Global Innovation Index 2021

PAKISTAN

99th Pakistan ranks 99th among the 132 economies featured in the GII 2021.

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 2021 is between ranks 90 and 101.

Rankings for Pakistan (2019–2021)

	GII	Innovation inputs	Innovation outputs
2021	99	117	77
2020	107	118	88
2019	105	113	89

- Pakistan performs better in innovation outputs than innovation inputs in 2021.
- This year Pakistan ranks 117th in innovation inputs, higher than last year but lower than 2019.
- As for innovation outputs, Pakistan ranks 77th. This position is higher than both 2020 and 2019.

17th Pakistan ranks 17th among the 34 lower middle-income group economies.

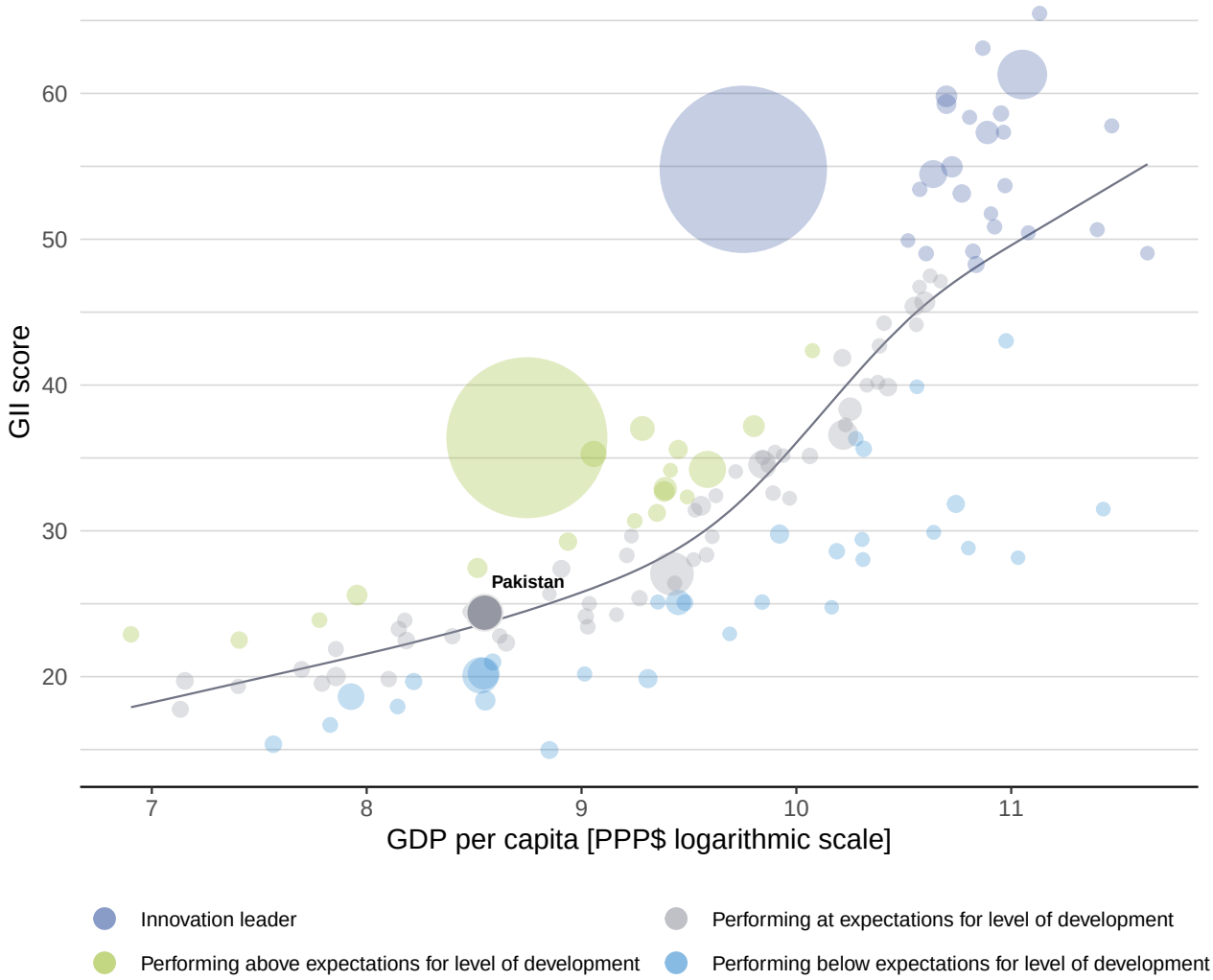
7th Pakistan ranks 7th among the 10 economies in Central and Southern Asia.

