GLOBAL INNOVATION INDEX 2019

PAKISTAN

105th Pakistan ranks 105th among the 129 economies featured in the GII 2019.

The Global Innovation Index (GII) is a ranking of world economies based on 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 Pakistan over the past three years, noting that data availability and the GII model influence year-on-year comparisons of the GII ranks. The confidence interval for Pakistan's ranking in the GII 2019 is between 98 and 108.

Pakistan's Rankings, 2017 - 2019

	GII	Innovation Inputs	Innovation Outputs
2019	105	113	89
2018	109	120	92
2017	113	116	101

- Pakistan performs better in Innovation Outputs than Inputs.
- This year Pakistan ranks 113th in Innovation Inputs, better than last year and compared to 2017.
- As for Innovation Outputs, Pakistan ranks 89th. This position is better than last year and compared to 2017.

18th Pakistan ranks 18th among the 26 lower middle-income economies.

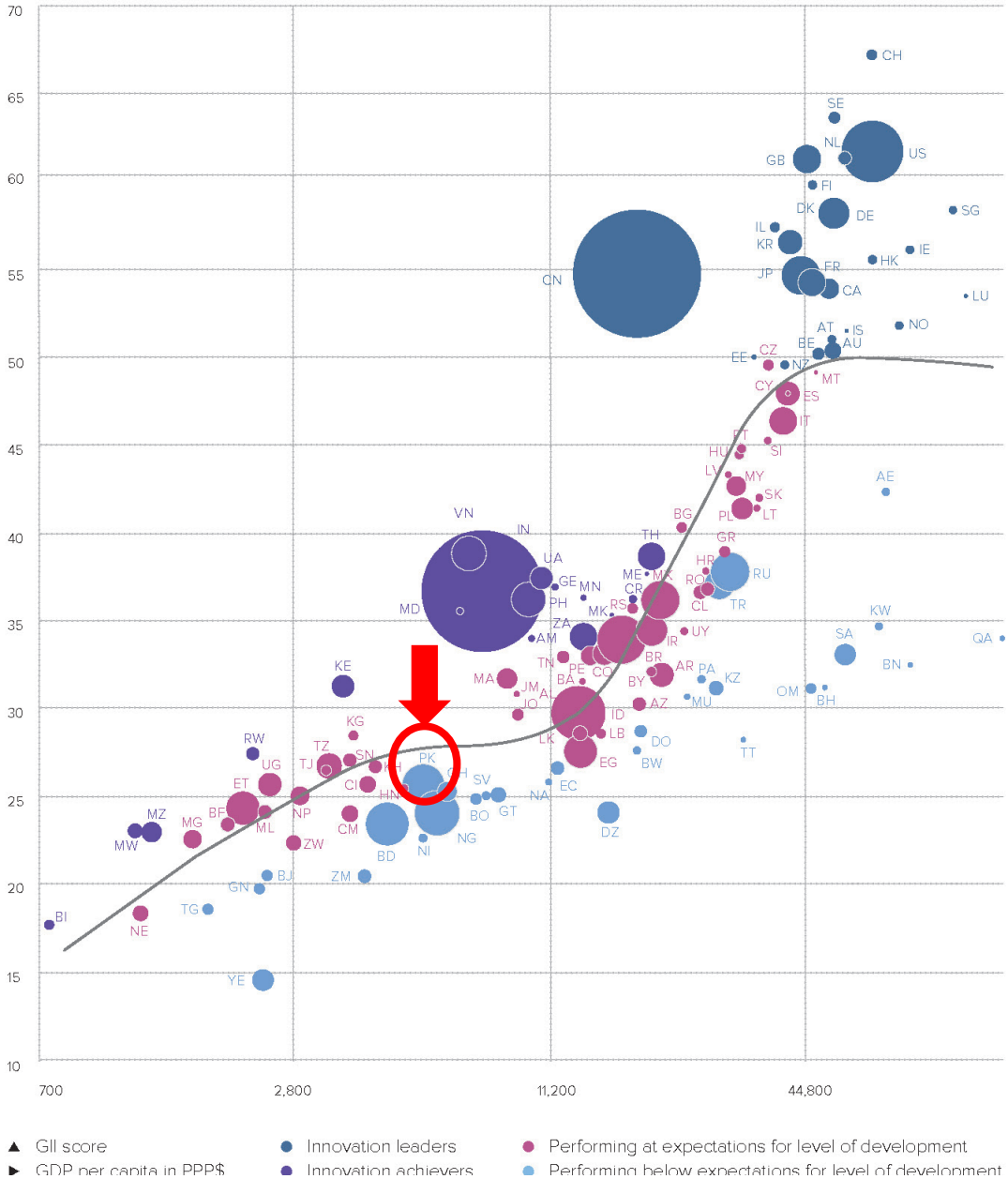
7th Pakistan ranks 7th among the 9 economies in Central and Southern Asia.

