs above the upper-middle-income group average in four pillars, namely: Institutions; Human capital and research; Infrastructure; and, Knowledge and technology outputs.

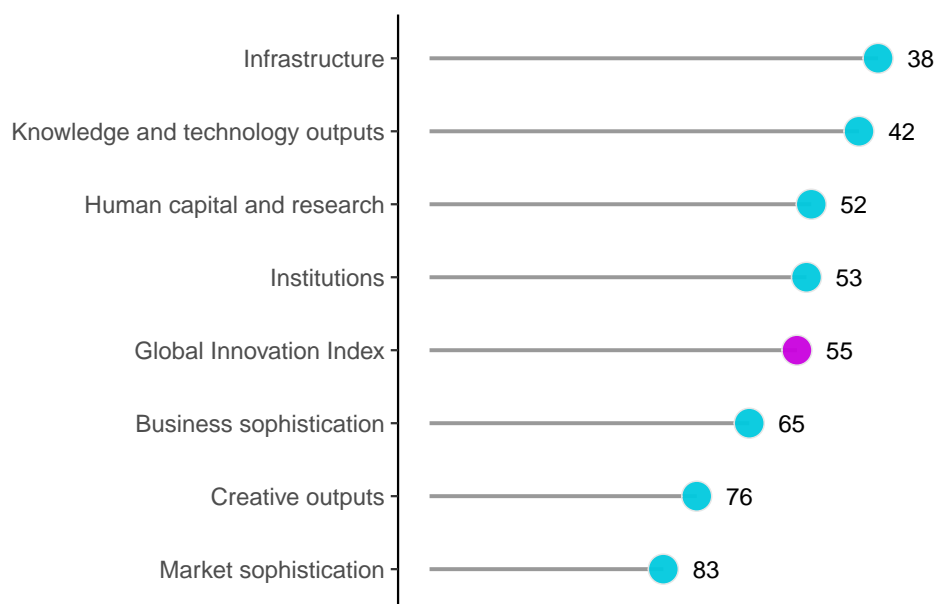
### Europe

Serbia performs below the regional average in all GII pillars.

## OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Serbia performs best in Infrastructure and its weakest performance is in Market sophistication.

### The seven GII pillar ranks for Serbia



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

**The full WIPO Intellectual Property Statistics profile for Serbia can be found at:**

[https://www.wipo.int/ipstats/en/statistics/country\\_profile/profile.jsp?code=RS](https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=RS).

## INNOVATION STRENGTHS AND WEAKNESSES




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

### Strengths and weaknesses for Serbia

Strengths			Weaknesses		
Code	Indicator name	Rank	Code	Indicator name	Rank
1.2.3	Cost of redundancy dismissal	1	2.1.1	Expenditure on education, % GDP	92
2.1.2	Government funding/pupil, secondary, % GDP/cap	8	2.3.3	Global corporate R&D investors, top 3, mn USD	38
2.1.5	Pupil-teacher ratio, secondary	6	2.3.4	QS university ranking, top 3	72
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP	2	4.2.1	Market capitalization, % GDP	76
4.3.1	Applied tariff rate, weighted avg., %	19	5.1.4	GERD financed by business, %	87
5.3.4	FDI net inflows, % GDP	13	5.3.5	Research talent, % in businesses	62
6.1.4	Scientific and technical articles/bn PPP\$ GDP	17	6.2.3	Software spending, % GDP	106
6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP	4	7.1.1	Intangible asset intensity, top 15, %	64
6.3.4	ICT services exports, % total trade	17	7.1.3	Global brand value, top 5,000, % GDP	77
7.2.1	Cultural and creative services exports, % total trade	13	7.2.2	National feature films/mn pop. 15–69	65