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 at expectations for its level of development.

The positive relationship between innovation and development

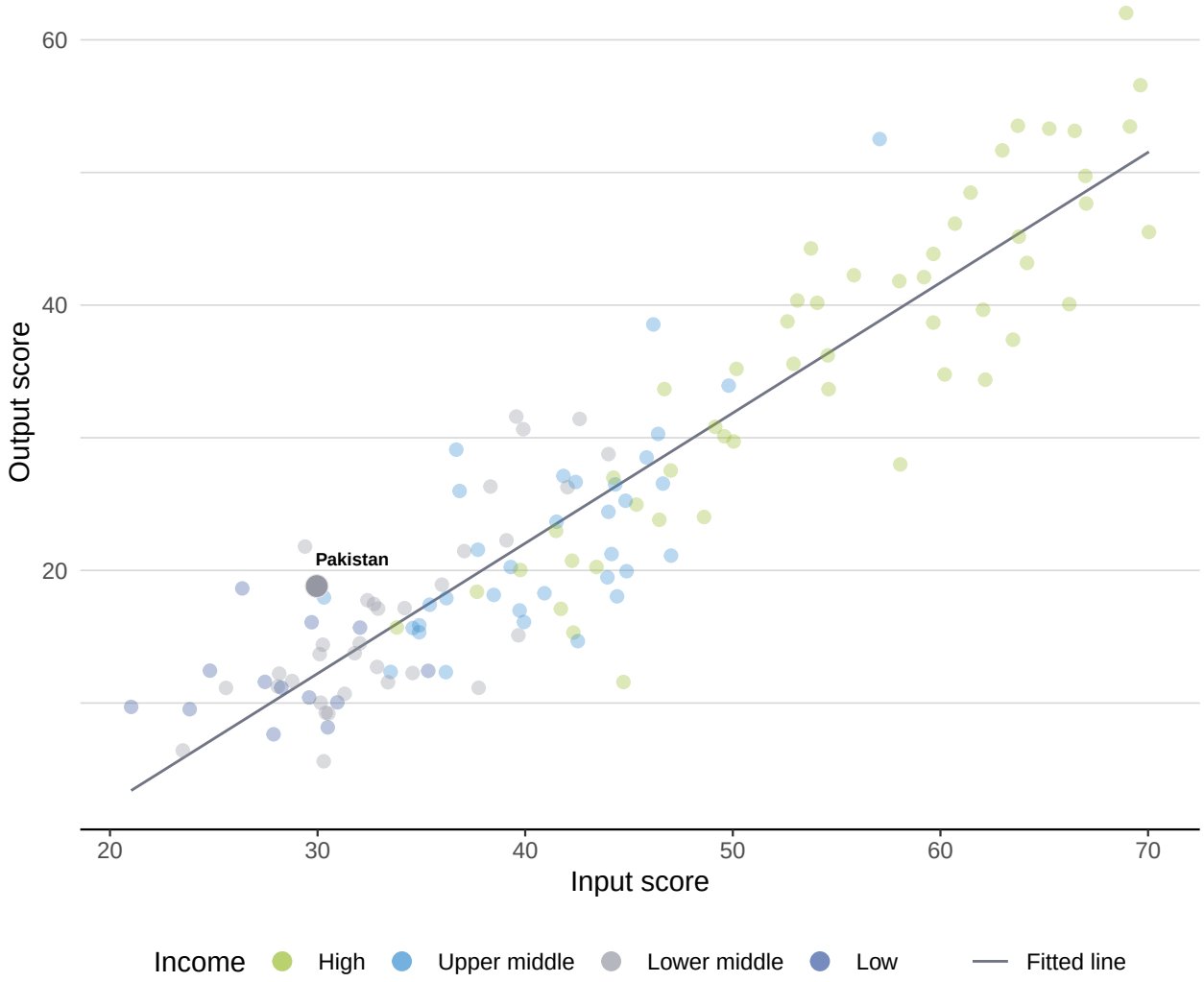


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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



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 four pillars, namely: Institutions; Business sophistication; Knowledge and technology outputs; and, Creative outputs.

