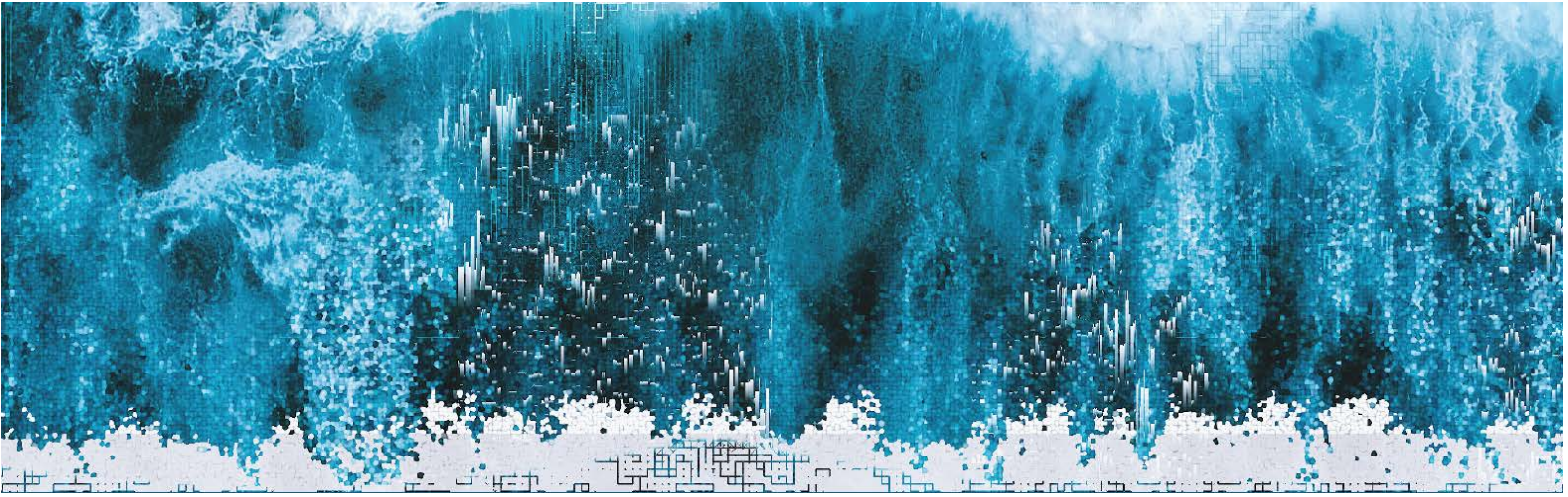


GLOBAL INNOVATION INDEX 2018

Serbia

55th Serbia is ranked 55th in the GII 2018, moving up 7 positions from the previous year.

The GII indicators are grouped into innovation inputs and outputs. The following table reflects Serbia's ranking over time[1].

Serbia's ranking over time

	GII	Input	Output	Efficiency
2018	55	56	58	57
2017	62	58	61	67
2016	65	68	63	70

- Over the last three years Serbia has improved in innovation inputs, reaching the 56th position this year, up from the 58rd in 2017 and 68th in 2016.
- Its rank in innovation outputs improves too, ranking 58th this year, up 3 spots from last year and 5 from 2016.
- Serbia places 57th globally in the Innovation Efficiency Ratio, moving up from the 67th position it held last year and the 70th in 2016. Such advancement in the Efficiency Ratio is partly influenced by the improved ranking in innovation outputs. It shows that the country is becoming increasingly efficient in translating its innovation inputs into more outputs.

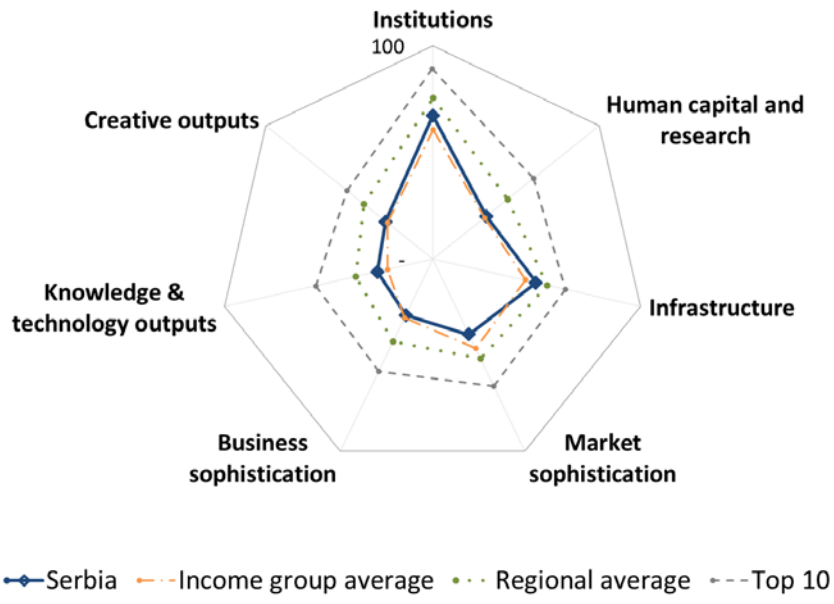
11th Serbia is ranked 11th among the 34 upper-middle-income countries in the GII 2018.

