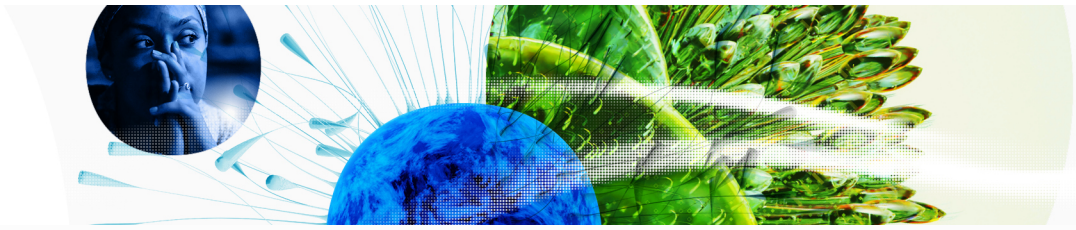
Global Innovation Index 2023



The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

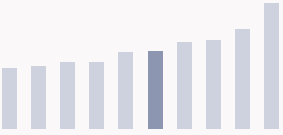
Consisting of **roughly 80 indicators**, grouped into innovation inputs and outputs, the GII **aims to capture the multi-dimensional facets of innovation**.

Pakistan ranking in the Global Innovation Index 2023

> Pakistan ranks 88th among the 132 economies featured in the GII 2023.

> Pakistan ranks 12th among the 37 lower-middle-income group economies.

> Pakistan ranks 5th among the 10 economies in Central and Southern Asia.



> Pakistan GII Ranking (2020-2023)

The table shows the rankings of Pakistan over the past four years. 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 2023 is between ranks 84 and 100.

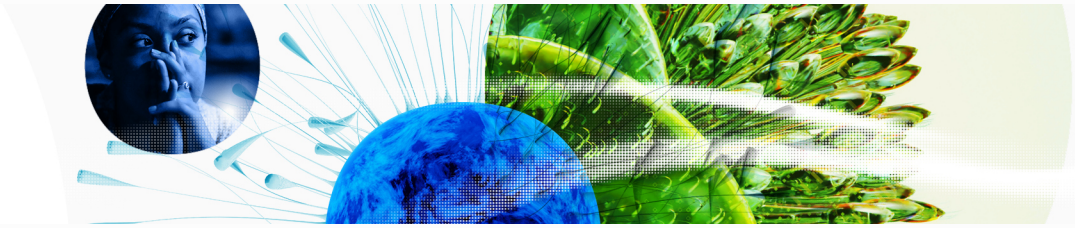
	GII Position	Innovation Inputs	Innovation Outputs
2020	107th	118th	88th
2021	99th	117th	77th
2022	87th	111st	69th
2023	88th	113rd	68th

Pakistan performs better in innovation outputs than innovation inputs in 2023.

This year **Pakistan ranks 113rd in innovation inputs.** This position is lower than last year.

Pakistan ranks 68th in innovation outputs. This position is higher than last year.

Global Innovation Index 2023



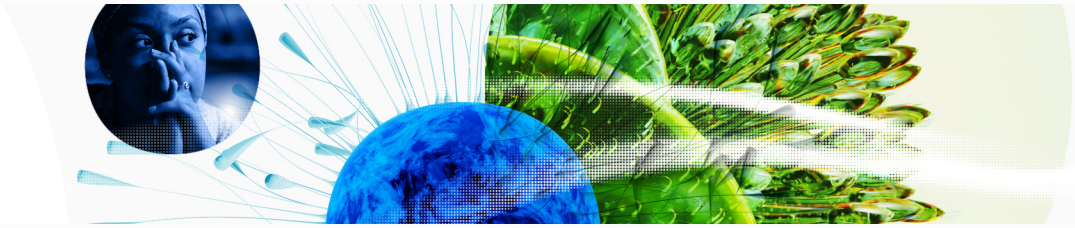
→ Expected vs. observed innovation performance

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 is performing above expectations for its level of development.