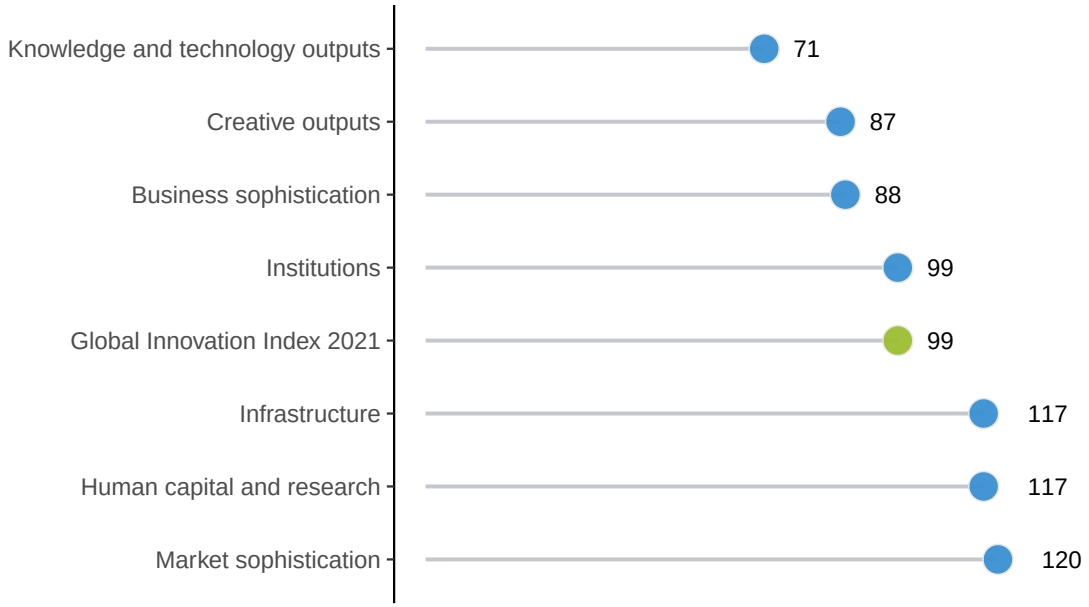
Central and Southern Asia

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

OVERVIEW OF RANKINGS IN THE SEVEN GII 2021 AREAS

Pakistan performs best in Knowledge and technology outputs and its weakest performance is in Market sophistication.

The seven GII pillar ranks for Pakistan



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

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Pakistan in the GII 2021.

Strengths and weaknesses for Pakistan

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
2.3.4	QS university ranking, top 3	43	2.1	Education	121
4.2.1	Ease of protecting minority investors	27	2.1.3	School life expectancy, years	117
4.3.3	Domestic market scale, bn PPP$	22	2.2.1	Tertiary enrolment, % gross	117
5.2.1	University-industry R&D collaboration	42	2.3.3	Global corporate R&D investors, top 3, mn US$	41
5.3.2	High-tech imports, % total trade	29	3.2	General infrastructure	125
6.1.4	Scientific and technical articles/bn PPP$ GDP	49	3.2.2	Logistics performance	112
6.1.5	Citable documents H-index	50	3.2.3	Gross capital formation, % GDP	113
6.2.3	Software spending, % GDP	33	4.1	Credit	123
6.3.4	ICT services exports, % total trade	36	4.2.3	Venture capital investors, deals/bn PPP$ GDP	88
7.3.4	Mobile app creation/bn PPP$ GDP	19	6.2.2	New businesses/th pop. 15–64	117
			7.2	Creative goods and services	126
			7.2.2	National feature films/mn pop. 15–69	107
			7.2.3	Entertainment and media market/th pop. 15–69	62
			7.3.3	Wikipedia edits/mn pop. 15–69	123

Pakistan

GII 2021 rank

99

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
77	**117**	**Lower middle**	**CSA**	**220.9**	**1,076.3**	**5,160**	**107**

