



PAKISTAN

87th Pakistan ranks 87th 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 Pakistan 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 Pakistan in the GII 2022 is between ranks 82 and 97.

Rankings for Pakistan (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	107	118	88
2021	99	117	77
2022	87	111	69

- Pakistan performs better in innovation outputs than innovation inputs in 2022.
- This year Pakistan ranks 111th in innovation inputs, higher than both 2021 and 2020.
- As for innovation outputs, Pakistan ranks 69th. This position is higher than both 2021 and 2020.

12th Pakistan ranks 12th among the 36 lower-middle-income group economies.

6th Pakistan ranks 6th among the 10 economies in Central and Southern Asia.

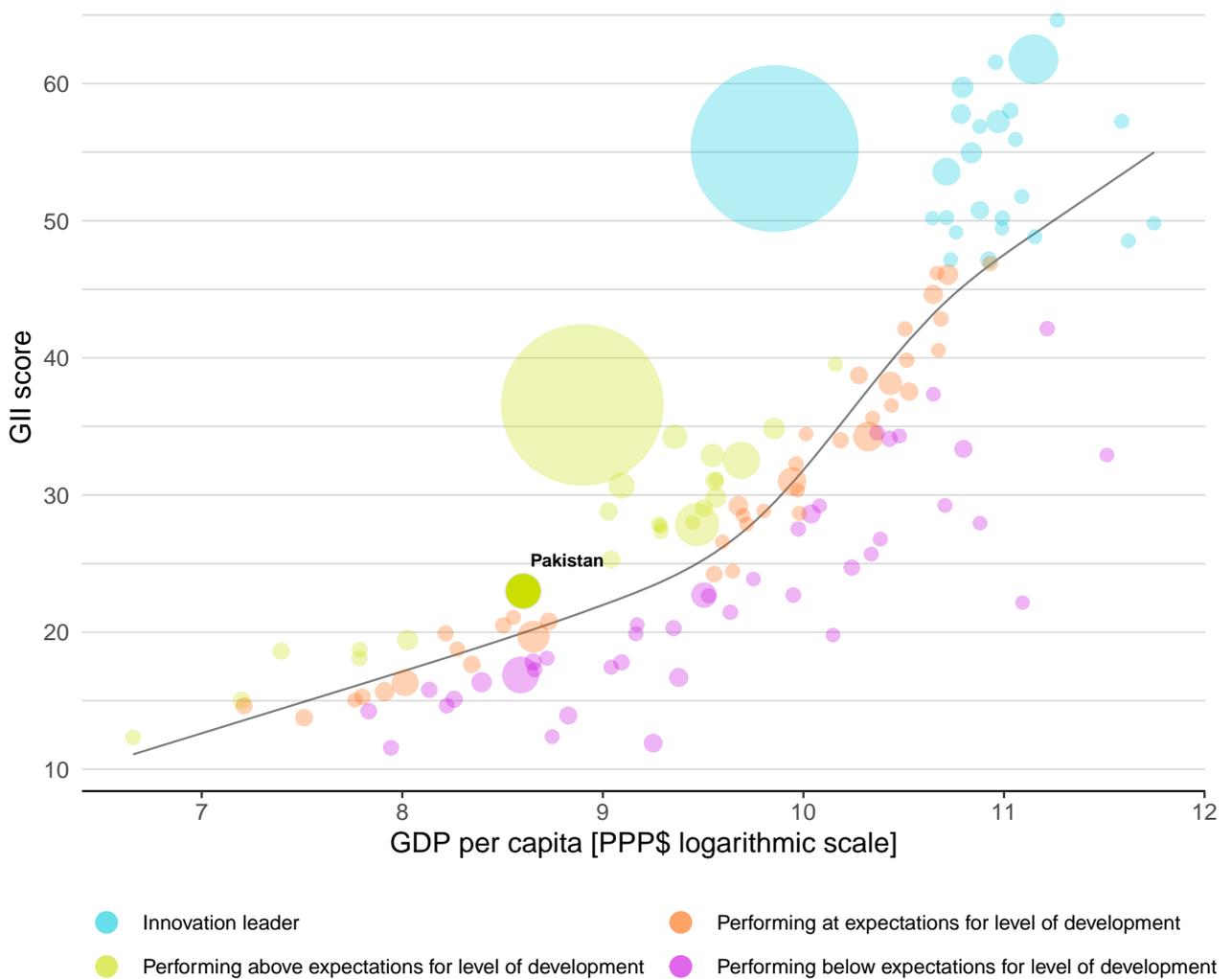


EXPECTED VS. OBSERVED INNOVATION PERFORMANCE

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 performing below expectations.