## Serbia

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
58	55	Upper middle	EUR	8.7	146.6	21,243
		Score/Value		Rank		
 <b>Institutions</b>		60.3	53			
1.1	<b>Political environment</b>	59.7	65			
1.1.1	Political and operational stability*	69.1	63			
1.1.2	Government effectiveness*	50.4	69			
1.2	<b>Regulatory environment</b>	72.3	43			
1.2.1	Regulatory quality*	47.9	67			
1.2.2	Rule of law*	41.3	72			
1.2.3	Cost of redundancy dismissal	8.0	1 ● ◆			
1.3	<b>Business environment</b>	49.0	[62]			
1.3.1	Policies for doing business†	49.0	65			
1.3.2	Entrepreneurship policies and culture*	n/a	n/a			
 <b>Human capital and research</b>		35.5	52			
2.1	<b>Education</b>	56.9	52			
2.1.1	Expenditure on education, % GDP	3.6	92 ○			
2.1.2	Government funding/pupil, secondary, % GDP/cap	32.4	8 ● ◆			
2.1.3	School life expectancy, years	14.4	65			
2.1.4	PISA scales in reading, maths and science	442.5	44			
2.1.5	Pupil-teacher ratio, secondary	7.6	6 ● ◆			
2.2	<b>Tertiary education</b>	42.6	29 ◆			
2.2.1	Tertiary enrolment, % gross	68.1	38			
2.2.2	Graduates in science and engineering, %	30.5	16 ◆			
2.2.3	Tertiary inbound mobility, %	4.7	53			
2.3	<b>Research and development (R&amp;D)</b>	6.9	66			
2.3.1	Researchers, FTE/mn pop.	2,167.1	39 ◆			
2.3.2	Gross expenditure on R&D, % GDP	0.9	44			
2.3.3	Global corporate R&D investors, top 3, mn USD	0.0	38 ○ ◆			
2.3.4	QS university ranking, top 3*	0.0	72 ○ ◆			
 <b>Infrastructure</b>		53.6	38 ◆			
3.1	<b>Information and communication technologies (ICTs)</b>	81.1	43			
3.1.1	ICT access*	91.3	35			
3.1.2	ICT use*	71.7	53			
3.1.3	Government's online service*	79.4	42			
3.1.4	E-participation*	82.1	41			
3.2	<b>General infrastructure</b>	32.2	57			
3.2.1	Electricity output, GWh/mn pop.	5,405.2	40 ◆			
3.2.2	Logistics performance*	36.7	64			
3.2.3	Gross capital formation, % GDP	24.4	57			
3.3	<b>Ecological sustainability</b>	47.5	16 ● ◆			
3.3.1	GDP/unit of energy use	7.9	93			
3.3.2	Environmental performance*	43.9	59			
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP	12.8	2 ● ◆			
 <b>Market sophistication</b>		27.5	[83]			
4.1	<b>Credit</b>	15.8	[97]			
4.1.1	Finance for startups and scaleups*	n/a	n/a			
4.1.2	Domestic credit to private sector, % GDP	45.5	75			
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a			
4.2	<b>Investment</b>	3.0	[94]			
4.2.1	Market capitalization, % GDP	8.2	76 ○			
4.2.2	Venture capital investors, deals/bn PPP\$ GDP	n/a	n/a			
4.2.3	Venture capital recipients, deals/bn PPP\$ GDP	n/a	n/a			
4.2.4	Venture capital received, value, % GDP	n/a	n/a			
4.3	<b>Trade, diversification, and market scale</b>	63.7	35			
4.3.1	Applied tariff rate, weighted avg., %	1.4	19 ●			
4.3.2	Domestic industry diversification	97.2	18			
4.3.3	Domestic market scale, bn PPP\$	146.6	77			
 <b>Business sophistication</b>		27.5	65			
5.1	<b>Knowledge workers</b>	29.2	69			
5.1.1	Knowledge-intensive employment, %	28.3	51			
5.1.2	Firms offering formal training, %	38.3	36			
5.1.3	GERD performed by business, % GDP	0.3	47			
5.1.4	GERD financed by business, %	2.1	87 ○ ◆			
5.1.5	Females employed w/advanced degrees, %	15.2	49			
5.2	<b>Innovation linkages</b>	22.0	73			
5.2.1	University-industry R&D collaboration†	41.5	74			
5.2.2	State of cluster development and depth†	43.3	85			
5.2.3	GERD financed by abroad, % GDP	0.1	39			
5.2.4	Joint venture/strategic alliance deals/bn PPP\$ GDP	0.0	82			
5.2.5	Patent families/bn PPP\$ GDP	0.1	49			
5.3	<b>Knowledge absorption</b>	31.4	59			
5.3.1	Intellectual property payments, % total trade	1.1	34			
5.3.2	High-tech imports, % total trade	7.1	92			
5.3.3	ICT services imports, % total trade	2.2	33			
5.3.4	FDI net inflows, % GDP	7.6	13 ● ◆			
5.3.5	Research talent, % in businesses	9.9	62 ○			
 <b>Knowledge and technology outputs</b>		30.3	42			
6.1	<b>Knowledge creation</b>	20.6	44			
6.1.1	Patents by origin/bn PPP\$ GDP	1.1	61			
6.1.2	PCT patents by origin/bn PPP\$ GDP	0.2	57			
6.1.3	Utility models by origin/bn PPP\$ GDP	0.6	32			
6.1.4	Scientific and technical articles/bn PPP\$ GDP	43.7	17 ● ◆			
6.1.5	Citable documents H-index	15.5	53			
6.2	<b>Knowledge impact</b>	34.5	41			
6.2.1	Labor productivity growth, %	2.4	29			
6.2.2	New businesses/th pop. 15–64	2.0	60			
6.2.3	Software spending, % GDP	0.0	106 ○ ◆			
6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP	24.4	4 ● ◆			
6.2.5	High-tech manufacturing, %	24.4	51			
6.3	<b>Knowledge diffusion</b>	35.8	41 ◆			
6.3.1	Intellectual property receipts, % total trade	0.2	40 ◆			
6.3.2	Production and export complexity	59.2	34			
6.3.3	High-tech exports, % total trade	2.5	54			
6.3.4	ICT services exports, % total trade	5.9	17 ● ◆			
 <b>Creative outputs</b>		17.1	76			
7.1	<b>Intangible assets</b>	21.6	74			
7.1.1	Intangible asset intensity, top 15, %	35.4	64 ○			
7.1.2	Trademarks by origin/bn PPP\$ GDP	30.9	76			
7.1.3	Global brand value, top 5,000, % GDP	0.0	77 ○ ◆			
7.1.4	Industrial designs by origin/bn PPP\$ GDP	1.2	61			
7.2	<b>Creative goods and services</b>	18.2	59			
7.2.1	Cultural and creative services exports, % total trade	1.8	13 ● ◆			
7.2.2	National feature films/mn pop. 15–69	0.6	65 ○			
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a			
7.2.4	Printing and other media, % manufacturing	1.0	48			
7.2.5	Creative goods exports, % total trade	0.6	61			
7.3	<b>Online creativity</b>	6.8	53			
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.5	88			
7.3.2	Country-code TLDs/th pop. 15–69	5.7	51			
7.3.3	GitHub commit pushes received/mn pop. 15–69	7.6	49			
7.3.4	Mobile app creation/bn PPP\$ GDP	12.3	30			