		Score/ Value	Rank	
Institutions		**54.0**	**99**	
1.1	**Political environment**	**42.8**	**107**	
1.1.1	Political and operational stability*	57.1	106	
1.1.2	Government effectiveness*	35.6	110	
1.2	**Regulatory environment**	**44.9**	**116**	
1.2.1	Regulatory quality*	26.7	109	
1.2.2	Rule of law*	29.1	107	
1.2.3	Cost of redundancy dismissal	27.2	108	
1.3	**Business environment**	**74.1**	**55**	◆
1.3.1	Ease of starting a business*	89.3	59	
1.3.2	Ease of resolving insolvency*	59.0	53	◆
Human capital and research		**14.0**	**117**	
2.1	**Education**	**27.0**	**121**	○ ◇
2.1.1	Expenditure on education, % GDP	2.9	100	
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	16.0	70	
2.1.3	School life expectancy, years	8.3	117	○ ◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	16.3	79	
2.2	**Tertiary education**	**5.7**	**[124]**	
2.2.1	Tertiary enrolment, % gross	9.0	117	○
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**9.2**	**63**	
2.3.1	Researchers, FTE/mn pop. ⏲	335.6	75	
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.2	88	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	28.4	43	● ◆
Infrastructure		**25.4**	**117**	
3.1	**Information and communication technologies (ICTs)**	**43.0**	**104**	
3.1.1	ICT access*	39.0	109	
3.1.2	ICT use*	17.9	117	◇
3.1.3	Government's online service*	62.9	82	
3.1.4	E-participation*	52.4	97	
3.2	**General infrastructure**	**12.5**	**125**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	703.0	104	
3.2.2	Logistics performance*	17.3	112	○
3.2.3	Gross capital formation, % GDP	15.4	113	○ ◇
3.3	**Ecological sustainability**	**20.5**	**96**	
3.3.1	GDP/unit of energy use	10.1	67	
3.3.2	Environmental performance*	33.1	111	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	85	
Market sophistication		**35.1**	**120**	○
4.1	**Credit**	**20.9**	**123**	○
4.1.1	Ease of getting credit*	45.0	101	
4.1.2	Domestic credit to private sector, % GDP	18.1	115	
4.1.3	Microfinance gross loans, % GDP	0.2	50	
4.2	**Investment**	**21.1**	**107**	
4.2.1	Ease of protecting minority investors*	72.0	27	● ◆
4.2.2	Market capitalization, % GDP ⏲	29.2	49	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	88	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	78	
4.3	**Trade, diversification, and market scale**	**63.2**	**83**	
4.3.1	Applied tariff rate, weighted avg., %	8.7	109	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	1,076.3	22	● ◆

		Score/ Value	Rank	
Business sophistication		**21.4**	**88**	
5.1	**Knowledge workers**	**20.8**	**[99]**	
5.1.1	Knowledge-intensive employment, % ⏲	11.6	105	
5.1.2	Firms offering formal training, % ⏲	32.0	46	
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	109	
5.2	**Innovation linkages**	**18.4**	**78**	
5.2.1	University-industry R&D collaboration†	49.0	42	● ◆
5.2.2	State of cluster development and depth†	48.6	55	
5.2.3	GERD financed by abroad, % GDP ⏲	0.0	89	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	57	
5.2.5	Patent families/bn PPP$ GDP	0.0	94	
5.3	**Knowledge absorption**	**25.1**	**69**	
5.3.1	Intellectual property payments, % total trade	0.4	71	
5.3.2	High-tech imports, % total trade	10.3	29	●
5.3.3	ICT services imports, % total trade	1.0	79	
5.3.4	FDI net inflows, % GDP	0.7	115	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**19.2**	**71**	
6.1	**Knowledge creation**	**15.6**	**[65]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	88	
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 and technical articles/bn PPP$ GDP	18.1	49	● ◆
6.1.5	Citable documents H-index	17.2	50	● ◆
6.2	**Knowledge impact**	**27.4**	**74**	
6.2.1	Labor productivity growth, %	0.7	52	
6.2.2	New businesses/th pop. 15–64	0.1	117	○
6.2.3	Software spending, % GDP	0.3	33	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.3	84	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**14.6**	**71**	
6.3.1	Intellectual property receipts, % total trade ⏲	0.0	84	
6.3.2	Production and export complexity	28.2	98	
6.3.3	High-tech exports, % total trade	1.3	70	
6.3.4	ICT services exports, % total trade	2.8	36	●
Creative outputs		**18.4**	**87**	
7.1	**Intangible assets**	**30.8**	**64**	
7.1.1	Trademarks by origin/bn PPP$ GDP	30.7	74	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	90	
7.1.4	ICTs and organizational model creation†	51.6	76	
7.2	**Creative goods and services**	**1.1**	**126**	○ ◇
7.2.1	Cultural and creative services exports, % total trade	0.1	84	
7.2.2	National feature films/mn pop. 15–69	0.1	107	○
7.2.3	Entertainment and media market/th pop. 15–69	0.1	62	○ ◇
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	107	
7.3	**Online creativity**	**11.2**	**89**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.5	106	
7.3.2	Country-code TLDs/th pop. 15–69	0.2	110	
7.3.3	Wikipedia edits/mn pop. 15–69	19.6	123	○
7.3.4	Mobile app creation/bn PPP$ GDP	28.5	19	● ◆