Relative to GDP, Pakistan's performance is above expectations for its level of development.

The positive relationship between innovation and development



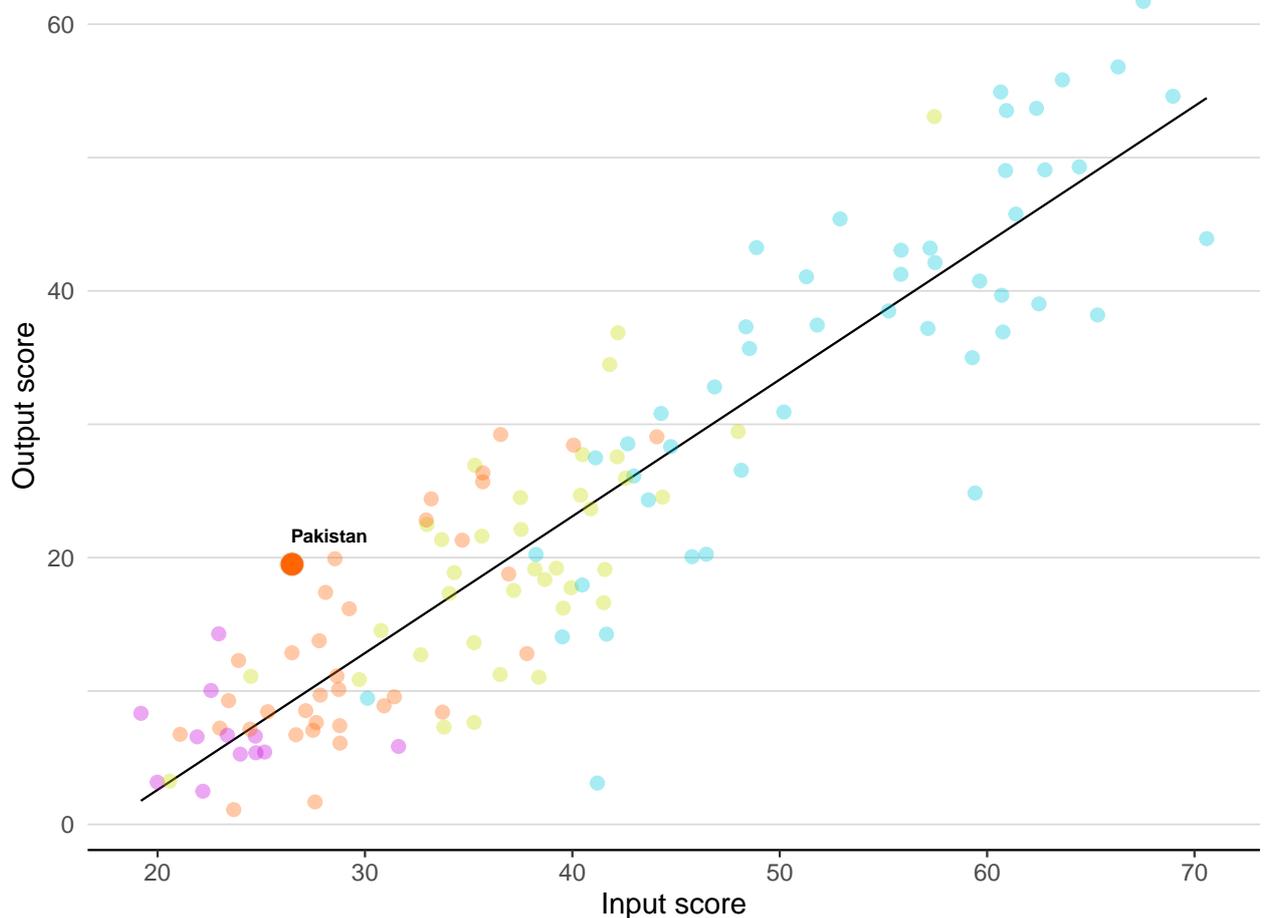


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

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

Innovation input to output performance

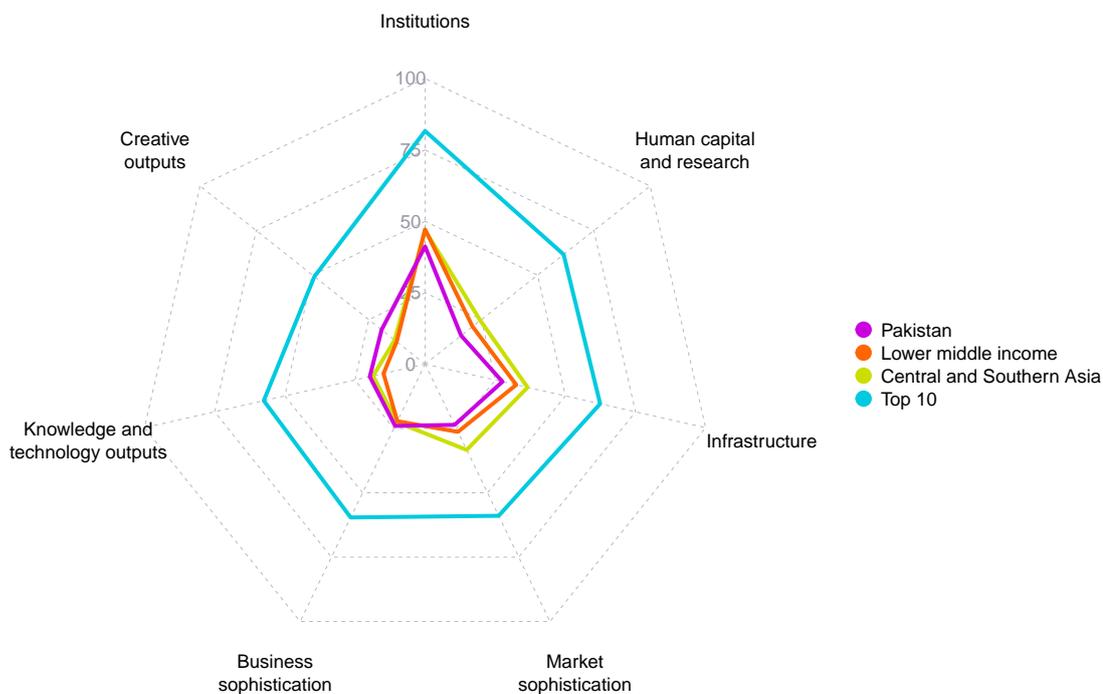


Income ● High income ● Upper middle ● Lower middle ● Low income — Fitted line



BENCHMARKING AGAINST OTHER LOWER MIDDLE-INCOME GROUP ECONOMIES AND CENTRAL AND SOUTHERN ASIA