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 considered Innovation under-performers relative to GDP.

Relative to GDP, Pakistan performs below its expected level of development.

GII scores and GDP per capita in PPP US$
(bubbles sized by population)

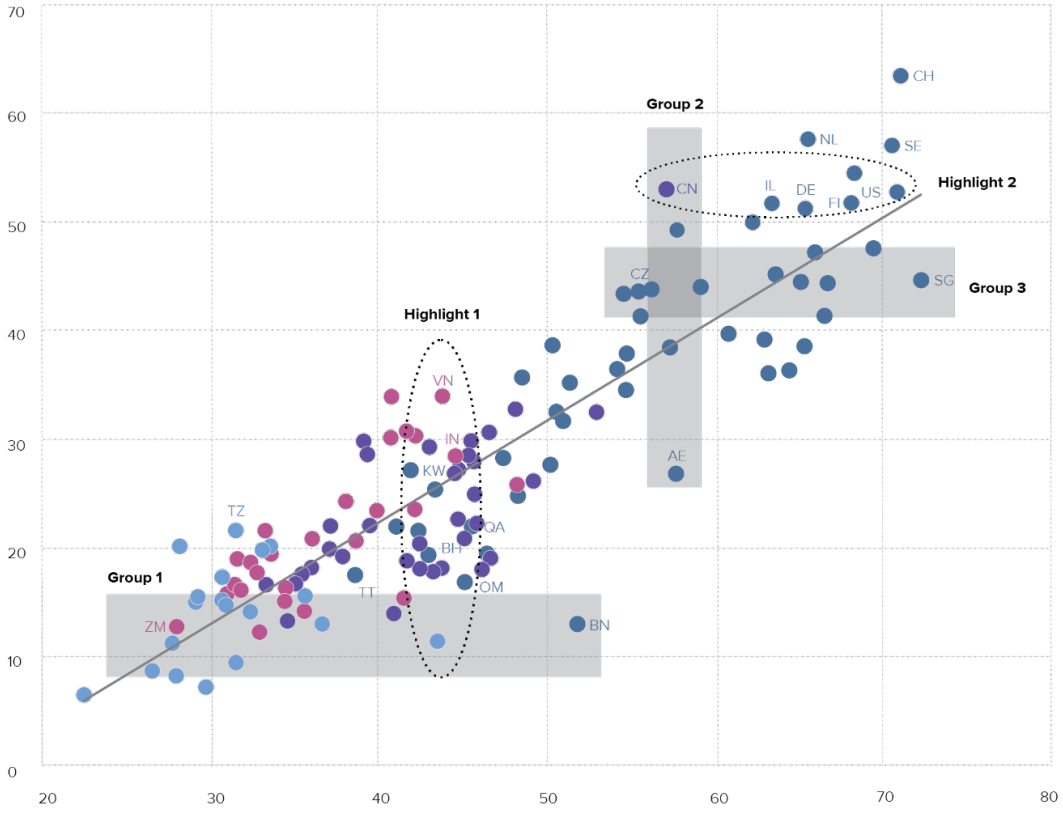


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs, indicating which economies best translate innovation inputs into innovation outputs. Economies appearing above the line are effectively translating their costly innovation investments into more and higher-quality outputs. In contrast, those below the line are not effectively translating innovation inputs into outputs.

Pakistan produces more innovation outputs relative to its level of innovation investments.

