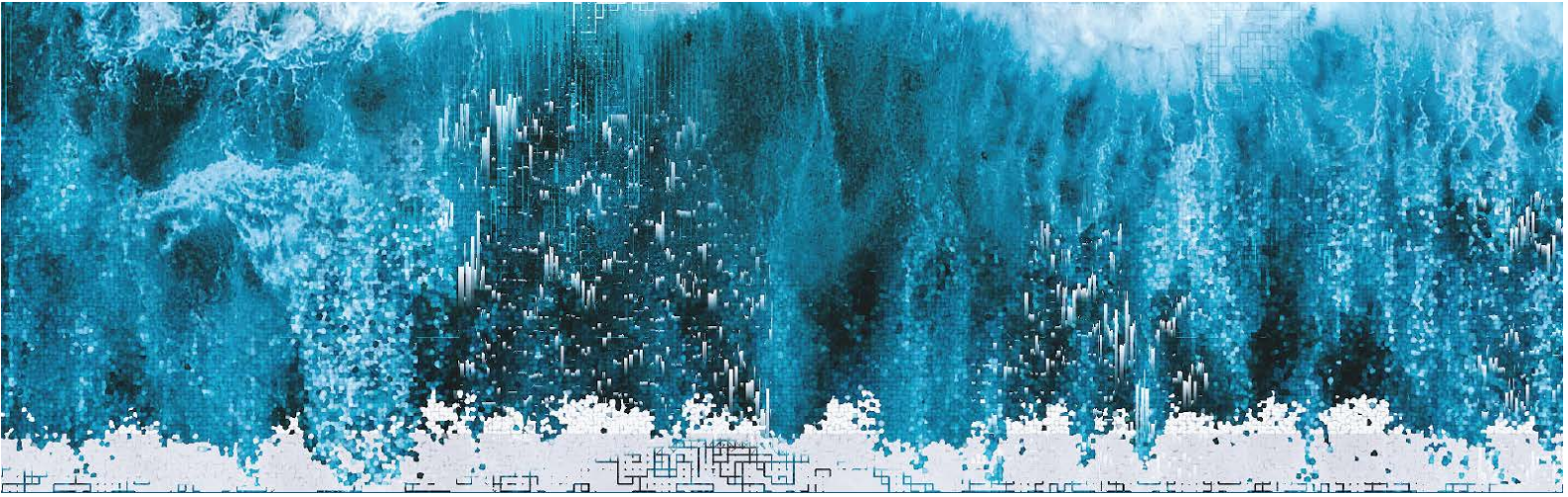


GLOBAL INNOVATION INDEX 2018

Senegal

100th Senegal is ranked 100th in the GII 2018, the same position as last year.

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

Senegal's ranking over time

	GII	Input	Output	Efficiency
2018	100	102	90	70
2017	100	102	98	95
2016	106	109	96	62

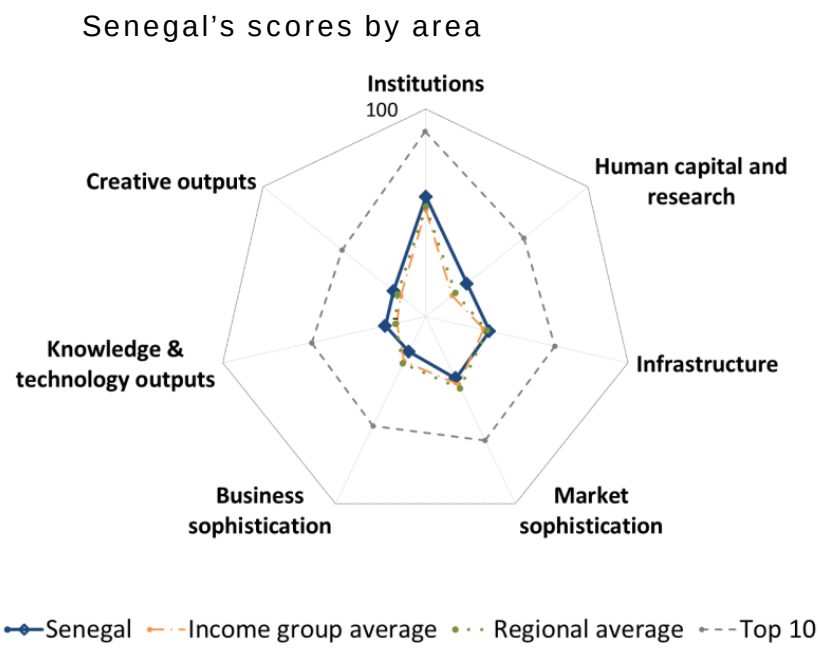
- Senegal performs better in innovation outputs than in innovation inputs.
- Over the last three years, Senegal has markedly improved in innovation outputs, taking the 90th position this year, up from the 98th in 2017 and the 96th in 2016.
- It places 102nd in innovation inputs, the same position as last year, and up 7 spots from 2016.
- Senegal is highly efficient in translating its innovation inputs into outputs. This is shown in the Innovation Efficiency Ratio which positions 70th this year, moving up from the 95th spot in 2017. This is partly influenced by the better (and improved) ranking in innovation outputs (90th) compared to inputs (102nd). Relative to its overall GII position (100th), the Innovation Efficiency Ratio (70th) proves to be quite strong.