35th Serbia is ranked 35th among the 39 countries in Europe.

[1] Note that year-on-year comparisons of the GII ranks are imperfect and influenced by changes in the GII model and data availability.

Benchmarking Serbia to other upper-middle-income countries and the Europe region

Serbia's scores by area



Upper-middle-income countries

Serbia has high scores in 5 of the 7 GII areas – **Institutions, Human Capital & Research, Infrastructure, Knowledge & Technology Outputs,** and **Creative Outputs**, in which it scores above the average of the upper-middle-income group.

Top scores in areas such as *Business environment, Education, Information & Communication Technologies (ICTs), Knowledge impact*, and *Intangible assets* are behind these high rankings.

Europe region

Compared to other countries in the Europe region, Serbia performs below-average in all GII areas.

Serbia's innovation profile

Strengths

- **Infrastructure** (48th) is the top-ranked GII area for Serbia. Here the country shows strong performance in three indicators: *Government's online service* (24th), *E-participation* (17th), and *ISO 14001 environmental certificates* (8th).

- The indicator *Cost of redundancy dismissal* ranks 1st in the world and is highlighted as a strength in **Institutions** (50th).

- Among innovation inputs, Serbia is strong also in the indicator *Pupil-teacher ratio* (11th) in **Human Capital & Research** (58th) and *FDI inflows* (28th) in **Business Sophistication** (70th).

- On the **innovation output** side, Serbia achieves comparatively strong results in **Knowledge & Technology Outputs** (50th), where GII strengths lie in three indicators – *Scientific & technical articles* (5th), *ISO 9001 quality certificates* (7th), and *ICT services exports* (21st).

- In **Creative Outputs** (64th), the newly-introduced indicator *Mobile app creation* (15th) presents a strong performance for Serbia.

Weaknesses

- Serbia demonstrates most of its relative weaknesses on the **innovation input** side, among four of the five GII input areas.

- **Market Sophistication** (101st), the lowest-ranked GII area for Serbia, is signaled as a GII weakness. Here the country performs rather weakly in the area *Trade, competition & market scale* (102nd) as well as in the indicators *Microfinance gross loans* (63rd) and *Intensity of local competition* (107th).

- In **Human Capital & Research** (58th), two indicators – *Government funding per pupil* (80th) and *Global R&D companies expenditures* (40th) – are marked as GII weaknesses.

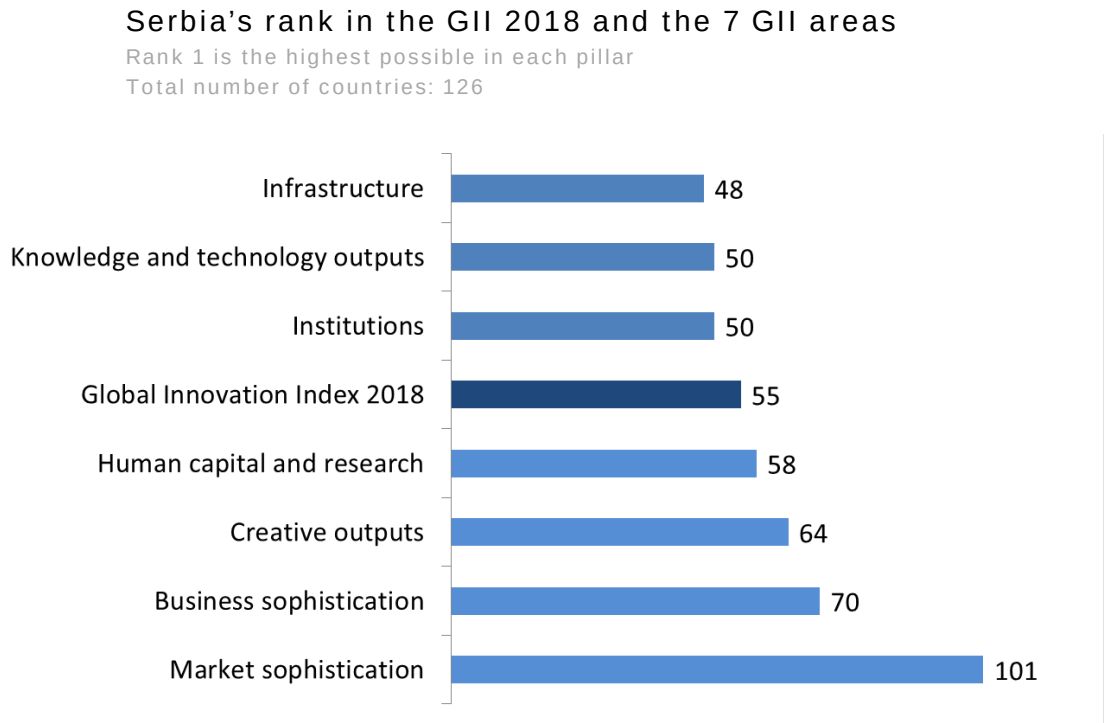
- Moreover, two indicators – *Gross capital formation* (99th) and *GDP per unit of energy use* (95th) – rank rather weakly within **Infrastructure** (48th).