> Innovation overperformers relative to their economic development

Global Innovation Index 2023

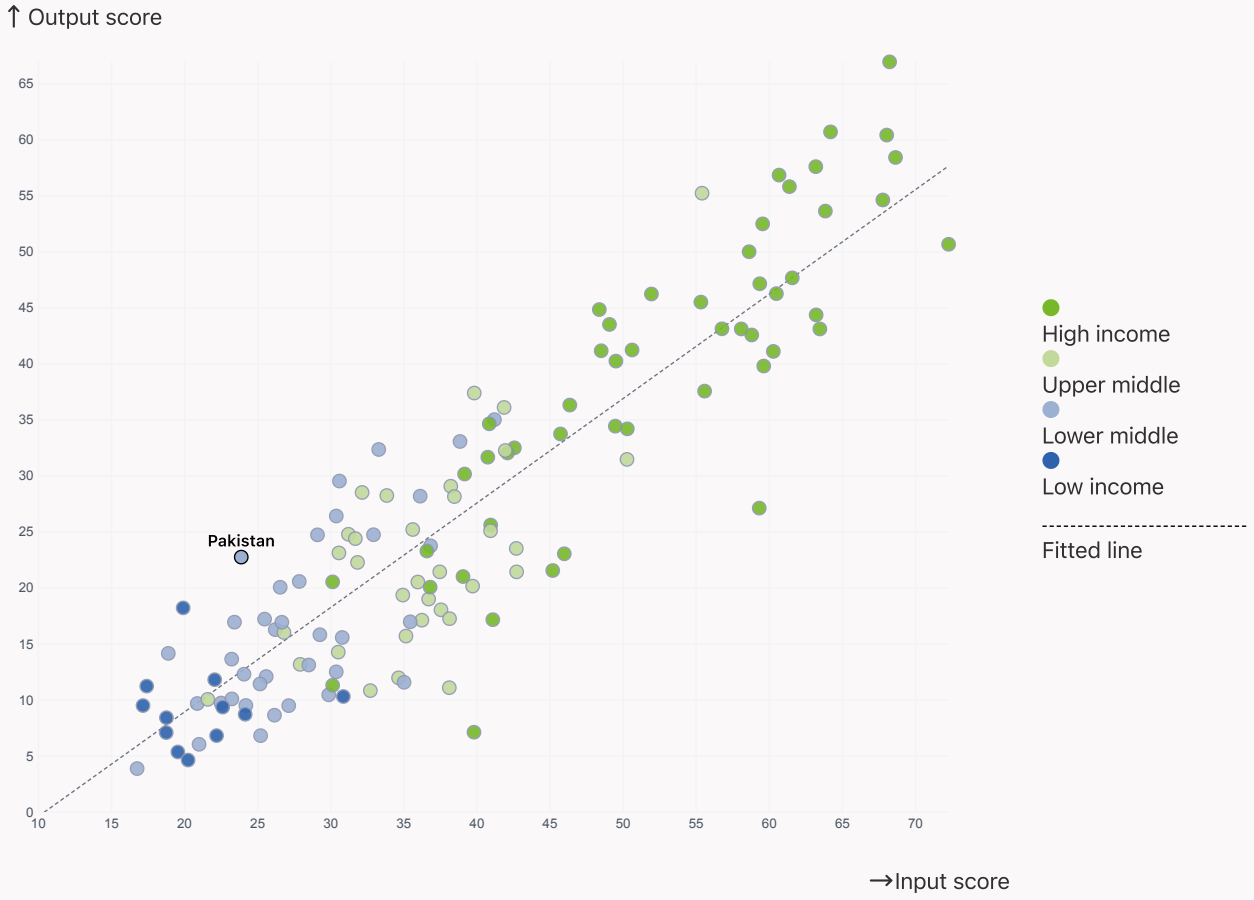


→ Effectively translating innovation investments into innovation outputs

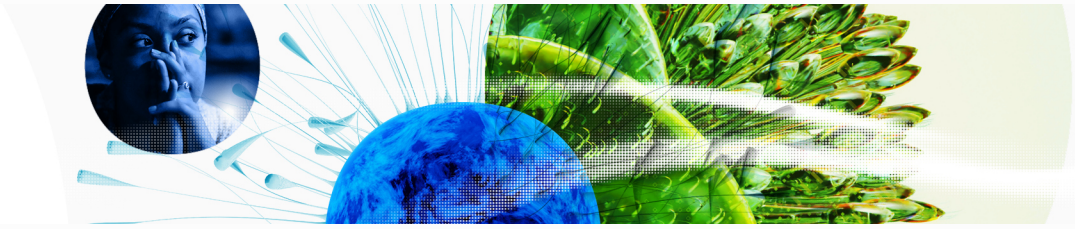
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

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

> Relationship between innovation inputs and outputs



Global Innovation Index 2023



→ Overview of Pakistan's rankings in the seven areas of the GII in 2023

The chart shows the ranking for each of the seven areas that the GII comprises. The strongest areas for Pakistan are those that rank above the GII (shown in blue) and the weakest are those that rank below.