3rd Senegal is ranked 3rd among the 15 low-income countries in the GII 2018.

8th Senegal is ranked 8th among the 24 countries in Sub-Saharan Africa.

[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 Senegal to other low-income countries and the Sub-Saharan Africa region



Low-income countries

Senegal 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 low-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.

Sub-Saharan Africa region

Compared to other countries in the Sub-Saharan Africa region, Senegal performs above-average in 5 of the 7 GII areas: Institutions, Human Capital & Research, Infrastructure, Knowledge & Technology Outputs, and Creative Outputs.

Senegal's innovation profile

Strengths

- On the **innovation input** side, comparative GII strengths of Senegal are found across all five GII areas.
- **Institutions** (73th), the top-ranked GII area for Senegal, exhibits particularly strong performance in the indicator *Ease of starting a business* (53rd).
- In **Human Capital & Research** (83rd), three indicators – *Expenditure on education* (11th), *Government funding per pupil* (15th), and *Tertiary inbound mobility* (27th) – are highlighted as Senegal's GII strengths.
- Senegal also shows strength within **Infrastructure** (109th) in the indicator *Gross capital formation* (27th).
- Finally, the indicator *Microfinance gross loans* (19th) is marked as GII strength in **Market Sophistication** (117th), while the indicator *ICT services imports* (11th) is strong in **Business Sophistication** (122th).
- On the **innovation output** side, Senegal shows comparatively strong performance only in **Knowledge & Technology Outputs** (77th), where three indicators – *Productivity growth*

(17th), *Computer software spending* (41st), and *ICT services exports* (12th) – are strong for Senegal.

Weaknesses

- Nearly all the relative weaknesses for Senegal are in **innovation inputs**, with only one weakness among innovation outputs. On the input side, weaknesses are scattered across four of the five GII input areas.

- **Business Sophistication** (122nd), the lowest-ranked GII area for Senegal, is signaled as a GII weakness. Here the country shows relatively weak performance in the area *Knowledge workers* (122nd) as well as in the indicators *Knowledge-intensive employment* (105th), *R&D performed by business* (85th), and *Research talent in business enterprise* (84th).

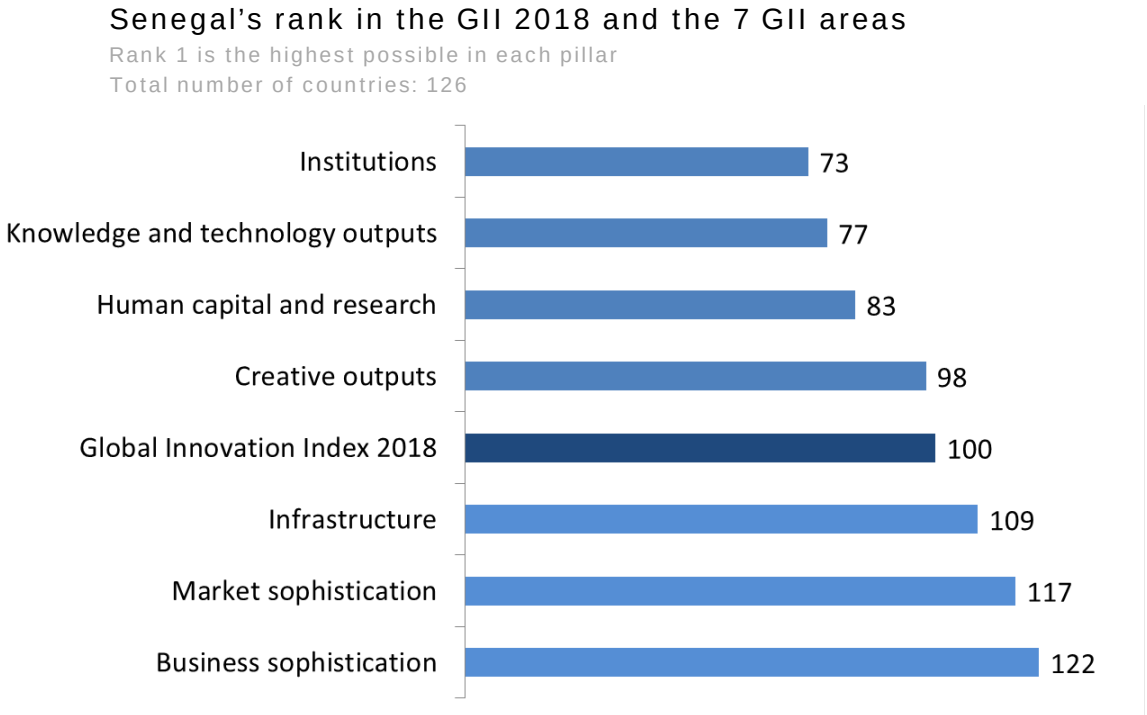
- **Market Sophistication** (117th) is also marked as a GII weakness for Senegal. Here the country performs rather weakly in one of its indicators – *Ease of getting credit* (111th).