- Only one indicator – *High-tech imports* (101st) – is relatively weak within **Business Sophistication** (70th).

- On the **innovation output** side, two of the three GII weaknesses are found in **Knowledge & Technology Outputs** (50th), where Serbia performs relatively weakly in the indicators *Productivity growth* (103rd) and *Computer software spending* (104th).

- In **Creative Outputs** (64th) Serbia shows weak performance in only one indicator – *ICTs & business model creation* (92nd).

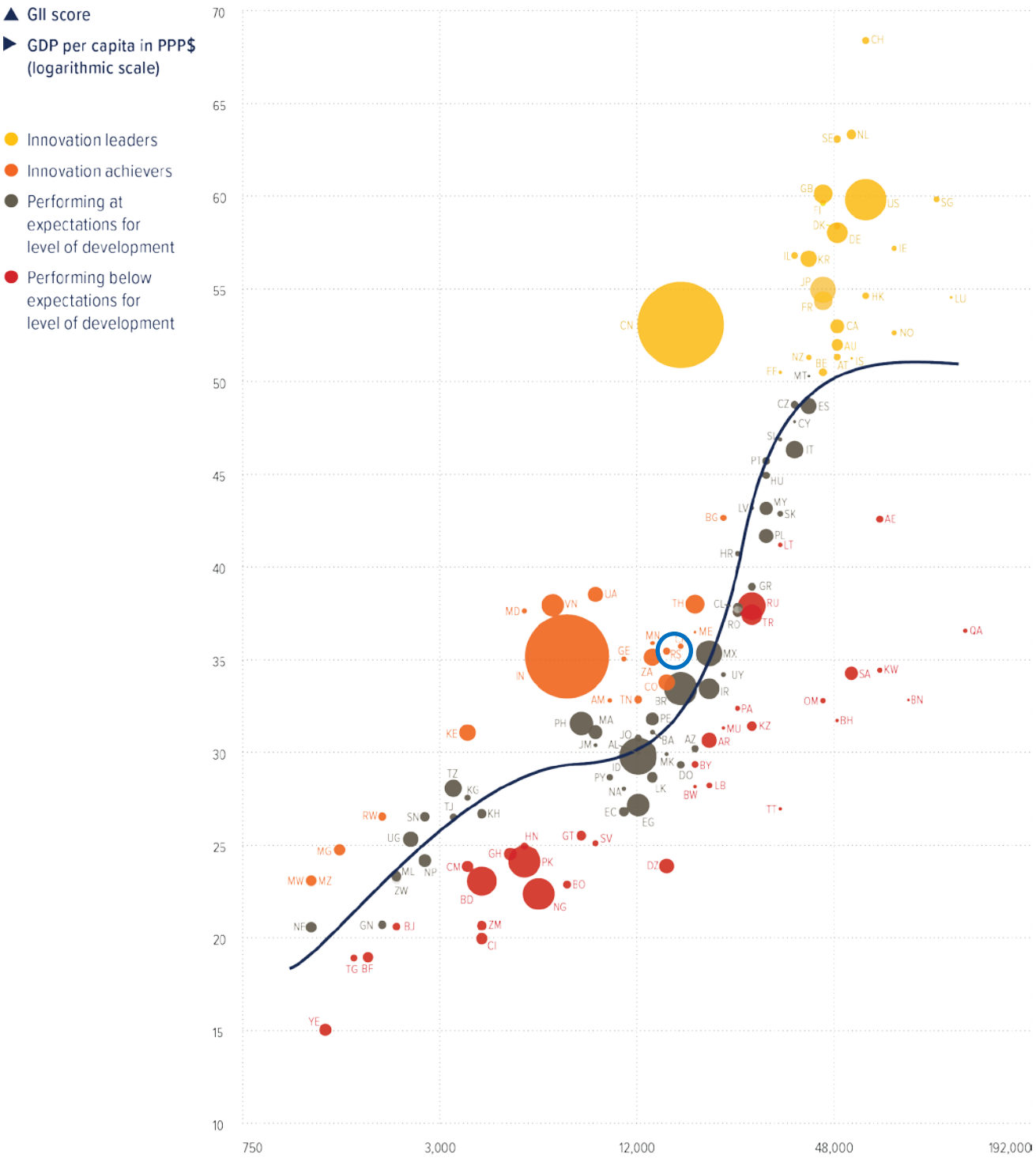
The following figure presents a summary of Serbia's ranks in the 7 GII areas, as well as the overall rank in the GII 2018.



