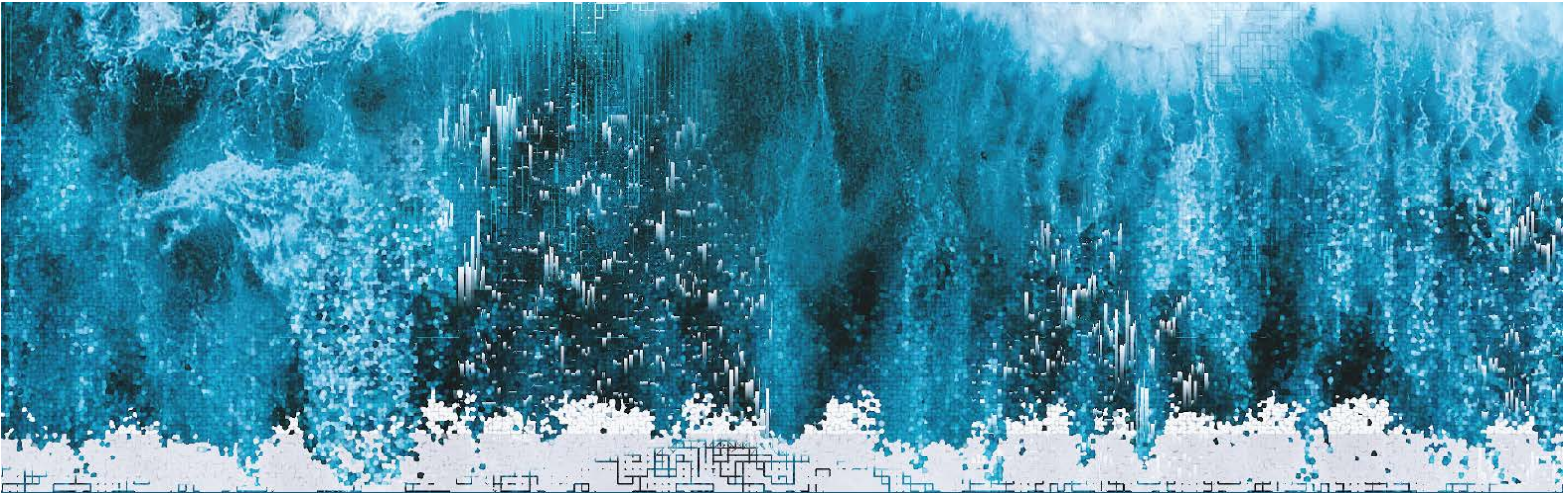


GLOBAL INNOVATION INDEX 2018

Rwanda

99th Rwanda is ranked 99th in the GII 2018, the same position as last year.

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

Rwanda's ranking over time

	GII	Input	Output	Efficiency
2018	99	73	120	125
2017	99	76	121	125
2016	83	55	114	123

- Rwanda performs better in innovation inputs than outputs. It improves in innovation inputs this year, moving up to the 73rd position from the 76th in 2017. However, this is a notably lower position than the 55th it held in 2016.
- Rwanda's innovation outputs rank 120th, up 1 spot from the previous year but down 6 from 2016.
- Rwanda demonstrates low efficiency in translating innovation inputs into outputs, ranking 125th in the Innovation Efficiency Ratio. Relative to its GII position (99th), Rwanda's Efficiency Ratio is rather low. This is influenced by a higher ranking in innovation inputs (73rd) compared to outputs (120th).