Innovation input/output performance by income group, 2019



▲ Output score
▶ Input score

● High income
● Upper-middle income

● Lower-middle income
● Low income

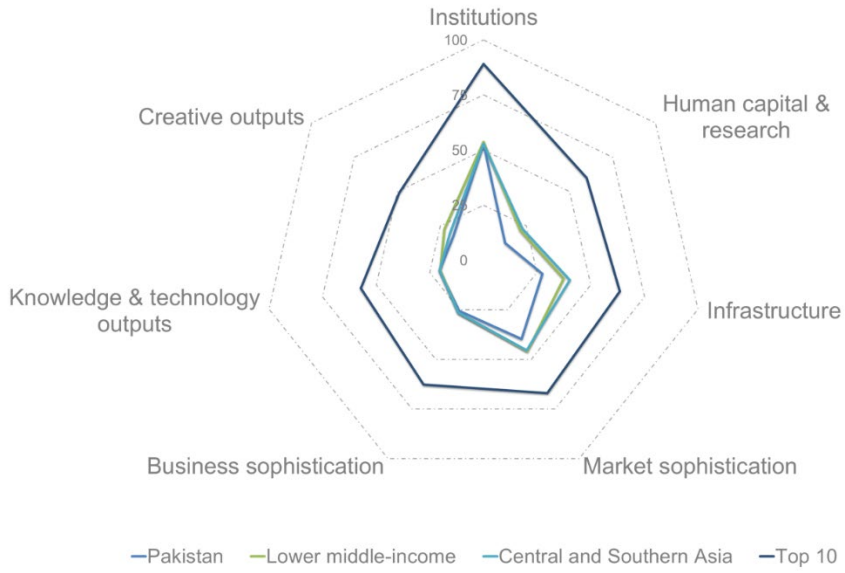
— Fitted values

AE United Arab Emirates	CZ Czech Republic	NL Netherlands	TZ United Republic of Tanzania
BH Bahrain	DE Germany	OM Oman	US United States of America
BN Brunei Darussalam	FI Finland	QA Qatar	VN Viet Nam
CH Switzerland	IL Israel	SE Sweden	ZM Zambia
CN China	IN India	SG Singapore	
	KW Kuwait	TT Trinidad and Tobago	

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2019.

BENCHMARKING PAKISTAN TO OTHER LOWER MIDDLE-INCOME ECONOMIES AND THE CENTRAL AND SOUTHERN ASIA REGION

Pakistan's scores in the seven GII pillars



Lower middle-income economies

Pakistan has high scores in 1 out of the 7 GII pillars: Knowledge & technology outputs, which is above the average of the lower middle-income group.

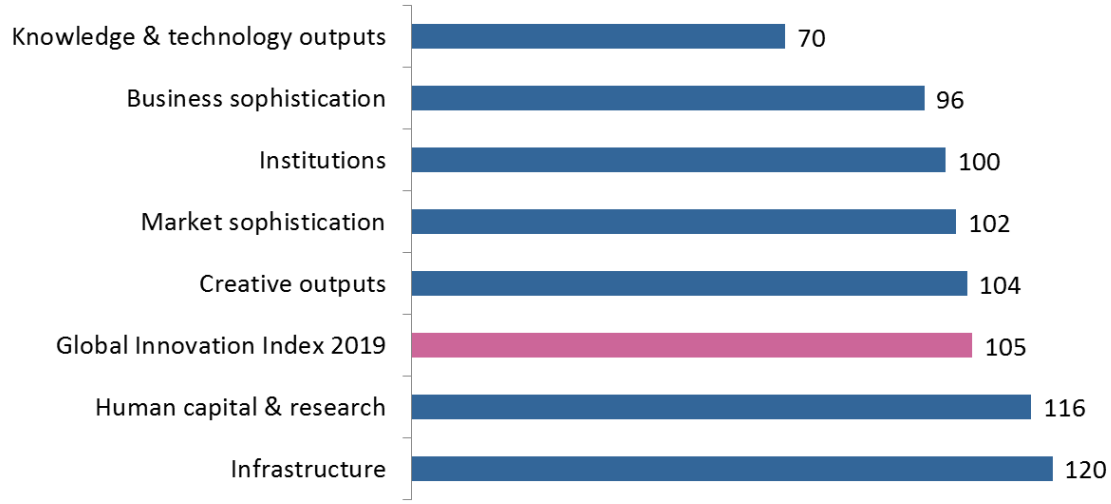
Central and Southern Asia Region

Compared to other economies in Central and Southern Asia, Pakistan performs above average in 2 out of the 7 GII pillars: Institutions and Knowledge & technology outputs

Top ranks are found in sub-pillars Business environment, Research and development (R&D), Trade, competition, & market scale, Knowledge absorption, Knowledge creation, and Knowledge impact where the country ranks in the top 70 worldwide.

OVERVIEW OF PAKISTAN'S RANKINGS IN THE 7 GII AREAS

Pakistan performs the best in Knowledge & technology outputs and its weakest performance is in Infrastructure.



*The highest possible ranking in each pillar is 1.

PAKISTAN'S INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of Pakistan's strengths and weaknesses in the GII 2019.