Expected vs. Observed Innovation Performance

The GII bubble chart shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The depicted trendline gives an indication of the expected innovation performance at different levels of income. Countries located above the trendline are performing better that what would be expected based on their income level. Countries below the line are Innovation Under-performers relative to GDP.

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



Missing and Outdated Data

More and better data improves the ability of a country to understand its strengths and weaknesses and give policymakers greater capacity to plan and adapt public policies accordingly. The GII 2018 covers 126 countries that complied with the minimum indicator coverage of 35 indicators in the Innovation Input Sub-Index (66%) and 18 indicators in the Innovation Output Sub-Index (66%).

The following tables show data for Serbia that is not available or that is outdated.

Missing Data

Code	Indicator	Country Year	Model Year	Source
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	2017	Thomson Reuters, Thomson One Banker Private Equity, SDC Platinum
4.3.1	Applied tariff rate, weighted mean, %	n/a	2016	World Bank, World Development Indicators
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	2016	PwC's Global Entertainment and Media Outlook, 2017–2021

Outdated Data

Code	Indicator	Country Year	Model Year	Source
2.1.4	PISA scales in reading, maths & science	2012	2015	OECD PISA
4.2.2	Market capitalization, % GDP	2011	2016	World Bank, World Development Indicators

SERBIA

GII 2018 rank **55**

Output rank	Input rank	Income	Region	Efficiency ratio	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2017 rank
58	56	Upper-middle	EUR	57	8.8	106.6	15,000.0	62

		Score/Value	Rank	
	Institutions	**67.2**	**50**	
1.1	Political environment	53.5	61	
1.1.1	Political stability & safety*	65.7	63	
1.1.2	Government effectiveness*	47.4	67	
1.2	Regulatory environment	71.6	47	
1.2.1	Regulatory quality*	45.5	69	
1.2.2	Rule of law*	40.8	69	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	Business environment	76.5	42	
1.3.1	Ease of starting a business*	92.6	29	
1.3.2	Ease of resolving insolvency*	60.5	45	
	Human capital & research	**32.2**	**58**	
2.1	Education	43.0	80	
2.1.1	Expenditure on education, % GDP	4.0	78	
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.9	80	○
2.1.3	School life expectancy, years	14.6	58	
2.1.4	PISA scales in reading, maths & science[4]	446.6	43	
2.1.5	Pupil-teacher ratio, secondary	8.2	11	● ◆
2.2	Tertiary education	41.0	34	
2.2.1	Tertiary enrolment, % gross	62.1	39	
2.2.2	Graduates in science & engineering, %	25.9	26	
2.2.3	Tertiary inbound mobility, %	4.3	47	
2.3	Research & development (R&D)	12.5	52	
2.3.1	Researchers, FTE/mn pop.	2,132.8	38	◆
2.3.2	Gross expenditure on R&D, % GDP	0.9	37	
2.3.3	Global R&D companies, top 3, mn US$	0.0	40	○ ◇
2.3.4	QS university ranking, average score top 3*	3.8	73	
	Infrastructure	**49.6**	**48**	
3.1	Information & communication technologies (ICTs)	73.1	32	◆
3.1.1	ICT access*	72.0	48	◆
3.1.2	ICT use*	55.4	57	
3.1.3	Government's online service*	81.9	24	● ◆
3.1.4	E-participation*	83.1	17	● ◆
3.2	General infrastructure	30.5	96	
3.2.1	Electricity output, kWh/cap	5,295.1	38	◆
3.2.2	Logistics performance*	32.4	76	
3.2.3	Gross capital formation, % GDP	18.5	99	○
3.3	Ecological sustainability	45.3	42	
3.3.1	GDP/unit of energy use	6.0	95	○ ◇
3.3.2	Environmental performance*	57.5	73	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	11.2	8	● ◆
	Market sophistication	**39.2**	**101**	○ ◇
4.1	Credit	27.6	96	
4.1.1	Ease of getting credit*	65.0	49	
4.1.2	Domestic credit to private sector, % GDP	43.4	81	
4.1.3	Microfinance gross loans, % GDP	0.0	63	○
4.2	Investment	40.4	67	
4.2.1	Ease of protecting minority investors*	56.7	74	
4.2.2	Market capitalization, % GDP[4]	17.6	66	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	Trade, competition, & market scale	49.8	102	○ ◇
4.3.1	Applied tariff rate, weighted mean, %	n/a	n/a	
4.3.2	Intensity of local competition†	58.3	107	○ ◇
4.3.3	Domestic market scale, bn PPP$	106.6	72	