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](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 Serbia.

### Missing data for Serbia

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)
4.2.2	Venture capital investors, deals/bn PPP\$ GDP	n/a	2021	Refinitiv
4.2.3	Venture capital recipients, deals/bn PPP\$ GDP	n/a	2021	Refinitiv
4.2.4	Venture capital received, value, % GDP	n/a	2021	Refinitiv
7.2.3	Entertainment and media market/th pop. 15–69	n/a	2021	PwC, GEMO

### Outdated data for Serbia

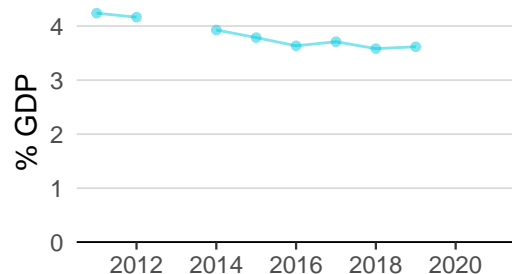
Code	Indicator name	Economy year	Model year	Source
2.1.1	Expenditure on education, % GDP	2019	2020	UNESCO Institute for Statistics
4.2.1	Market capitalization, % GDP	2011	2020	World Federation of Exchanges
4.3.1	Applied tariff rate, weighted avg., %	2018	2020	World Bank