> Highest rankings

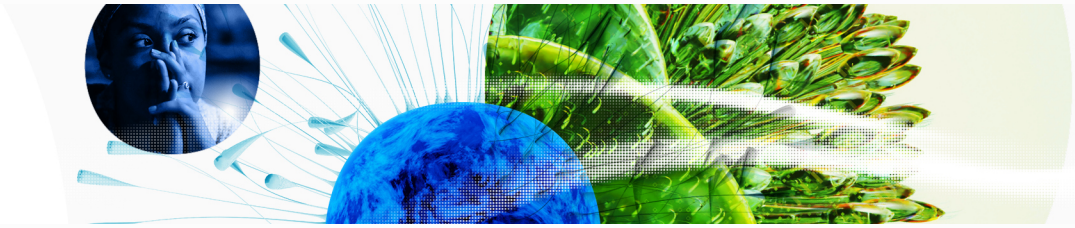
Pakistan ranks highest in Knowledge and technology outputs (69th), Creative outputs (70th) and Business sophistication (72nd).

> Lowest rankings

Pakistan ranks lowest in Infrastructure (120th), Human capital and research (117th) and Institutions (113rd).

The full WIPO Intellectual Property Statistics profile for Pakistan can be found on this link.

Global Innovation Index 2023



→ Benchmark of Pakistan against other country groupings for each of the seven areas of the GII Index

The charts shows the relative position of Pakistan (blue bar) against other country groupings (grey bars), for each of the seven areas of the GII Index.

> Lower-Middle-Income economies

Pakistan performs below the lower-middle-income group average in Market sophistication, Human capital and research, Infrastructure, Institutions.

> Central And Southern Asia

Pakistan performs below the regional average in Market sophistication, Human capital and research, Infrastructure, Institutions.

Knowledge and technology outputs

- Top 10 | Score: 58.96
- Pakistan | Score: 21.94
- Central and Southern Asia | Score: 20.48
- Lower middle income | Score: 17.21

Creative outputs

- Top 10 | 56.09
- Pakistan | 23.49
- Central and Southern Asia | 17.93
- Lower middle income | 16.35

Business sophistication

- Top 10 | 64.39
- Pakistan | 26.61
- Central and Southern Asia | 22.96
- Lower middle income | 22.71

Market sophistication

- Top 10 | 61.93
- Central and Southern Asia | 33.20
- Lower middle income | 28.01
- Pakistan | 24.73

Human capital and research

- Top 10 | 60.28
- Central and Southern Asia | 23.87
- Lower middle income | 21.73
- Pakistan | 14.79

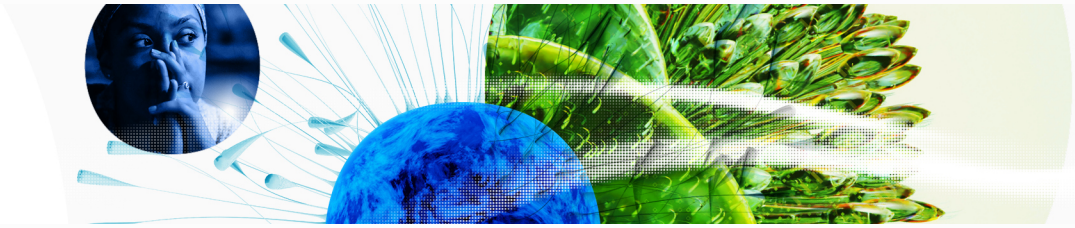
Infrastructure

- Top 10 | 62.83
- Central and Southern Asia | 30.45
- Lower middle income | 27.83
- Pakistan | 19.73

Institutions

- Top 10 | 79.85
- Lower middle income | 39.43
- Central and Southern Asia | 38.68
- Pakistan | 33.73

Global Innovation Index 2023



→ Innovation strengths and weaknesses in Pakistan

The table below gives an overview of the indicator strengths and weaknesses of Pakistan in the GII 2023.

> Pakistan's main innovation strengths are **Mobile app creation/bn PPP$ GDP** (rank 13), **High-tech imports, % total trade** (rank 14) and **Domestic market scale, bn PPP$** (rank 22).

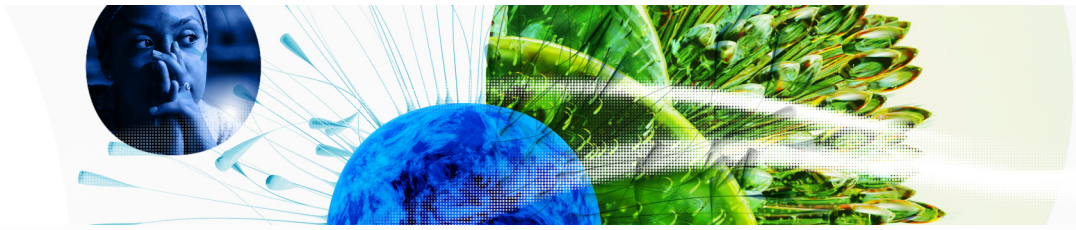
Strengths

Rank	Code	Indicator name
13	7.3.4	Mobile app creation/bn PPP$ GDP
14	5.3.2	High-tech imports, % total trade
22	4.3.3	Domestic market scale, bn PPP$
23	6.3.4	ICT services exports, % total trade
31	6.2.3	Software spending, % GDP
35	5.2.1	University-industry R&D collaboration
39	5.2.2	State of cluster development
42	2.3.4	QS university ranking, top 3
43	6.1.5	Citable documents H-index
45	6.1.4	Scientific and technical articles/bn PPP$ GDP