The seven GII pillar scores for Pakistan



Lower-middle-income group economies

Pakistan performs above the lower-middle-income group average in three pillars, namely: Business sophistication; Knowledge and technology outputs; and, Creative outputs.

Central and Southern Asia

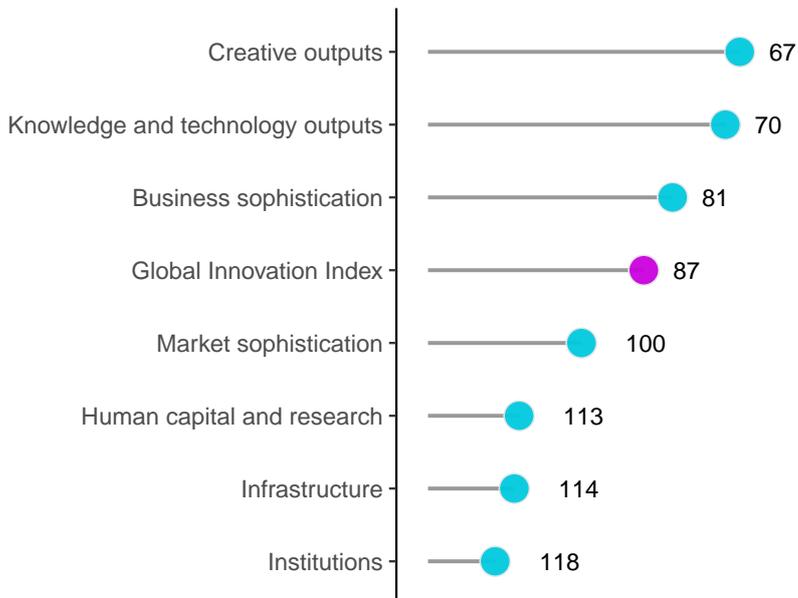
Pakistan performs above the regional average in three pillars, namely: Business sophistication; Knowledge and technology outputs; and, Creative outputs.



OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Pakistan performs best in Creative outputs and its weakest performance is in Institutions.

The seven GII pillar ranks for Pakistan



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

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

https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=PK.



INNOVATION STRENGTHS AND WEAKNESSES

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

Strengths and weaknesses for Pakistan

Strengths			Weaknesses		
Code	Indicator name	Rank	Code	Indicator name	Rank
2.3.4	QS university ranking, top 3	42	1.3.2	Entrepreneurship policies and culture	68
4.3.3	Domestic market scale, bn PPP\$	23	2.1.1	Expenditure on education, % GDP	116
5.2.1	University-industry R&D collaboration	32	2.1.3	School life expectancy, years	114
5.2.2	State of cluster development and depth	35	2.3.3	Global corporate R&D investors, top 3, mn USD	38
5.3.2	High-tech imports, % total trade	22	3.2.2	Logistics performance	110
6.1.4	Scientific and technical articles/bn PPP\$ GDP	40	3.2.3	Gross capital formation, % GDP	119
6.1.5	Citable documents H-index	46	3.3.2	Environmental performance	126
6.2.3	Software spending, % GDP	37	6.2.2	New businesses/th pop. 15–64	117
6.3.4	ICT services exports, % total trade	22	7.2.2	National feature films/mn pop. 15–69	77
7.3.4	Mobile app creation/bn PPP\$ GDP	12	7.2.3	Entertainment and media market/th pop. 15–69	61

Pakistan

87

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
69	111	Lower middle	CSA	225.2	1,157.5	5,447