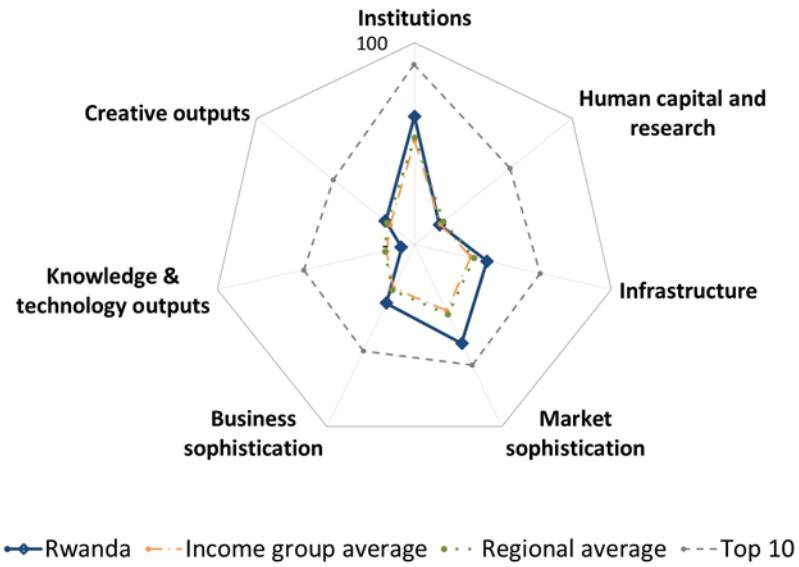
2nd Rwanda is ranked 2nd among the 15 low-income countries in the GII 2018.

7th Rwanda is ranked 7th 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 Rwanda to other low-income countries and the Sub-Saharan Africa region

Rwanda's scores by area



Low-income countries

Rwanda has high scores in 5 out of the 7 GII areas – **Institutions, Infrastructure, Market Sophistication, Business Sophistication,** and **Creative Outputs**, in which it scores above the average of the low-income group.

Top scores in the areas *Regulatory environment, General infrastructure, Credit, Innovation linkages, and Intangible assets,* are behind these high rankings.

Sub-Saharan Africa region

Compared to other countries in the Sub-Saharan Africa region, Rwanda performs above average in 5 out of the 7 GII areas: Institutions, Infrastructure, Market Sophistication, Business Sophistication, and Creative Outputs.

Rwanda's innovation profile

Strengths

- Most of the comparative strengths for Rwanda are found on the **innovation input** side of the GII.

- Several of them are in **Market Sophistication** (34th), which itself is highlighted as a strength for Rwanda. Here, the country also performs strongly in two of its main elements, namely *Credit* (14th) and *Investment* (24th). In these areas, strong indicators are *Ease of getting credit* (6th), *Ease of protecting minority investors* (16th), *Venture capital deals* (30th), and *Microfinance gross loans* – in which Rwanda positions 1st globally.

- In **Business Sophistication** (57th), Rwanda also exhibits a number of comparative strengths. These are in the area *Innovation linkages* (36th) and indicators *Firms offering formal training* (11th), *State of cluster development* (41st), and *High-tech imports* (40th).

- Strengths on the innovation input side are also marked in **Institutions (60th)** in the indicator *Cost of redundancy dismissal* (42nd) and in **Human Capital & Research** (107th) in indicator *Government expenditure on education per pupil* (5th). In addition, the area *General infrastructure* (40th) is marked as a strength in **Infrastructure** (91st).

- On the **innovation output** side, Rwanda shows only one strength in indicator *ICTs & business model creation* (42nd) within the area **Creative Outputs** (101st).

Weaknesses

- Both the **Innovation Output Sub-Index** (120th) and the **Innovation Efficiency Ratio** (125th) are relative weaknesses for Rwanda.