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 IV 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 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 Programme for International Student Assessment (PISA)
2.2.2	Graduates in science and engineering, %	n/a	2018	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.2.3	Tertiary inbound mobility, %	n/a	2018	UNESCO Institute for Statistics
4.3.2	Domestic industry diversification	n/a	2018	United Nations Industrial Development Organization
5.1.3	GERD performed by business, % GDP	n/a	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.4	GERD financed by business, %	n/a	2018	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.3.5	Research talent, % in businesses	n/a	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	2020	World Intellectual Property Organization
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2019	World Intellectual Property Organization
6.2.5	High-tech manufacturing, %	n/a	2018	United Nations Industrial Development Organization
7.1.2	Global brand value, top 5,000, % GDP	n/a	2020	Brand Finance
7.2.4	Printing and other media, % manufacturing	n/a	2018	United Nations Industrial Development Organization

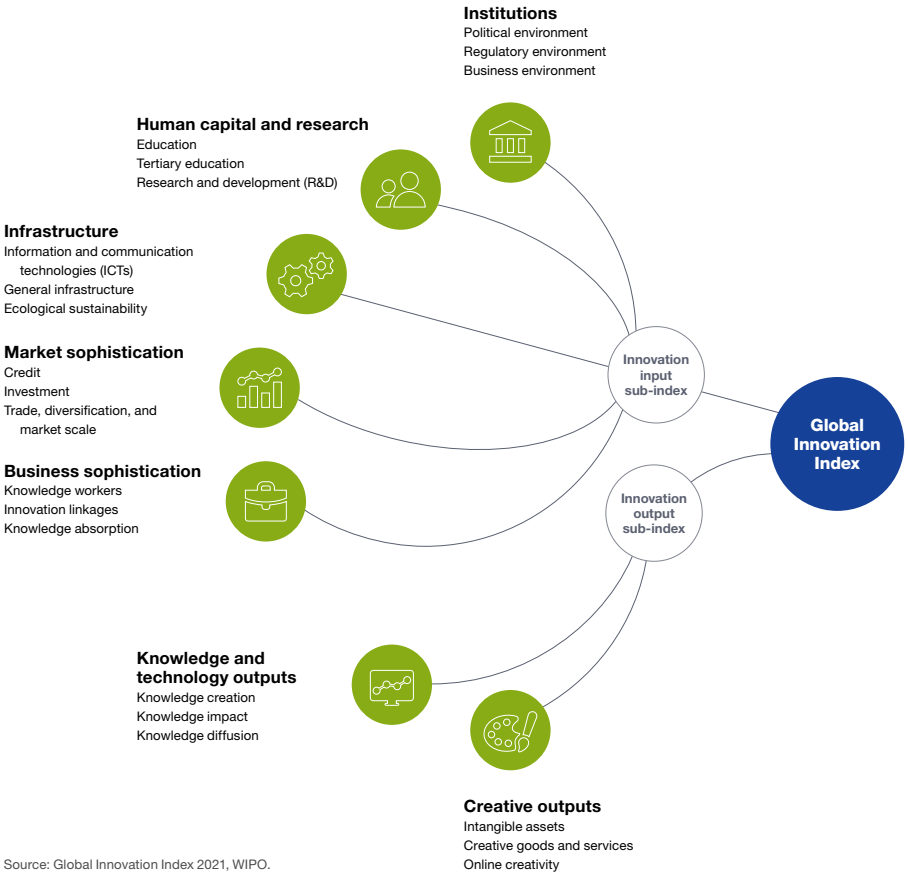
Outdated data for Pakistan

Code	Indicator name	Economy year	Model year	Source
2.1.2	Government funding/pupil, secondary, % GDP/cap	2015	2017	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2017	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2017	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
4.2.2	Market capitalization, % GDP	2016	2019	World Federation of Exchanges
5.1.1	Knowledge-intensive employment, %	2018	2019	International Labour Organization
5.1.2	Firms offering formal training, %	2013	2019	World Bank
5.1.5	Females employed w/advanced degrees, %	2018	2019	International Labour Organization
5.2.3	GERD financed by abroad, % GDP	2017	2018	UNESCO Institute for Statistics
6.3.1	Intellectual property receipts, % total trade	2018	2019	World Trade Organization

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.



Source: Global Innovation Index 2021, WIPO.

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.