Weaknesses

Rank	Code	Indicator name
128	3.3.2	Environmental performance
119	4.1.2	Domestic credit to private sector, % GDP
119	3.2.3	Gross capital formation, % GDP
117	2.1.1	Expenditure on education, % GDP
110	2.1.3	School life expectancy, years
81	7.2.2	National feature films/mn pop. 15-69
80	1.3.2	Entrepreneurship policies and culture
61	7.2.3	Entertainment and media market/th pop. 15-69
48	6.2.2	Unicorn valuation, % GDP
40	2.3.3	Global corporate R&D investors, top 3, mn US$

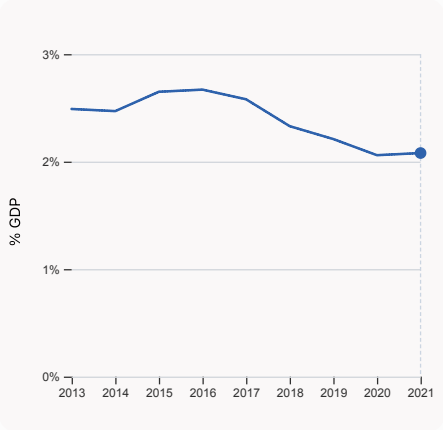
Global Innovation Index 2023



→ Pakistan's innovation system

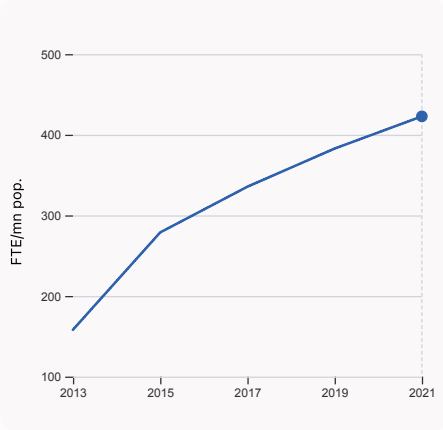
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Pakistan



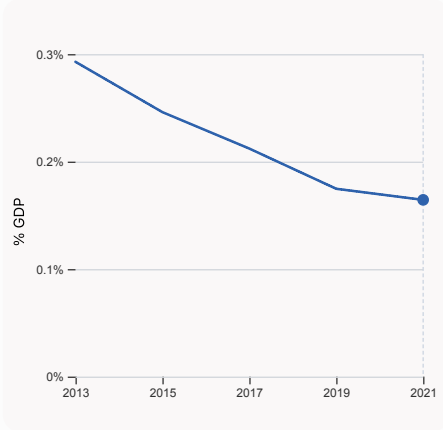
2.1.1 Expenditure on education, % GDP

was equal to 2.08% GDP in 2021, up by 0.02 percentage points from the year prior – and equivalent to an indicator rank of 117.



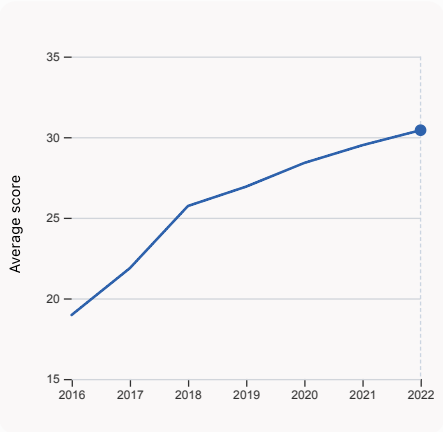
2.3.1 Researchers, FTE/mn pop.

was equal to 422.83 FTE/mn pop. in 2021, up by 10.43% from the year prior – and equivalent to an indicator rank of 73.