		Score/Value	Rank	
	Business sophistication	**29.2**	**70**	
5.1	Knowledge workers	35.0	66	
5.1.1	Knowledge-intensive employment, %	28.0	50	
5.1.2	Firms offering formal training, % firms	37.8	35	
5.1.3	GERD performed by business, % GDP	0.3	45	
5.1.4	GERD financed by business, %	9.2	74	
5.1.5	Females employed w/advanced degrees, %	14.0	45	
5.2	Innovation linkages	24.9	76	
5.2.1	University/industry research collaboration†	36.1	90	
5.2.2	State of cluster development†	39.5	90	
5.2.3	GERD financed by abroad, %	13.0	36	
5.2.4	JV–strategic alliance deals/bn PPP$ GDP	0.0	69	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	52	
5.3	Knowledge absorption	27.8	77	
5.3.1	Intellectual property payments, % total trade	1.0	37	
5.3.2	High-tech net imports, % total trade	5.6	101	○
5.3.3	ICT services imports, % total trade	1.8	30	◆
5.3.4	FDI net inflows, % GDP	5.6	28	●
5.3.5	Research talent, % in business enterprise	13.3	61	
	Knowledge & technology outputs	**26.7**	**50**	
6.1	Knowledge creation	21.8	45	
6.1.1	Patents by origin/bn PPP$ GDP	1.9	47	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	53	
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	36	
6.1.4	Scientific & technical articles/bn PPP$ GDP	34.4	5	● ◆
6.1.5	Citable documents H index	9.8	69	
6.2	Knowledge impact	37.0	62	
6.2.1	Growth rate of PPP$ GDP/worker, %	(1.9)	103	○
6.2.2	New businesses/th pop. 15–64	1.8	53	
6.2.3	Computer software spending, % GDP	0.0	104	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	29.7	7	● ◆
6.2.5	High- & medium-high-tech manufactures, %	0.3	44	
6.3	Knowledge diffusion	21.3	52	
6.3.1	Intellectual property receipts, % total trade	0.2	39	◆
6.3.2	High-tech net exports, % total trade	2.0	53	
6.3.3	ICT services exports, % total trade	4.0	21	● ◆
6.3.4	FDI net outflows, % GDP	0.8	57	
	Creative outputs	**28.1**	**64**	
7.1	Intangible assets	35.0	92	
7.1.1	Trademarks by origin/bn PPP$ GDP	33.7	70	
7.1.2	Industrial designs by origin/bn PPP$ GDP	1.7	53	
7.1.3	ICTs & business model creation†	53.2	92	○
7.1.4	ICTs & organizational model creation†	49.8	77	
7.2	Creative goods & services	24.4	58	
7.2.1	Cultural & creative services exports, % total trade	0.3	38	
7.2.2	National feature films/mn pop. 15–69	5.4	37	
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing & other media, % manufacturing	1.5	28	
7.2.5	Creative goods exports, % total trade	0.7	52	
7.3	Online creativity	18.1	40	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.4	88	
7.3.2	Country-code TLDs/th pop. 15–69	4.4	55	
7.3.3	Wikipedia edits/mn pop. 15–69	40.2	35	◆
7.3.4	Mobile app creation/bn PPP$ GDP	39.5	15	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question.
[4] indicates that the country'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; see page 75 of this appendix for details.