		Score/ Value	Rank			Score/ Value	Rank
	Institutions	41.2	118 ○		Business sophistication	24.0	81
1.1	Political environment	47.2	104	5.1	Knowledge workers	18.8	[101]
1.1.1	Political and operational stability*	56.4	108	5.1.1	Knowledge-intensive employment, %	⊙	11.8 102
1.1.2	Government effectiveness*	37.9	102	5.1.2	Firms offering formal training, %	⊙	32.0 49
1.2	Regulatory environment	44.8	118 ○	5.1.3	GERD performed by business, % GDP	n/a	n/a
1.2.1	Regulatory quality*	27.0	113	5.1.4	GERD financed by business, %	n/a	n/a
1.2.2	Rule of law*	28.1	106	5.1.5	Females employed w/advanced degrees, %	⊙	1.7 108
1.2.3	Cost of redundancy dismissal	27.2	109	5.2	Innovation linkages	24.6	60
1.3	Business environment	31.7	107	5.2.1	University-industry R&D collaboration†	55.0	32 ● ◆
1.3.1	Policies for doing business†	54.8	50	5.2.2	State of cluster development and depth†	56.1	35 ● ◆
1.3.2	Entrepreneurship policies and culture*	⊙	8.6 68 ○	5.2.3	GERD financed by abroad, % GDP	⊙	0.0 87
				5.2.4	Joint venture/strategic alliance deals/bn PPP\$ GDP	0.0	50 ◆
				5.2.5	Patent families/bn PPP\$ GDP	0.0	90
	Human capital and research	16.0	113	5.3	Knowledge absorption	28.6	71
2.1	Education	31.3	117	5.3.1	Intellectual property payments, % total trade	0.4	73
2.1.1	Expenditure on education, % GDP	⊙	2.5 116 ○	5.3.2	High-tech imports, % total trade	12.1	22 ●
2.1.2	Government funding/pupil, secondary, % GDP/cap	⊙	16.0 76	5.3.3	ICT services imports, % total trade	1.2	80
2.1.3	School life expectancy, years	8.7	114 ○ ◇	5.3.4	FDI net inflows, % GDP	0.7	108
2.1.4	PISA scales in reading, maths and science	n/a	n/a	5.3.5	Research talent, % in businesses	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary	17.0	84				
2.2	Tertiary education	5.6	[118]		Knowledge and technology outputs	19.7	70
2.2.1	Tertiary enrolment, % gross	12.2	108	6.1	Knowledge creation	17.0	[54]
2.2.2	Graduates in science and engineering, %	n/a	n/a	6.1.1	Patents by origin/bn PPP\$ GDP	0.3	87
2.2.3	Tertiary inbound mobility, %	n/a	n/a	6.1.2	PCT patents by origin/bn PPP\$ GDP	n/a	n/a
2.3	Research and development (R&D)	11.1	53	6.1.3	Utility models by origin/bn PPP\$ GDP	n/a	n/a
2.3.1	Researchers, FTE/mn pop.	⊙	382.9 76	6.1.4	Scientific and technical articles/bn PPP\$ GDP	21.7	40 ● ◆
2.3.2	Gross expenditure on R&D, % GDP	⊙	0.2 90	6.1.5	Citable documents H-index	18.3	46 ● ◆
2.3.3	Global corporate R&D investors, top 3, mn USD	0.0	38 ○ ◇	6.2	Knowledge impact	23.4	77
2.3.4	QS university ranking, top 3*	29.5	42 ● ◆	6.2.1	Labor productivity growth, %	1.3	55
				6.2.2	New businesses/th pop. 15-64	0.1	117 ○
	Infrastructure	27.6	114	6.2.3	Software spending, % GDP	0.3	37 ●
3.1	Information and communication technologies (ICTs)	53.5	98	6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP	2.1	83
3.1.1	ICT access*	64.2	108	6.2.5	High-tech manufacturing, %	⊙	21.1 60
3.1.2	ICT use*	34.3	108	6.3	Knowledge diffusion	18.7	77
3.1.3	Government's online service*	62.9	82	6.3.1	Intellectual property receipts, % total trade	0.0	91
3.1.4	E-participation*	52.4	96	6.3.2	Production and export complexity	26.0	91
3.2	General infrastructure	12.1	127 ○ ◇	6.3.3	High-tech exports, % total trade	0.9	77
3.2.1	Electricity output, GWh/mn pop.	⊙	615.6 106	6.3.4	ICT services exports, % total trade	4.4	22 ●
3.2.2	Logistics performance*	17.2	110 ○				
3.2.3	Gross capital formation, % GDP	15.2	119 ○ ◇		Creative outputs	19.3	67
3.3	Ecological sustainability	17.1	111	7.1	Intangible assets	34.3	51
3.3.1	GDP/unit of energy use	9.3	77	7.1.1	Intangible asset intensity, top 15, %	61.6	39
3.3.2	Environmental performance*	24.6	126 ○ ◇	7.1.2	Trademarks by origin/bn PPP\$ GDP	33.9	66
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP	0.5	82	7.1.3	Global brand value, top 5,000, % GDP	n/a	n/a
				7.1.4	Industrial designs by origin/bn PPP\$ GDP	0.3	92
	Market sophistication	23.6	100	7.2	Creative goods and services	3.2	108
4.1	Credit	14.1	102	7.2.1	Cultural and creative services exports, % total trade	0.1	79
4.1.1	Finance for startups and scaleups*	⊙	29.5 62	7.2.2	National feature films/mn pop. 15-69	0.2	77 ○ ◇
4.1.2	Domestic credit to private sector, % GDP	17.2	113	7.2.3	Entertainment and media market/th pop. 15-69	0.3	61 ○ ◇
4.1.3	Loans from microfinance institutions, % GDP	0.6	37	7.2.4	Printing and other media, % manufacturing	⊙	0.6 77
4.2	Investment	3.5	92	7.2.5	Creative goods exports, % total trade	0.1	104
4.2.1	Market capitalization, % GDP	⊙	15.2 65	7.3	Online creativity	5.5	60 ◆
4.2.2	Venture capital investors, deals/bn PPP\$ GDP	0.0	79	7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.5	105
4.2.3	Venture capital recipients, deals/bn PPP\$ GDP	0.0	68	7.3.2	Country-code TLDs/th pop. 15-69	0.2	112
4.2.4	Venture capital received, value, % GDP	⊙	0.0 79	7.3.3	GitHub commit pushes received/mn pop. 15-69	0.9	105
4.3	Trade, diversification, and market scale	53.2	75	7.3.4	Mobile app creation/bn PPP\$ GDP	20.2	12 ● ◆
4.3.1	Applied tariff rate, weighted avg., %	8.7	110				
4.3.2	Domestic industry diversification	⊙	89.8 45				
4.3.3	Domestic market scale, bn PPP\$	1,157.5	23 ●				

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. 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 Pakistan.