- In **Human Capital & Research** (83rd), Senegal demonstrates relative weaknesses in three indicators: *School life expectancy* (106th), *Global R&D companies expenditures* (40th), and *Quality of universities* (78th).

- Other relative weaknesses on the innovation input side appear in two indicators within **Infrastructure** (109th): *Electricity output* (111th) and *Logistics performance* (118th).

- On the **innovation output** side, Senegal has only one GII weakness in the indicator *National feature films* (95th) within **Creative Outputs** (98th).

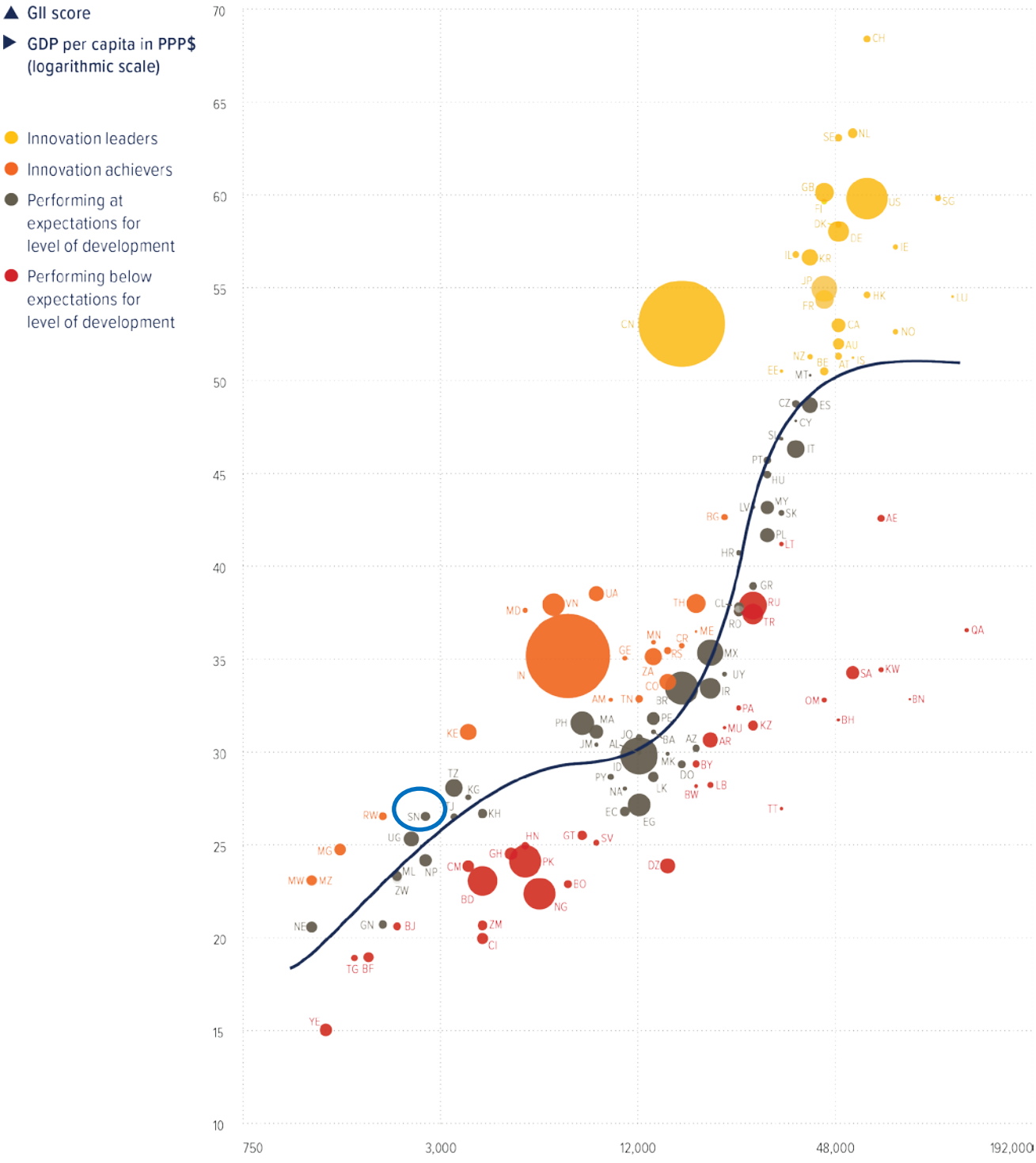
The following figure presents a summary of Senegal's ranks in the 7 GII areas, as well as the overall rank in the GII 2018.