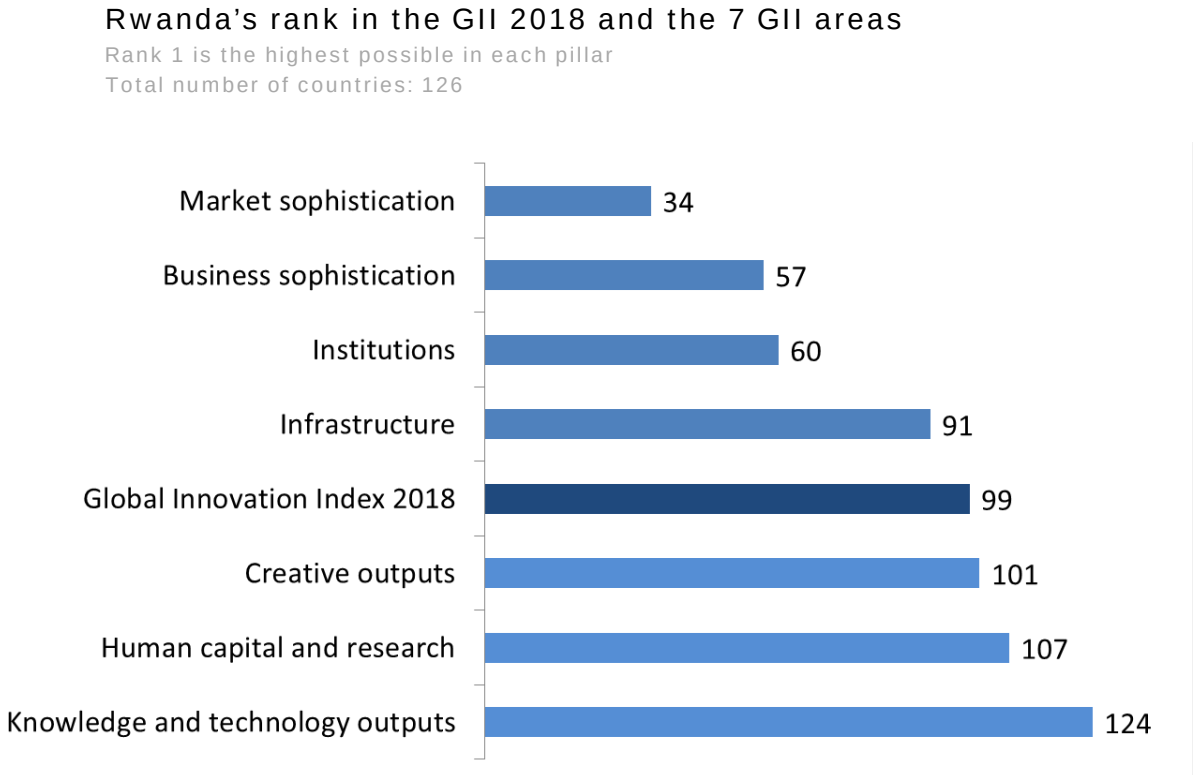
- On the **innovation input** side, GII weaknesses are mostly exhibited in **Human Capital & Research** (107th). Two of its three elements are identified as weak: *Tertiary education* (116th) and *Research & development (R&D)* (117th). At the indicator level, Rwanda also performs relatively weakly in *Researchers* (104th), *Global R&D companies expenditures* (40th), and *Quality of universities* (78th).

- Other relative weaknesses appear in **Infrastructure** (91st) in the indicator *ISO 14001 environmental certificates* (120th); in **Market Sophistication** (34th) in *Domestic market scale* (118th); and in **Business Sophistication** (57th) in *Knowledge-intensive employment* (114th) and *Females employed with advanced degrees* (102nd).

- On the **innovation output** side, the whole area **Knowledge & Technology Outputs** (124th) is highlighted as one of Rwanda's weaknesses. Here it also shows weak performance in the area *Knowledge impact* (123rd) and in indicator *ISO 9001 quality certificates* (119th).

- In **Creative Outputs** (101st), Rwanda performs relatively weakly in the area *Online creativity* (122nd) as well as in indicators *Generic top-level domains* (120th) and *Wikipedia edits* (117th).