Missing data for Pakistan

Code	Indicator name	Economy year	Model year	Source
2.1.4	PISA scales in reading, maths and science	n/a	2018	OECD, PISA
2.2.2	Graduates in science and engineering, %	n/a	2020	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	n/a	2019	UNESCO Institute for Statistics
5.1.3	GERD performed by business, % GDP	n/a	2020	UNESCO Institute for Statistics
5.1.4	GERD financed by business, %	n/a	2019	UNESCO Institute for Statistics
5.3.5	Research talent, % in businesses	n/a	2020	UNESCO Institute for Statistics
6.1.2	PCT patents by origin/bn PPP\$ GDP	n/a	2021	World Intellectual Property Organization
6.1.3	Utility models by origin/bn PPP\$ GDP	n/a	2020	World Intellectual Property Organization
7.1.3	Global brand value, top 5,000, % GDP	n/a	2021	Brand Finance

Outdated data for Pakistan

Code	Indicator name	Economy year	Model year	Source
1.3.2	Entrepreneurship policies and culture	2019	2021	Global Entrepreneurship Monitor
2.1.1	Expenditure on education, % GDP	2019	2020	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	2015	2018	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2019	2020	UNESCO Institute for Statistics
2.3.2	Gross expenditure on R&D, % GDP	2019	2020	UNESCO Institute for Statistics
3.2.1	Electricity output, GWh/mn pop.	2019	2020	International Energy Agency
4.1.1	Finance for startups and scaleups	2019	2021	Global Entrepreneurship Monitor
4.2.1	Market capitalization, % GDP	2011	2020	World Federation of Exchanges
4.2.4	Venture capital received, value, % GDP	2020	2021	Refinitiv
4.3.2	Domestic industry diversification	2016	2019	United Nations Industrial Development Organization
5.1.1	Knowledge-intensive employment, %	2019	2021	International Labour Organization
5.1.2	Firms offering formal training, %	2013	2019	World Bank Enterprise Surveys
5.1.5	Females employed w/advanced degrees, %	2019	2021	International Labour Organization
5.2.3	GERD financed by abroad, % GDP	2017	2019	UNESCO Institute for Statistics



Code	Indicator name	Economy year	Model year	Source
6.2.5	High-tech manufacturing, %	2016	2019	United Nations Industrial Development Organization
7.2.4	Printing and other media, % manufacturing	2016	2019	United Nations Industrial Development Organization

PAKISTAN'S INNOVATION SYSTEM

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

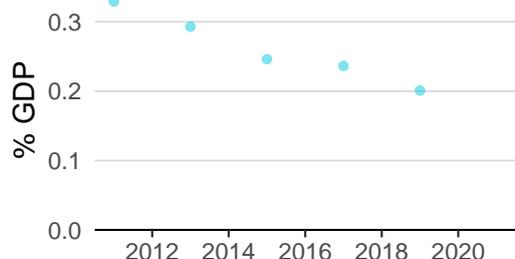
Innovation inputs



2.1.1 Expenditure on education was equal to 2.5% GDP in 2019 and equivalent to an indicator rank of 116.



2.3.1 Researchers was equal to 382.9 FTE/mn pop. in 2019 and equivalent to an indicator rank of 76.



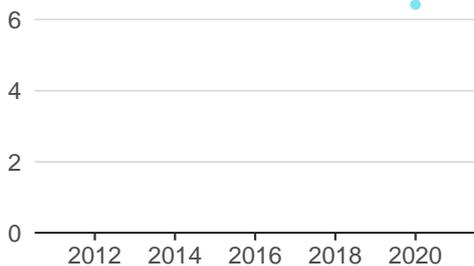
2.3.2 Gross expenditure on R&D was equal to 0.2% GDP in 2019 and equivalent to an indicator rank of 90.



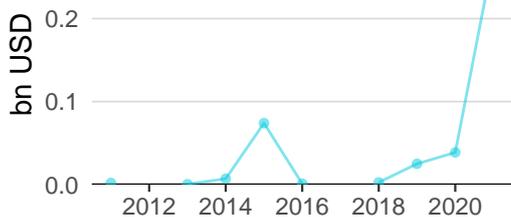
2.3.4 QS university ranking was equal to 29.5 in 2021—up by 4 percentage points from the year prior—and equivalent to an indicator rank of 42.



3.1.1 ICT access was equal to 6.4 in 2020 and equivalent to an indicator rank of 108.



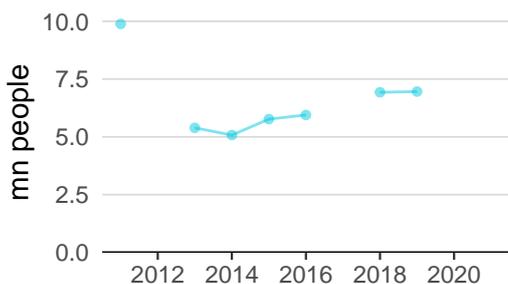
4.2.4 Venture capital received was equal to 0.3 bn USD in 2021—up by 612 percentage points from the year prior—and equivalent to an indicator rank of 79.