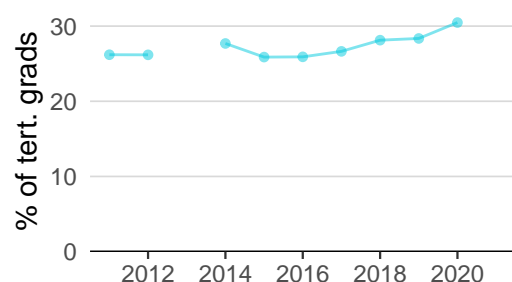
## SERBIA'S INNOVATION SYSTEM

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

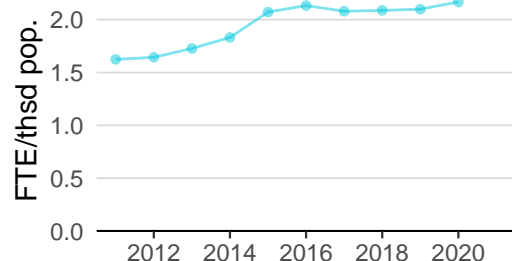
### Innovation inputs



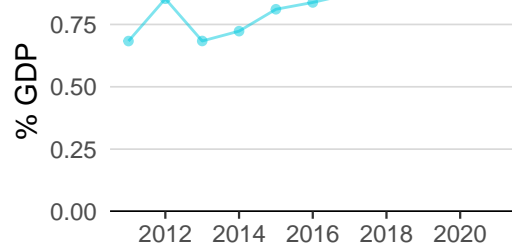
**2.1.1 Expenditure on education** was equal to 3.6% GDP in 2019—up by 1 percentage point from the year prior—and equivalent to an indicator rank of 92.



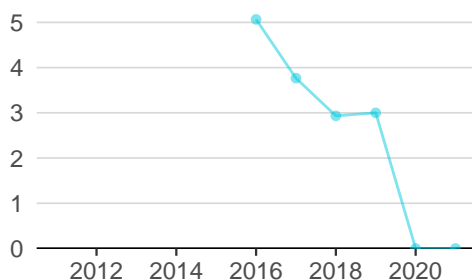
**2.2.2 Graduates in science and engineering** was equal to 30.5% of tert. grads in 2020—up by 7 percentage points from the year prior—and equivalent to an indicator rank of 16.



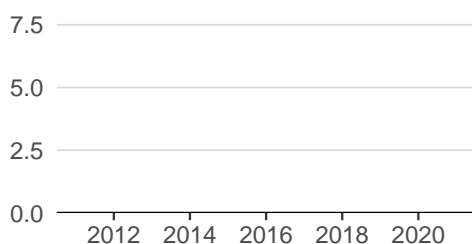
**2.3.1 Researchers** was equal to 2.2 FTE/thsd pop. in 2020—up by 3 percentage points from the year prior—and equivalent to an indicator rank of 39.



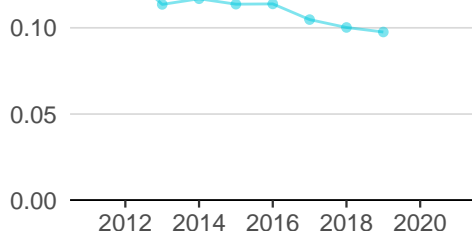
**2.3.2 Gross expenditure on R&D** was equal to 0.9% GDP in 2020—up by 2 percentage points from the year prior—and equivalent to an indicator rank of 44.



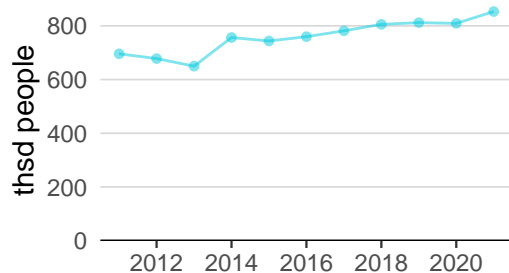
**2.3.4 QS university ranking** was equal to 0.0 in 2021—effectively unchanged from the year prior—and equivalent to an indicator rank of 72.



**3.1.1 ICT access** was equal to 9.1 in 2020 and equivalent to an indicator rank of 35.

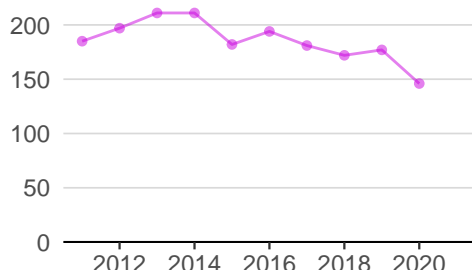


**4.3.2 Domestic industry diversification** was equal to 0.1 in 2019—down by 3 percentage points from the year prior—and equivalent to an indicator rank of 18.