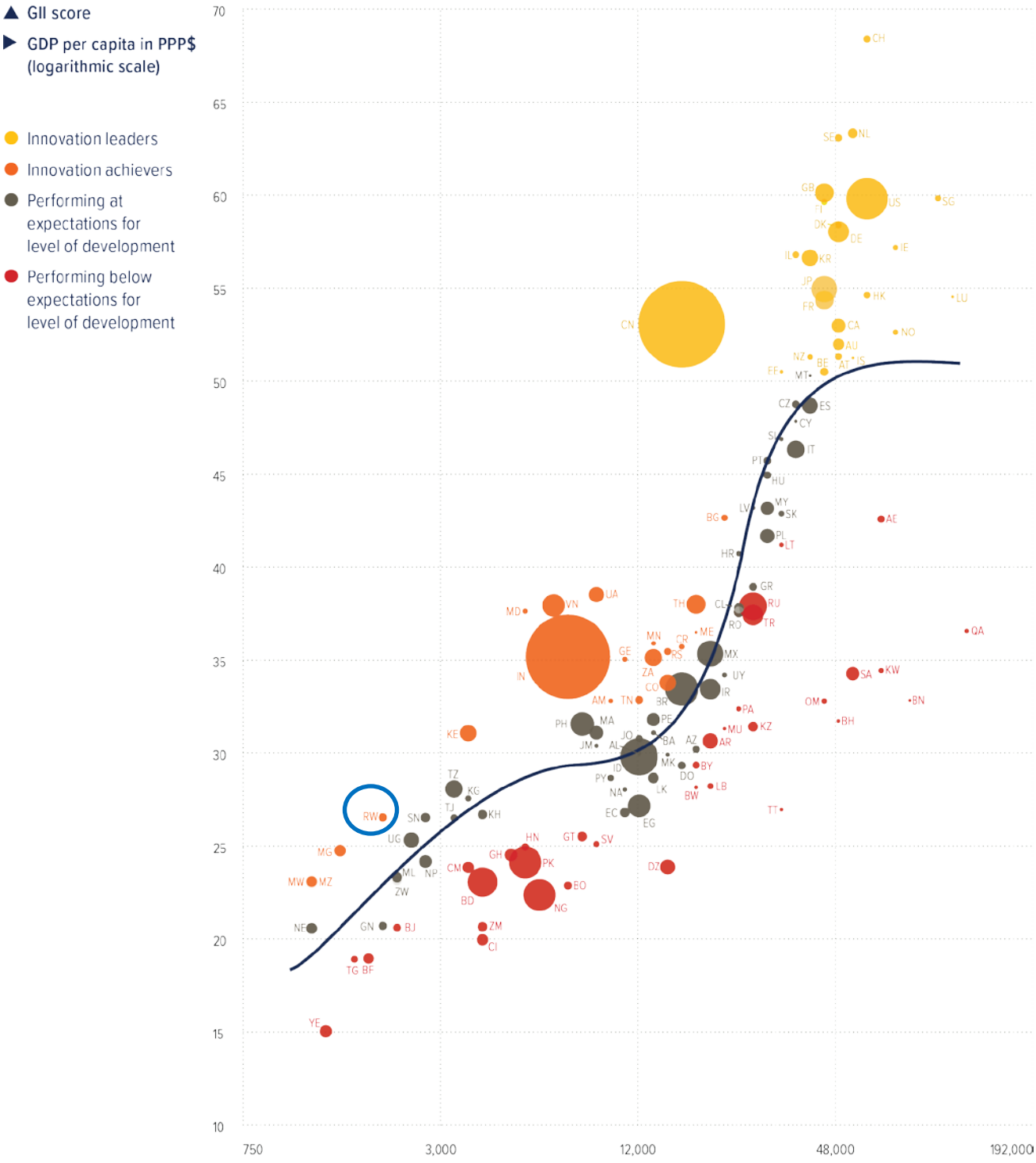
The following figure presents a summary of Rwanda's ranks in the 7 GII areas, as well as the overall rank in the GII 2018.