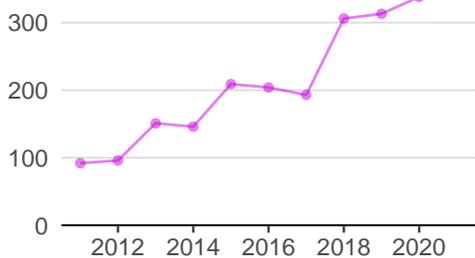
4.3.2 Domestic industry diversification was equal to 0.1 in 2016 and equivalent to an indicator rank of 45.



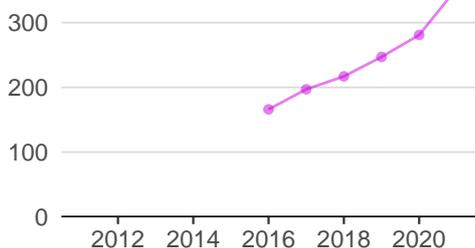
5.1.1 Knowledge-intensive employment was equal to 7.0 mn people in 2019—effectively unchanged from the year prior—and equivalent to an indicator rank of 102.



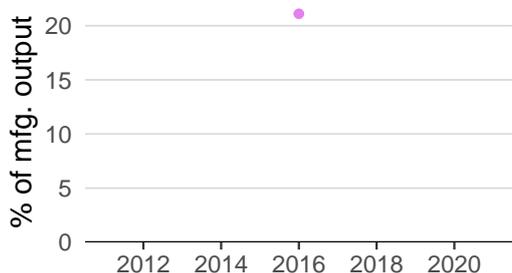
Innovation outputs



6.1.1 Patents by origin was equal to 338.0 in 2020—up by 8 percentage points from the year prior—and equivalent to an indicator rank of 87.



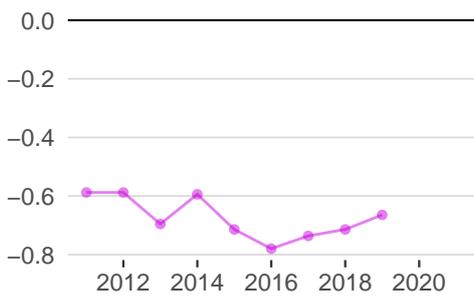
6.1.5 Citable documents H-index was equal to 353.0 in 2021—up by 26 percentage points from the year prior—and equivalent to an indicator rank of 46.



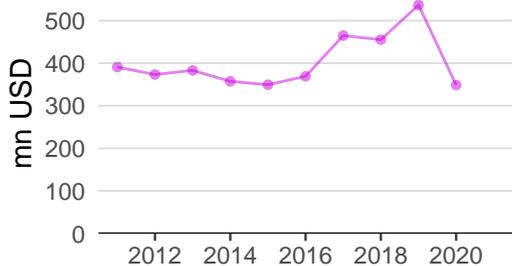
6.2.5 High-tech manufacturing was equal to 21.1% of mfg. output in 2016 and equivalent to an indicator rank of 60.



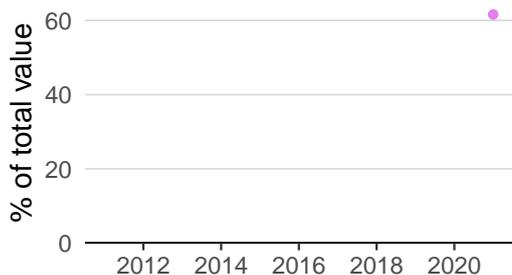
6.3.1 Intellectual property receipts was equal to 11.0 mn USD in 2020—up by 1nf percentage points from the year prior—and equivalent to an indicator rank of 91.



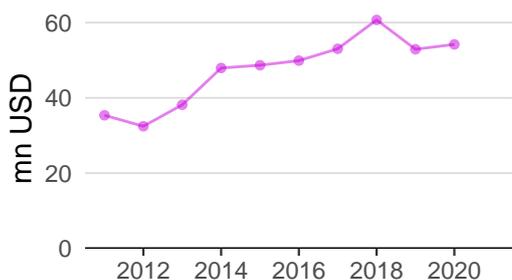
6.3.2 Production and export complexity was equal to -0.7 in 2019—up by 7 percentage points from the year prior—and equivalent to an indicator rank of 91.