Strengths

Code	Indicator name	Rank
1.3.2	Ease of resolving insolvency*	48
2.3.4	QS university ranking, average score top 3*	41
4.1.3	Microfinance gross loans, % GDP	28
4.2.1	Ease of protecting minority investors*	24
4.3.3	Domestic market scale, bn PPP$	24
5.3.2	High-tech imports, % total trade	24
6.1.5	Citable documents H index	50
6.2.1	Growth rate of PPP$ GDP/worker, %, 3-year average	27
6.2.3	Computer software spending, % GDP	52
6.3.3	ICT services exports, % total trade	49

Weaknesses

Code	Indicator name	Rank
2.1	Education	122
2.1.1	Expenditure on education, % GDP	110
2.1.3	School life expectancy, years	114
2.3.3	Global R&D companies, top 3, in mn US$	43
3	Infrastructure	120
3.1.2	ICT use*	118
3.2	General infrastructure	123
3.3.2	Environmental performance*	121
4.2.3	Venture capital deals/bn PPP$ GDP	72
6.2.2	New businesses/th pop. 15–64	104
7.2.2	National feature films/mn pop. 15–69	106
7.2.3	Entertainment & Media market/th pop. 15–69	62
7.2.4	Printing & other media, % manufacturing	100

STRENGTHS

- GII strengths for Pakistan are found in five of the seven GII pillars.
- Several of these strengths are in Knowledge & technology outputs (70), where relative strengths are four indicators: Quality of scientific publications (50), Labor productivity growth (27), Computer software spending (52), and ICT services exports (49).
- Other three relative strengths of Pakistan are in Market sophistication (102), where indicators Microfinance gross loans (28), Ease of protecting minority investors (24), and Domestic market scale (24) are GII strengths for this country.
- In Institutions (100), Pakistan's strength is indicator Ease of resolving insolvency (48).
- In Human capital & research (116), indicator Quality of universities (41) is a relative strength of the country.
- In Business sophistication (96), Pakistan's only strength is indicator High-tech imports (24).

WEAKNESSES

- Pakistan's weaknesses in the GII are found in five of the seven GII pillars.
- Pillar Infrastructure (120) is a notable weakness for Pakistan.
- In Infrastructure (120), other relative weaknesses are sub-pillar General infrastructure (123) and indicators ICT use (118) and Environmental performance (121).
- In Human capital & research (116), several of Pakistan's weaknesses are found. These are sub-pillar Education (122) as well as three indicators: Expenditure on education (110), School life expectancy (114), and Global R&D companies (43).
- Other three relative weaknesses for the country are in Creative outputs (104), and in particular in indicators National feature films (106), Entertainment & Media market (62), and Printing & other media (100).
- In Market sophistication (102), only one indicator – Venture capital deals (72) – is a relative weakness of the country.
- In Knowledge & technology outputs (70), Pakistan shows only one weakness in indicator New businesses (104).

PAKISTAN

GII 2019 rank

105

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2018 rank
89	**113**	**Lower middle**	**CSA**	**200.8**	**1,148.3**	**5,679.8**	**109**