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, Rwanda 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 Rwanda 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
2.3.2	Gross expenditure on R&D, % GDP	n/a	2016	UNESCO Institute for Statistics
3.2.1	Electricity output, kWh/cap	n/a	2015	IEA, World Energy Balances
3.3.1	GDP/unit of energy use	n/a	2015	IEA, World Energy Balances
4.2.2	Market capitalization, % GDP	n/a	2016	World Bank, World Development Indicators
5.1.3	GERD performed by business, % GDP	n/a	2016	UNESCO Institute for Statistics
5.1.4	GERD financed by business, %	n/a	2015	UNESCO Institute for Statistics
5.2.3	GERD financed by abroad, %	n/a	2015	UNESCO Institute for Statistics
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	2014	WIPO, Intellectual Property Statistics
5.3.5	Research talent, % in business enterprise	n/a	2016	UNESCO Institute for Statistics
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	2016	The Conference Board, Total Economy Database
6.2.5	High- & medium-high-tech manufactures, %	n/a	2015	UNIDO, Industrial Statistics
7.2.1	Cultural & creative services exports, % total trade	n/a	2016	WTO, Trade in Commercial Services
7.2.2	National feature films/mn pop. 15–69	n/a	2015	UNESCO Institute for Statistics
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	2016	PwC's Global Entertainment and Media Outlook, 2017–2021
7.2.4	Printing & other media, % manufacturing	n/a	2015	UNIDO, Industrial Statistics
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	2017	App Annie Intelligence

Outdated Data

Code	Indicator	Country Year	Model Year	Source
2.3.1	Researchers, FTE/mn pop.	2009	2016	UNESCO Institute for Statistics
5.1.1	Knowledge-intensive employment, %	2014	2016	ILO, ILOSTAT
5.1.2	Firms offering formal training, % firms	2011	2013	World Bank, Enterprise Surveys
5.1.5	Females employed w/advanced degrees, %	2014	2016	ILO, ILOSTAT
5.3.1	Intellectual property payments, % total trade	2009	2016	WTO, Trade in Commercial Services
6.1.2	PCT patents by origin/bn PPP$ GDP	2015	2017	WIPO, Intellectual Property Statistics
6.3.1	Intellectual property receipts, % total trade	2009	2016	WTO, Trade in Commercial Services
7.1.2	Industrial designs by origin/bn PPP$ GDP	2015	2016	WIPO, Intellectual Property Statistics
7.3.3	Wikipedia edits/mn pop. 15–69	2014	2017	Wikimedia Foundation

RWANDA

GII 2018 rank **99**

Output rank	Input rank	Income	Region	Efficiency ratio	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2017 rank
120 ○	73	Low	SSF	125 ○	12.2	24.6	2,079.9	99

		Score/Value	Rank	
	Institutions	**63.4**	**60**	◆
1.1	Political environment	53.0	63	◆
1.1.1	Political stability & safety*	63.5	66	◆
1.1.2	Government effectiveness*	47.8	63	◆
1.2	Regulatory environment	69.4	53	◆
1.2.1	Regulatory quality*	46.8	65	◆
1.2.2	Rule of law*	45.9	56	◆
1.2.3	Cost of redundancy dismissal, salary weeks	13.0	42	●
1.3	Business environment	67.7	66	
1.3.1	Ease of starting a business*	87.7	64	
1.3.2	Ease of resolving insolvency*	47.8	71	◆
	Human capital & research	**15.8**	**107**	
2.1	Education	42.8	81	
2.1.1	Expenditure on education, % GDP	3.5	92	
2.1.2	Government funding/pupil, secondary, % GDP/cap	38.1	5	●
2.1.3	School life expectancy, years	11.2	93	
2.1.4	PISA scales in reading, maths & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.6	80	
2.2	Tertiary education	4.7	116	○
2.2.1	Tertiary enrolment, % gross	8.0	108	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	0.7	87	
2.3	Research & development (R&D)	0.0	117	○ ◇
2.3.1	Researchers, FTE/mn pop.[4]	12.3	104	○ ◇
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
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	**36.8**	**91**	◆
3.1	Information & communication technologies (ICTs)	34.3	104	◆
3.1.1	ICT access*	26.7	116	
3.1.2	ICT use*	15.8	111	
3.1.3	Government's online service*	45.7	90	◆
3.1.4	E-participation*	49.2	89	◆
3.2	General infrastructure	46.7	40	●
3.2.1	Electricity output, kWh/cap	n/a	n/a	
3.2.2	Logistics performance*	42.7	61	◆
3.2.3	Gross capital formation, % GDP	24.6	46	
3.3	Ecological sustainability	29.3	97	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	43.7	111	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	120	○
	Market sophistication	**54.2**	**34**	● ◆
4.1	Credit	65.7	14	● ◆
4.1.1	Ease of getting credit*	90.0	6	● ◆
4.1.2	Domestic credit to private sector, % GDP	21.2	111	
4.1.3	Microfinance gross loans, % GDP	6.1	1	● ◆
4.2	Investment	53.6	24	● ◆
4.2.1	Ease of protecting minority investors*	73.3	16	● ◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	30	●
4.3	Trade, competition, & market scale	43.4	117	
4.3.1	Applied tariff rate, weighted mean, %	6.8	98	
4.3.2	Intensity of local competition†	64.7	79	
4.3.3	Domestic market scale, bn PPP$	24.6	118	○