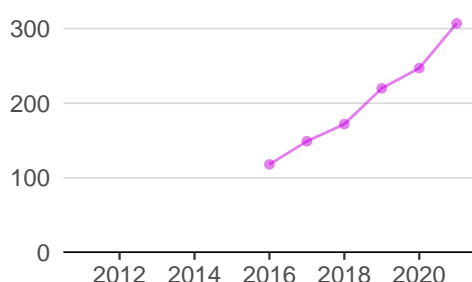


**5.1.1 Knowledge-intensive employment** was equal to 853.2 thsd people in 2021—up by 5 percentage points from the year prior—and equivalent to an indicator rank of 51.

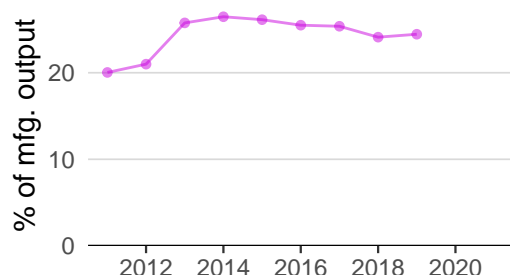
## Innovation outputs



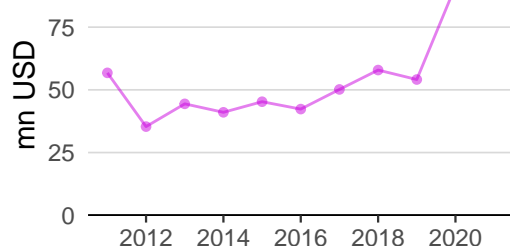
**6.1.1 Patents by origin** was equal to 146.0 in 2020—down by 18 percentage points from the year prior—and equivalent to an indicator rank of 61.



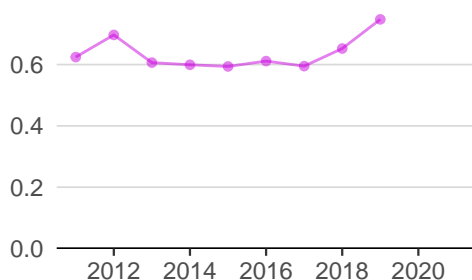
**6.1.5 Citable documents H-index** was equal to 307.0 in 2021—up by 24 percentage points from the year prior—and equivalent to an indicator rank of 53.



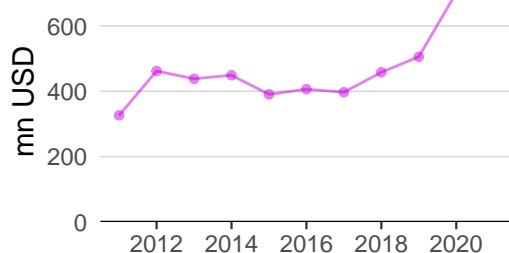
**6.2.5 High-tech manufacturing** was equal to 24.4% of mfg. output in 2019—up by 1 percentage point from the year prior—and equivalent to an indicator rank of 51.



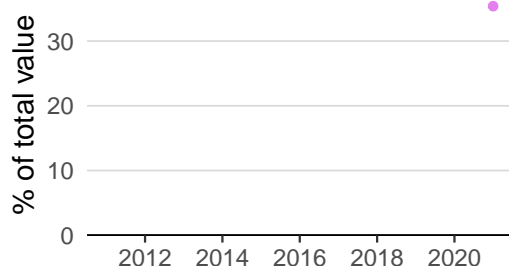
**6.3.1 Intellectual property receipts** was equal to 91.3 mn USD in 2020—up by 69 percentage points from the year prior—and equivalent to an indicator rank of 40.



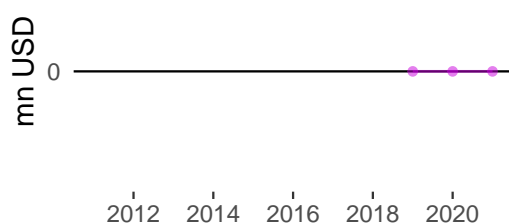
**6.3.2 Production and export complexity** was equal to 0.7 in 2019—up by 15 percentage points from the year prior—and equivalent to an indicator rank of 34.



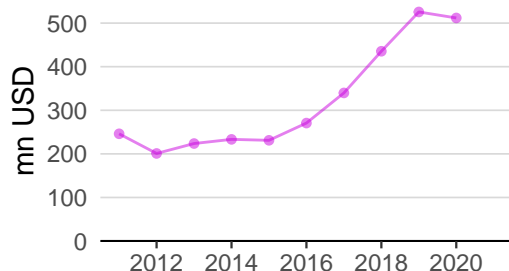
**6.3.3 High-tech exports** was equal to 701.6 mn USD in 2020—up by 39 percentage points from the year prior—and equivalent to an indicator rank of 54.