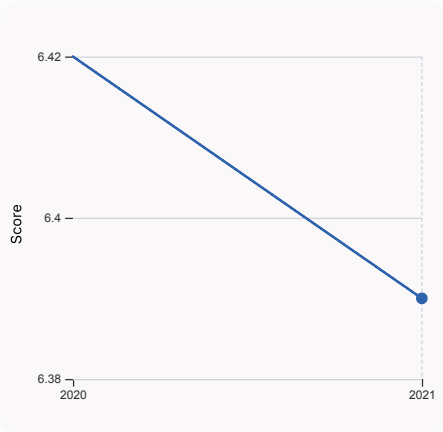
2.3.2 Gross expenditure on R&D, % GDP

was equal to 0.164% GDP in 2021, down by 0.01 percentage points from the year prior – and equivalent to an indicator rank of 95.



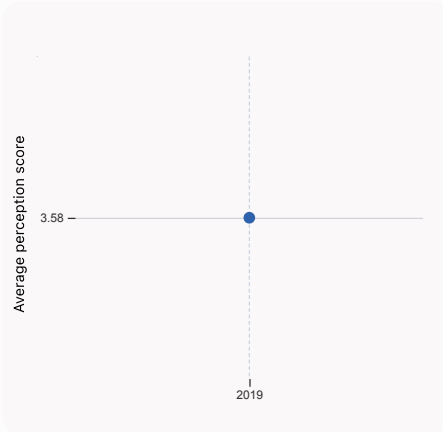
2.3.4 QS university ranking, top 3

was equal to an average score of 30.43 for the top 3 universities in 2022, up by 3.15% from the year prior – and equivalent to an indicator rank of 42.



3.1.1 ICT access

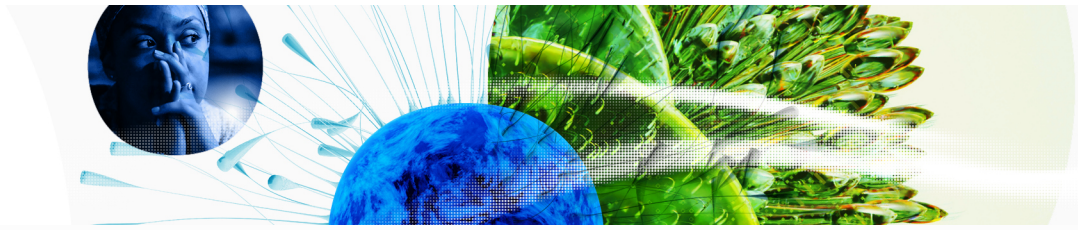
was equal to a score of 6.39 in 2021, down by 0.47% from the year prior – and equivalent to an indicator rank of 113.

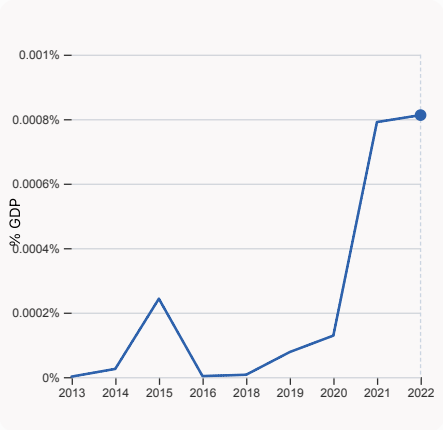


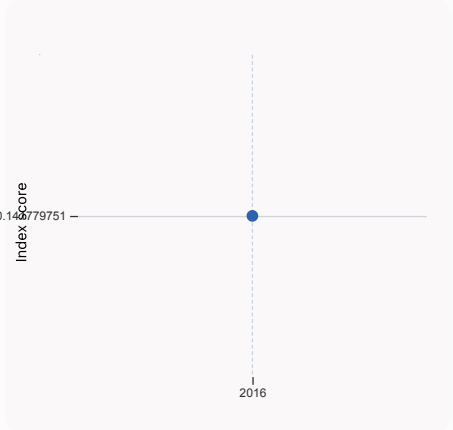
4.1.1 Finance for startups and scaleups

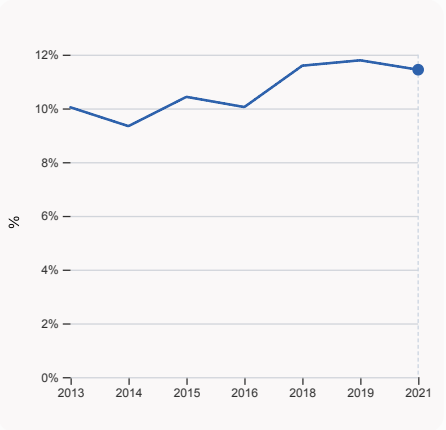
was equal to an average perception score of 3.58 in 2019, equivalent to an indicator rank of 72.

Global Innovation Index 2023









4.2.4 VC received, value, % GDP

was equal to 0.00081% GDP in 2022, up by 0.000022 percentage points from the year prior – and equivalent to an indicator rank of 61.