		Score/Value	Rank	
INSTITUTIONS		**53.1**	**100**	
1.1	**Political environment**	**39.7**	**107**	
1.1.1	Political and operational stability*	54.4	111	
1.1.2	Government effectiveness*	32.4	101	
1.2	**Regulatory environment**	**48.7**	**113**	
1.2.1	Regulatory quality*	26.0	107	
1.2.2	Rule of law*	27.2	109	
1.2.3	Cost of redundancy dismissal, salary weeks	27.2	105	
1.3	**Business environment**	**70.9**	**62**	
1.3.1	Ease of starting a business*	81.9	100	
1.3.2	Ease of resolving insolvency*	59.9	48	● ◆
HUMAN CAPITAL & RESEARCH		**12.5**	**116**	
2.1	**Education**	**21.6**	**122**	○ ◇
2.1.1	Expenditure on education, % GDP	2.8	110	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	10.9	92	
2.1.3	School life expectancy, years	8.5	114	○ ◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	19.4	86	
2.2	**Tertiary education**	**7.4**	**[115]**	◇
2.2.1	Tertiary enrolment, % gross	10.1	108	◇
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**8.6**	**62**	
2.3.1	Researchers, FTE/mn pop. 🕘	293.6	73	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.2	84	
2.3.3	Global R&D companies, avg. exp. top 3, mn US$	0.0	43	○ ◇
2.3.4	QS university ranking, average score top 3*	25.7	41	● ◆
INFRASTRUCTURE		**27.3**	**120**	○ ◇
3.1	**Information & communication technologies(ICTs)**	**38.5**	**109**	
3.1.1	ICT access*	35.1	111	◇
3.1.2	ICT use*	13.9	118	○ ◇
3.1.3	Government's online service*	54.9	100	
3.1.4	E-participation*	50.0	104	
3.2	**General infrastructure**	**16.2**	**123**	○ ◇
3.2.1	Electricity output, kWh/mn pop	590.1	104	
3.2.2	Logistics performance*	16.6	110	◇
3.2.3	Gross capital formation, % GDP	16.4	113	◇
3.3	**Ecological sustainability**	**27.4**	**108**	
3.3.1	GDP/unit of energy use	9.6	60	
3.3.2	Environmental performance*	37.5	121	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	97	
MARKET SOPHISTICATION		**39.6**	**102**	
4.1	**Credit**	**20.1**	**118**	◇
4.1.1	Ease of getting credit*	45.0	94	
4.1.2	Domestic credit to private sector, % GDP	17.0	112	◇
4.1.3	Microfinance gross loans, % GDP	0.6	28	●
4.2	**Investment**	**38.8**	**83**	
4.2.1	Ease of protecting minority investors*	71.7	24	● ◆
4.2.2	Market capitalization, % GDP 🕘	29.2	50	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	72	○
4.3	**Trade, competition, & market scale**	**60.0**	**68**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	10.1	113	◇
4.3.2	Intensity of local competition†	57.7	115	◇
4.3.3	Domestic market scale, bn PPP$	1,148.3	24	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**25.5**	**96**	
5.1	**Knowledge workers**	**23.6**	**[100]**	
5.1.1	Knowledge-intensive employment, %	11.6	96	
5.1.2	Firms offering formal training, % firms	32.0	47	
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, %	1.6	104	
5.2	**Innovation linkages**	**20.4**	**83**	
5.2.1	University/industry research collaboration†	44.5	52	
5.2.2	State of cluster development†	49.2	52	
5.2.3	GERD financed by abroad, % 🕘	2.7	72	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	59	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	90	
5.3	**Knowledge absorption**	**32.5**	**68**	
5.3.1	Intellectual property payments, % total trade	0.5	63	
5.3.2	High-tech imports, % total trade	10.6	24	●
5.3.3	ICT services imports, % total trade	0.9	73	
5.3.4	FDI net inflows, % GDP	0.8	110	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**20.6**	**70**	
6.1	**Knowledge creation**	**13.3**	**[59]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	101	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	8.5	56	
6.1.5	Citable documents H-index	14.4	50	●
6.2	**Knowledge impact**	**36.1**	**68**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.9	27	●
6.2.2	New businesses/th pop. 15-64	0.1	104	○
6.2.3	Computer software spending, % GDP	0.3	52	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.7	91	
6.2.5	High- & medium-high-tech manufactures, %	n/a	n/a	
6.3	**Knowledge diffusion**	**12.3**	**91**	
6.3.1	Intellectual property receipts, % total trade	0.0	75	
6.3.2	High-tech net exports, % total trade	0.8	73	
6.3.3	ICT services exports, % total trade	2.2	49	●
6.3.4	FDI net outflows, % GDP	0.0	109	
CREATIVE OUTPUTS		**17.6**	**104**	
7.1	**Intangible assets**	**33.5**	**98**	
7.1.1	Trademarks by origin/bn PPP$ GDP	28.9	77	
7.1.2	Industrial designs by origin/bn PPP$ GDP	0.4	91	
7.1.3	ICTs & business model creation†	53.8	89	
7.1.4	ICTs & organizational model creation†	51.6	75	
7.2	**Creative goods & services**	**2.0**	**116**	
7.2.1	Cultural & creative services exports, % total trade	0.1	77	
7.2.2	National feature films/mn pop. 15-69	0.1	106	○
7.2.3	Entertainment & Media market/th pop. 15-69	0.4	62	○ ◇
7.2.4	Printing & other media, % manufacturing 🕘	0.3	100	○
7.2.5	Creative goods exports, % total trade	0.3	72	
7.3	**Online creativity**	**1.5**	**96**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.6	105	
7.3.2	Country-code TLDs/th pop. 15-69	0.2	109	
7.3.3	Wikipedia edits/mn pop. 15-69	1.6	101	
7.3.4	Mobile app creation/bn PPP$ GDP	4.2	55	

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 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.