**7.1.1 Intangible asset intensity** was equal to 35.4% of total value in 2021 and equivalent to an indicator rank of 64.



**7.1.3 Global brand value** was equal to 0.0 mn USD in 2021—effectively unchanged from the year prior—and equivalent to an indicator rank of 77.



**7.2.1 Cultural and creative services exports** was equal to 511.8 mn USD in 2020—down by 3 percentage points from the year prior—and equivalent to an indicator rank of 13.



## SERBIA'S INNOVATION TOP PERFORMERS

### 2.3.3 Global corporate R&D investors

Firm	Industry	R&D	R&D Growth	R&D Intensity	Rank
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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
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No observations

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

### 7.1.1 Intangible asset intensity, top 15

Firm	Rank
FINTEL ENERGIJA	1
AERODROM NIKOLA TESLA	2
SAJKASKA FABRIKA SECERA	3

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

Note: Brand Finance only provides within economy ranks.

### 7.1.3 Global brand value, top 5,000

Brand	Industry	Rank
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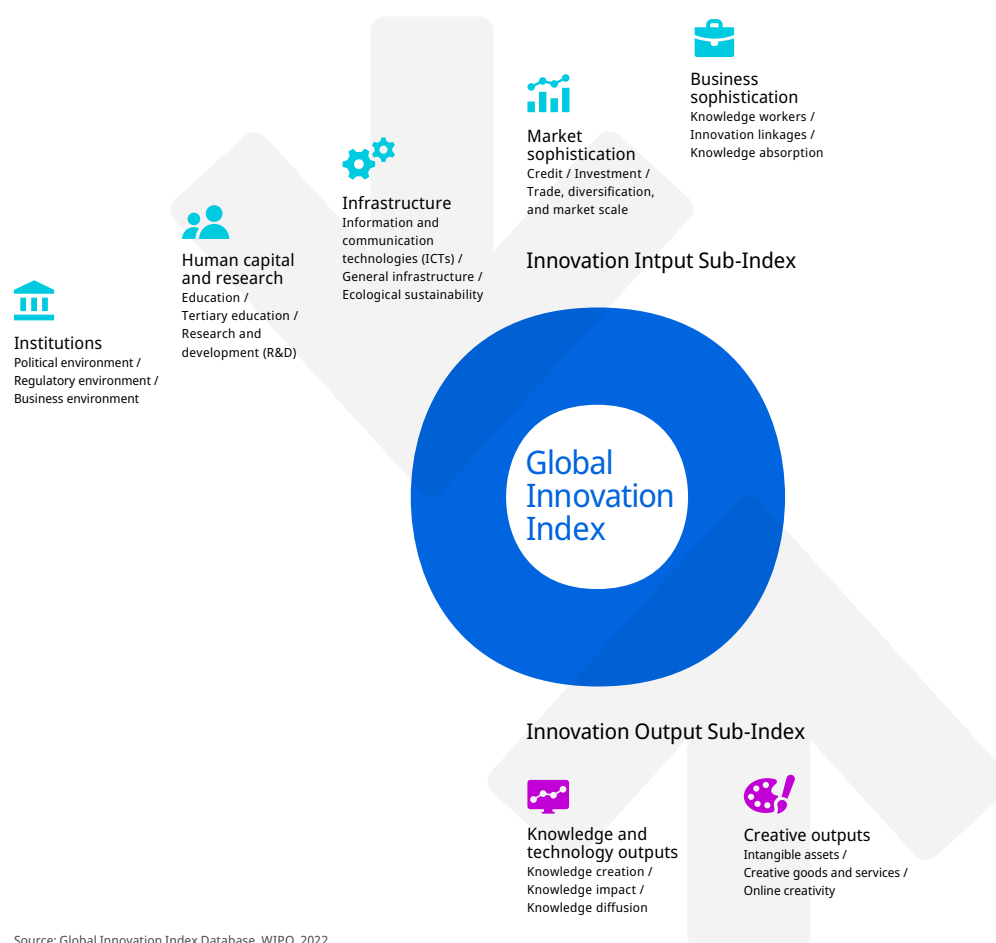
No observations

Source: Brand Finance (<https://brandirectory.com>).

## 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.



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.