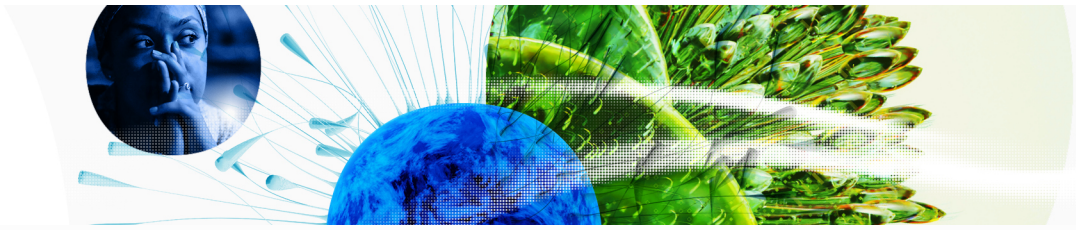
4.3.2 Domestic industry diversification

was equal to an index score of 0.142 in 2016, equivalent to an indicator rank of 43.

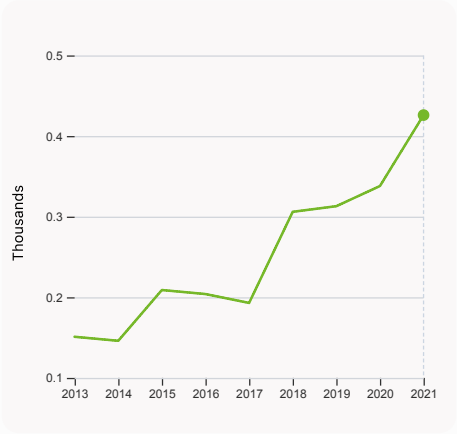
5.1.1 Knowledge-intensive employment, %

was equal to 11.44% in 2021, down by 0.35 percentage points from the year prior – and equivalent to an indicator rank of 102.

Global Innovation Index 2023

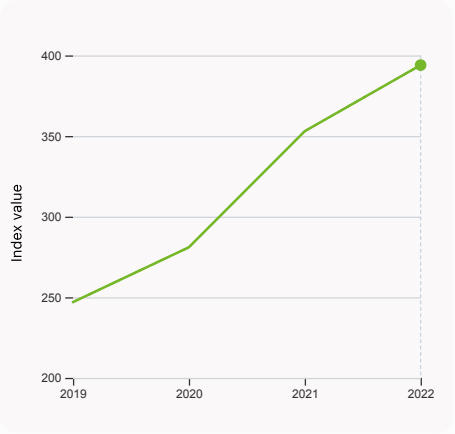


> Innovation outputs in Pakistan



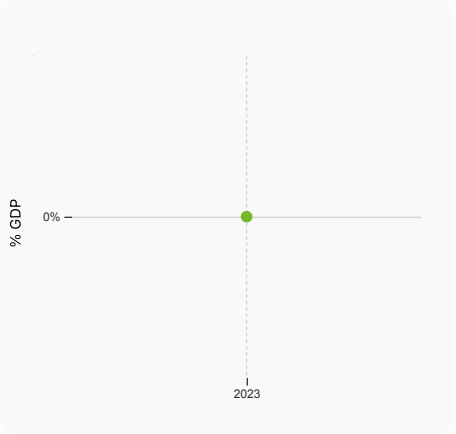
6.1.1 Patents by origin

was equal to 0.43 Thousands in 2021, up by 26.036% from the year prior – and equivalent to an indicator rank of 89.



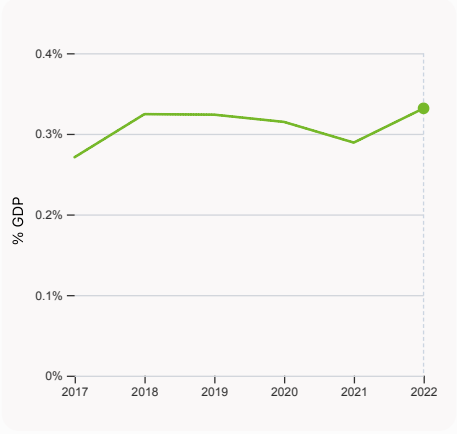
6.1.5 Citable documents H-index

was equal to an index value of 394 in 2022, up by 11.61% from the year prior – and equivalent to an indicator rank of 43.