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, Senegal performs at 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 Senegal that is not available or that is outdated.

Missing Data

Code	Indicator	Country Year	Model Year	Source
2.1.4	PISA scales in reading, maths & science	n/a	2015	OECD PISA
2.2.2	Graduates in science & engineering, %	n/a	2016	UNESCO Institute for Statistics (UIS)
4.2.2	Market capitalization, % GDP	n/a	2016	World Bank, World Development Indicators
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2016	WIPO, Intellectual Property Statistics
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	2016	PwC's Global Entertainment and Media Outlook, 2017–2021
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	2017	App Annie Intelligence

Outdated Data

Code	Indicator	Country Year	Model Year	Source
5.1.1	Knowledge-intensive employment, %	2015	2016	ILO, ILOSTAT
5.1.3	GERD performed by business, % GDP	2010	2016	UNESCO Institute for Statistics (UIS)
5.1.5	Females employed w/advanced degrees, %	2015	2016	ILO, ILOSTAT
5.3.1	Intellectual property payments, % total trade	2015	2016	WTO, Trade in Commercial Services
5.3.3	ICT services imports, % total trade	2015	2016	WTO, Trade in Commercial Services
5.3.5	Research talent, % in business enterprise	2010	2016	UNESCO Institute for Statistics (UIS)
6.2.5	High- & medium-high-tech manufactures, %	2012	2015	UNIDO, Industrial Statistics
6.3.1	Intellectual property receipts, % total trade	2015	2016	WTO, Trade in Commercial Services
6.3.3	ICT services exports, % total trade	2015	2016	WTO, Trade in Commercial Services
7.2.4	Printing & other media, % manufacturing	2012	2015	UNIDO, Industrial Statistics
7.3.3	Wikipedia edits/mn pop. 15–69	2014	2017	Wikimedia Foundation

SENEGAL

GII 2018 rank **100**

Output rank	Input rank	Income	Region	Efficiency ratio	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2017 rank
90	102	Low	SSF	70	15.9	43.1	2,726.6	100