		Score/Value	Rank	
	Business sophistication	**32.2**	**57**	◆
5.1	Knowledge workers	27.7	84	◆
5.1.1	Knowledge-intensive employment, %[4]	3.3	114	○ ◇
5.1.2	Firms offering formal training, % firms[4]	55.4	11	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %[4]	0.7	102	○
5.2	Innovation linkages	40.3	36	●
5.2.1	University/industry research collaboration†	42.1	54	
5.2.2	State of cluster development†	52.1	41	● ◆
5.2.3	GERD financed by abroad, %	n/a	n/a	
5.2.4	JV–strategic alliance deals/bn PPP$ GDP	0.0	45	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	n/a	
5.3	Knowledge absorption	28.6	72	
5.3.1	Intellectual property payments, % total trade[4]	0.1	100	
5.3.2	High-tech net imports, % total trade	10.0	40	● ◆
5.3.3	ICT services imports, % total trade	1.3	57	
5.3.4	FDI net inflows, % GDP	3.2	48	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
	Knowledge & technology outputs	**6.6**	**124**	○ ◇
6.1	Knowledge creation	3.3	113	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	111	
6.1.2	PCT patents by origin/bn PPP$ GDP[4]	0.0	83	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	51	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.8	80	
6.1.5	Citable documents H index	2.4	113	
6.2	Knowledge impact	3.7	123	○ ◇
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	2.0	51	◆
6.2.3	Computer software spending, % GDP	0.0	103	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	119	○
6.2.5	High- & medium-high-tech manufactures, %	n/a	n/a	
6.3	Knowledge diffusion	12.9	105	
6.3.1	Intellectual property receipts, % total trade[4]	0.0	85	
6.3.2	High-tech net exports, % total trade	0.2	93	
6.3.3	ICT services exports, % total trade	1.9	54	
6.3.4	FDI net outflows, % GDP	0.1	104	
	Creative outputs	**18.6**	**101**	
7.1	Intangible assets	35.1	91	
7.1.1	Trademarks by origin/bn PPP$ GDP	8.5	107	
7.1.2	Industrial designs by origin/bn PPP$ GDP[4]	0.2	102	
7.1.3	ICTs & business model creation†	66.3	42	● ◆
7.1.4	ICTs & organizational model creation†	53.1	67	
7.2	Creative goods & services	4.0	[111]	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing & other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	93	
7.3	Online creativity	0.1	122	○
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	120	○
7.3.2	Country-code TLDs/th pop. 15–69	0.1	113	
7.3.3	Wikipedia edits/mn pop. 15–69[4]	0.2	117	○
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.
[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.