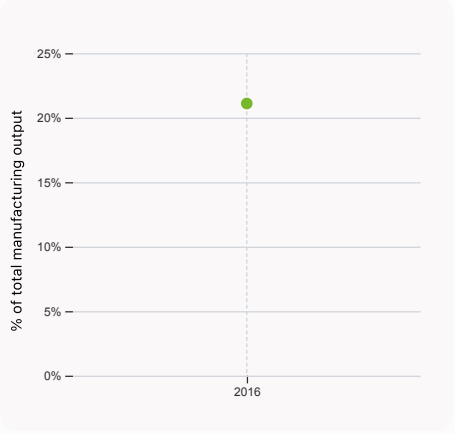
6.2.2 Unicorn valuation, % GDP

was equal to 0 % GDP in 2023 – and equivalent to an indicator rank of 48.



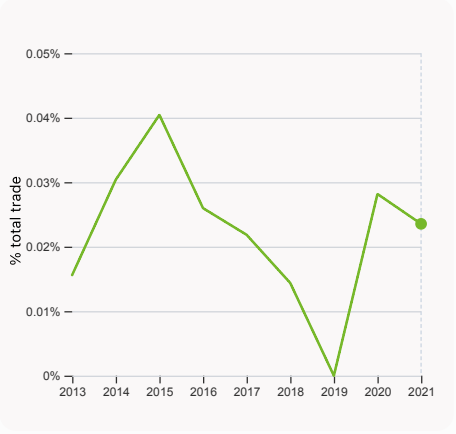
6.2.3 Software spending, % GDP

was equal to 0.332% GDP in 2022, up by 0.042 percentage points from the year prior – and equivalent to an indicator rank of 31.



6.2.4 High-tech manufacturing, %

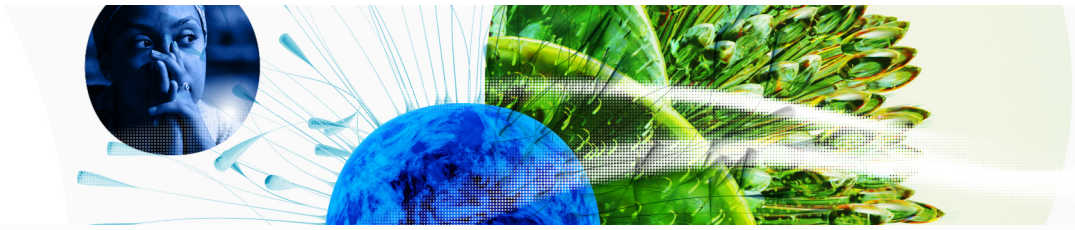
was equal to 21.1 % of total manufacturing output in 2016 – and equivalent to an indicator rank of 60.

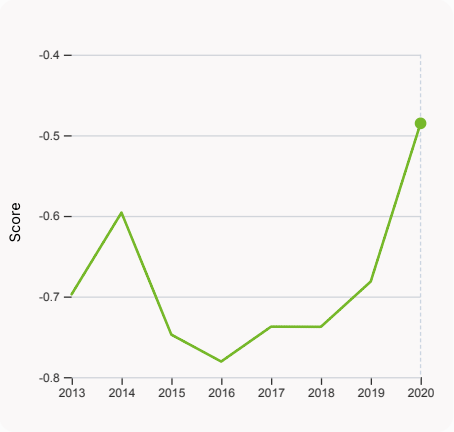


6.3.1 Intellectual property receipts, % total trade

was equal to 0.024% total trade in 2021, down by 0.0046 percentage points from the year prior – and equivalent to an indicator rank of 87.

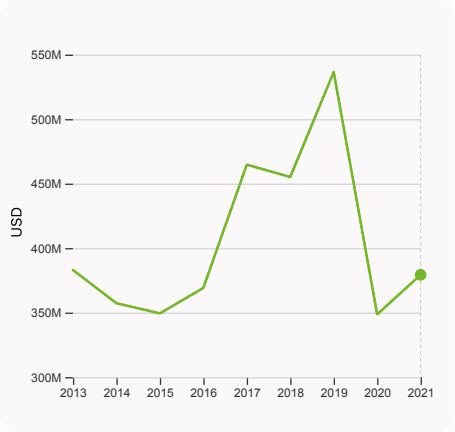
Global Innovation Index 2023





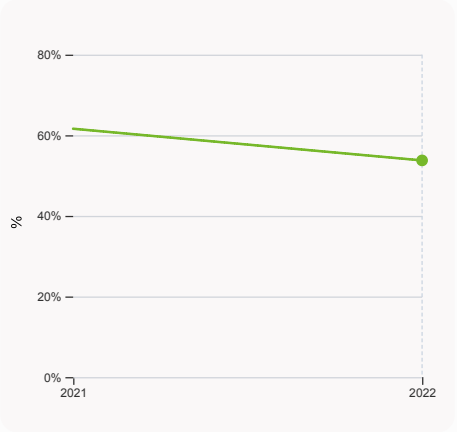
6.3.2 Production and export complexity

was equal to a score of -0.485 in 2020, up by 28.8% from the year prior – and equivalent to an indicator rank of 87.