6.3.3 High-tech exports was equal to 348.6 mn USD in 2020—down by 35 percentage points from the year prior—and equivalent to an indicator rank of 77.



7.1.1 Intangible asset intensity was equal to 61.6% of total value in 2021 and equivalent to an indicator rank of 39.



7.2.1 Cultural and creative services exports was equal to 54.2 mn USD in 2020—up by 2 percentage points from the year prior—and equivalent to an indicator rank of 79.

PAKISTAN'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
NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY ISLAMABAD	30.9	358=
QUAID-I-AZAM UNIVERSITY	29.4	378=
PAKISTAN INSTITUTE OF ENGINEERING AND APPLIED SCIENCES	28.2	398

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

Note: QS Quacquarelli Symonds Ltd annually assesses over 1,200 universities across the globe and scores them between [0,100]. Ranks can represent a single value "x", a tie "x=" or a range "x-y".

7.1.1 Intangible asset intensity, top 15

Firm	Rank
COLGATE PALMOLIVE PAKISTAN	1
LUCKY CEMENT	2
MEEZAN BANK	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
VINDA	Household Products	1
HBL	Banking	2
JAZZ	Telecoms	3

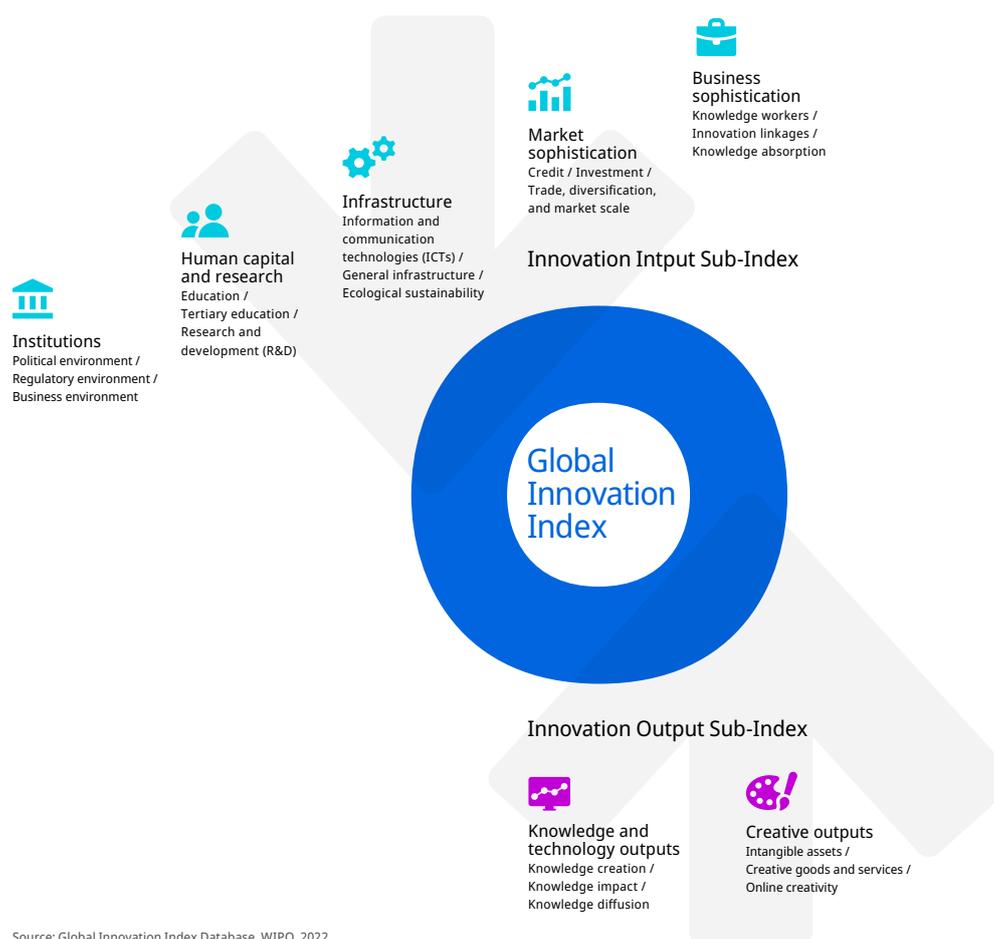
Source: Brand Finance (<https://brandirectory.com>).

Note: Rank corresponds to within economy ranks.

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.