		Score/Value	Rank	
	Institutions	**57.8**	**73**	◆
1.1	Political environment	41.9	90	
1.1.1	Political stability & safety*	58.5	78	
1.1.2	Government effectiveness*	33.6	93	
1.2	Regulatory environment	64.6	68	
1.2.1	Regulatory quality*	40.4	80	◆
1.2.2	Rule of law*	38.8	73	◆
1.2.3	Cost of redundancy dismissal, salary weeks	14.8	57	
1.3	Business environment	66.9	69	
1.3.1	Ease of starting a business*	89.7	53	●
1.3.2	Ease of resolving insolvency*	44.1	82	
	Human capital & research	**25.2**	**83**	◆
2.1	Education	45.6	71	◆
2.1.1	Expenditure on education, % GDP	7.1	11	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	27.5	15	●
2.1.3	School life expectancy, years	9.0	106	○
2.1.4	PISA scales in reading, maths & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	19.7	84	
2.2	Tertiary education	24.5	83	
2.2.1	Tertiary enrolment, % gross	10.6	101	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	8.1	27	● ◆
2.3	Research & development (R&D)	5.6	76	◆
2.3.1	Researchers, FTE/mn pop.	535.5	65	◆
2.3.2	Gross expenditure on R&D, % GDP	0.7	49	◆
2.3.3	Global R&D companies, top 3, mn US$	0.0	40	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	78	○ ◇
	Infrastructure	**31.3**	**109**	
3.1	Information & communication technologies (ICTs)	32.5	105	
3.1.1	ICT access*	35.7	106	◆
3.1.2	ICT use*	17.6	107	
3.1.3	Government's online service*	37.7	100	
3.1.4	E-participation*	39.0	98	
3.2	General infrastructure	30.5	97	
3.2.1	Electricity output, kWh/cap	261.4	111	○
3.2.2	Logistics performance*	12.2	118	○
3.2.3	Gross capital formation, % GDP	27.1	27	●
3.3	Ecological sustainability	31.0	88	◆
3.3.1	GDP/unit of energy use	8.3	68	◆
3.3.2	Environmental performance*	49.5	99	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.1	62	◆
	Market sophistication	**32.9**	**117**	○
4.1	Credit	23.6	105	
4.1.1	Ease of getting credit*	30.0	111	○
4.1.2	Domestic credit to private sector, % GDP	33.3	94	
4.1.3	Microfinance gross loans, % GDP	1.7	19	●
4.2	Investment	30.4	113	◇
4.2.1	Ease of protecting minority investors*	41.7	107	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	43	
4.3	Trade, competition, & market scale	44.7	114	
4.3.1	Applied tariff rate, weighted mean, %	9.0	111	
4.3.2	Intensity of local competition†	68.2	66	
4.3.3	Domestic market scale, bn PPP$	43.1	96	

		Score/Value	Rank	
	Business sophistication	**18.7**	**122**	○ ◇
5.1	Knowledge workers	8.0	122	○ ◇
5.1.1	Knowledge-intensive employment, %	6.4	105	○ ◆
5.1.2	Firms offering formal training, % firms	17.4	80	
5.1.3	GERD performed by business, % GDP	0.0	85	○
5.1.4	GERD financed by business, %	2.1	85	
5.1.5	Females employed w/advanced degrees, %	1.8	92	
5.2	Innovation linkages	23.8	83	
5.2.1	University/industry research collaboration†	42.7	53	
5.2.2	State of cluster development†	40.9	84	
5.2.3	GERD financed by abroad, %	7.9	48	
5.2.4	JV–strategic alliance deals/bn PPP$ GDP	0.0	56	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	84	
5.3	Knowledge absorption	24.4	88	
5.3.1	Intellectual property payments, % total trade	0.1	101	
5.3.2	High-tech net imports, % total trade	5.6	102	
5.3.3	ICT services imports, % total trade	2.8	11	●
5.3.4	FDI net inflows, % GDP	2.8	59	
5.3.5	Research talent, % in business enterprise	0.1	84	○ ◇
	Knowledge & technology outputs	**19.9**	**77**	◆
6.1	Knowledge creation	6.8	81	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	79	◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	63	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.6	68	
6.1.5	Citable documents H index	6.1	85	
6.2	Knowledge impact	33.4	76	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.9	17	● ◆
6.2.2	New businesses/th pop. 15–64	0.4	90	
6.2.3	Computer software spending, % GDP	0.3	41	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	105	
6.2.5	High- & medium-high-tech manufactures, %	0.2	63	
6.3	Knowledge diffusion	19.6	66	
6.3.1	Intellectual property receipts, % total trade	0.1	63	
6.3.2	High-tech net exports, % total trade	0.4	87	◆
6.3.3	ICT services exports, % total trade	5.4	12	● ◆
6.3.4	FDI net outflows, % GDP	0.2	90	
	Creative outputs	**19.8**	**98**	
7.1	Intangible assets	34.7	94	
7.1.1	Trademarks by origin/bn PPP$ GDP	13.7	97	
7.1.2	Industrial designs by origin/bn PPP$ GDP	0.5	84	
7.1.3	ICTs & business model creation†	60.7	59	
7.1.4	ICTs & organizational model creation†	54.0	60	◆
7.2	Creative goods & services	9.4	94	
7.2.1	Cultural & creative services exports, % total trade	0.2	45	
7.2.2	National feature films/mn pop. 15–69	0.4	95	○
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing & other media, % manufacturing	0.8	68	
7.2.5	Creative goods exports, % total trade	0.1	97	
7.3	Online creativity	0.4	111	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.0	94	◆
7.3.2	Country-code TLDs/th pop. 15–69	0.1	107	
7.3.3	Wikipedia edits/mn pop. 15–69	0.2	114	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question.
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.