DATA AVAILABILITY

The following tables list data that are missing or are outdated for Pakistan.

Missing data

Code	Indicator name	Country year	Model year	Source
2.1.4	PISA scales in reading, maths & science	n/a	2015	OECD Programme for International Student Assessment (PISA)
2.2.2	Graduates in science & engineering, %	n/a	2016	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	n/a	2016	UNESCO Institute for Statistics
5.1.3	GERD performed by business, % GDP	n/a	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.4	GERD financed by business, %	n/a	2016	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.3.5	Research talent, % in business enterprise	n/a	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	2018	World Intellectual Property Organization
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2017	World Intellectual Property Organization
6.2.5	High- & medium-high-tech manufactures, %	n/a	2016	United Nations Industrial Development Organization

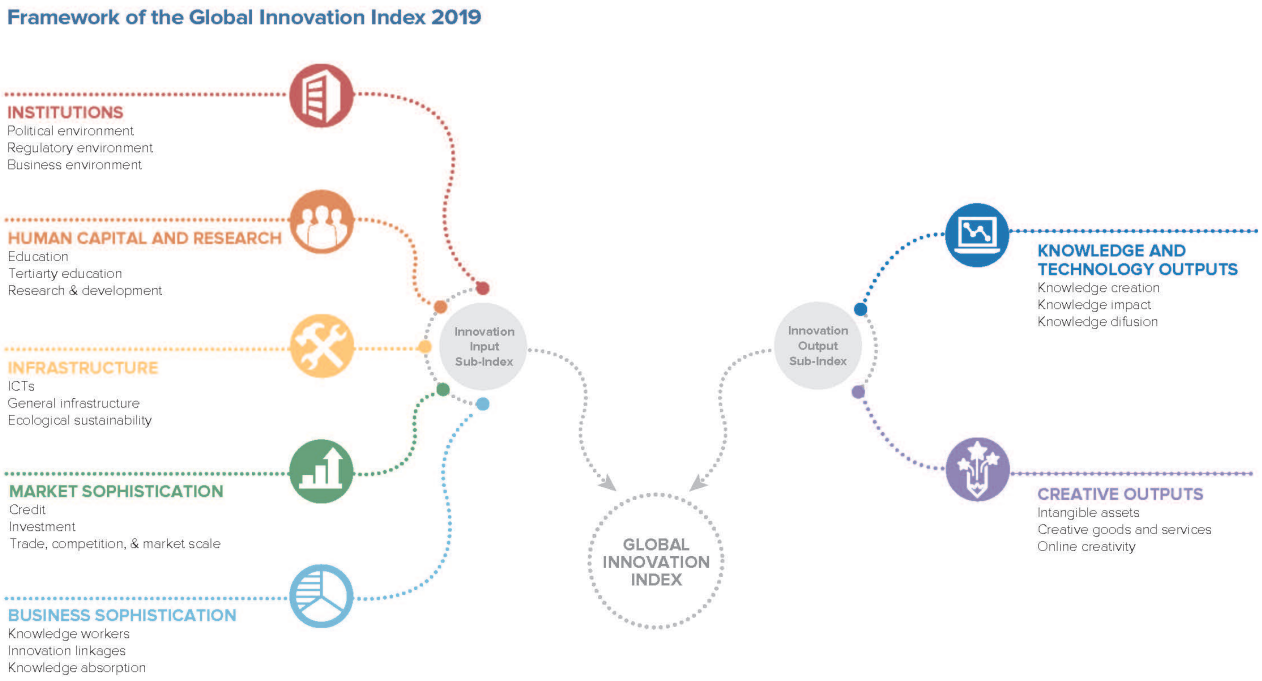
Outdated data

Code	Indicator name	Country year	Model year	Source
2.3.1	Researchers, FTE/mn pop.	2015	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2015	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
4.2.2	Market capitalization, % GDP	2016	2017	World Federation of Exchanges
4.3.1	Applied tariff rate, weighted mean, %	2016	2017	World Bank
5.2.3	GERD financed by abroad, %	2015	2016	UNESCO Institute for Statistics
7.2.4	Printing & other media, % manufacturing	2006	2016	United Nations Industrial Development Organization

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations. In 2019, the GII presents its 12th edition devoted to the theme **Creating Healthy Lives—The Future of Medical Innovation**.

Recognizing that innovation is a key driver of economic development, the GII aims to provide a rich innovation ranking and 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 countries 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 includes 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 containing three sub-pillars.