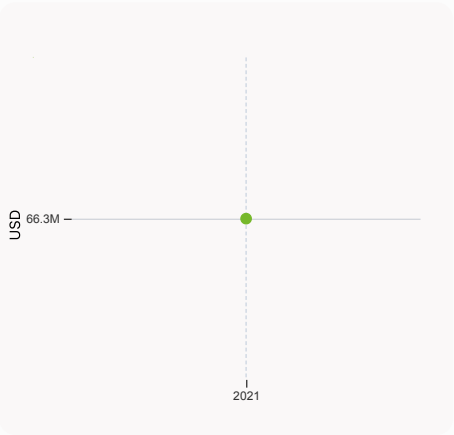
6.3.3 High-tech exports

was equal to 379,331,158 USD in 2021, up by 8.81% from the year prior – and equivalent to an indicator rank of 82.



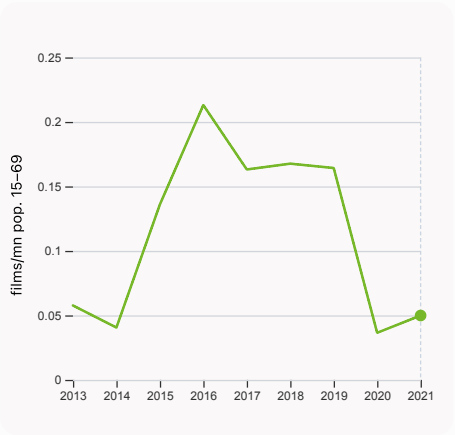
7.1.1 Intangible asset intensity, top 15, %

was equal to 53.76% in 2022, down by 7.86 percentage points from the year prior – and equivalent to an indicator rank of 44.



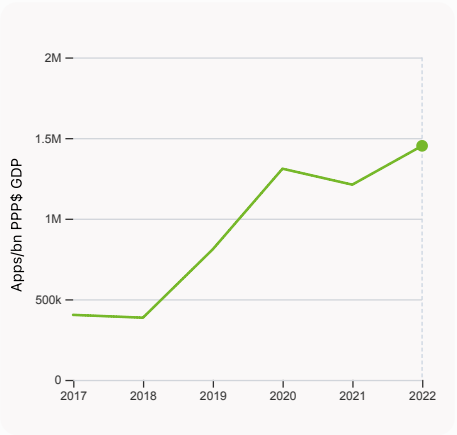
7.2.1 Cultural and creative services exports

was equal to 66,317,000 USD in 2021 – and equivalent to an indicator rank of 81.



7.2.2 National feature films/mn pop. 15-69

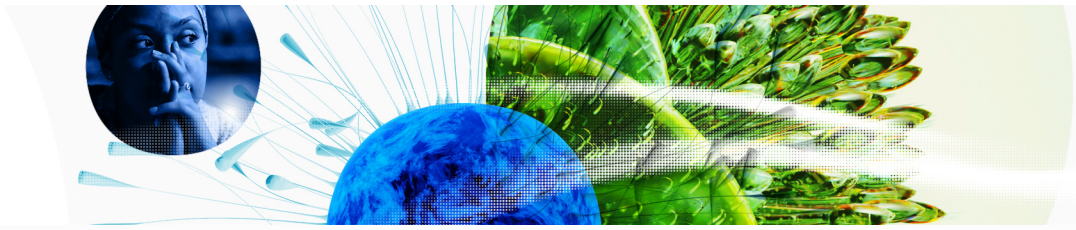
was equal to 0.05 films/mn pop. 15–69 in 2021, up by 36.7% from the year prior – and equivalent to an indicator rank of 81.



7.3.4 Mobile app creation/bn PPP$ GDP

was equal to 1,451,653.26 Apps/bn PPP$ GDP in 2022, up by 19.89% from the year prior – and equivalent to an indicator rank of 13.

Global Innovation Index 2023



→ Pakistan's innovation top performers

> 2.3.4 QS university ranking of Pakistan's top universities

Rank	University	Score
334	NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY (NUST) ISLAMABAD	32.00
363	QUAID-I-AZAM UNIVERSITY	30.20
390	PAKISTAN INSTITUTE OF ENGINEERING AND APPLIED SCIENCES (PIEAS)	29.10

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2023).
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 Top 15 intangible-asset intensive companies in Pakistan

Rank	Firm	Intensity, %
1	COLGATE PALMOLIVE	78.33
2	SYSTEMS LTD	84.37
3	MEEZAN BANK LTD	33.29

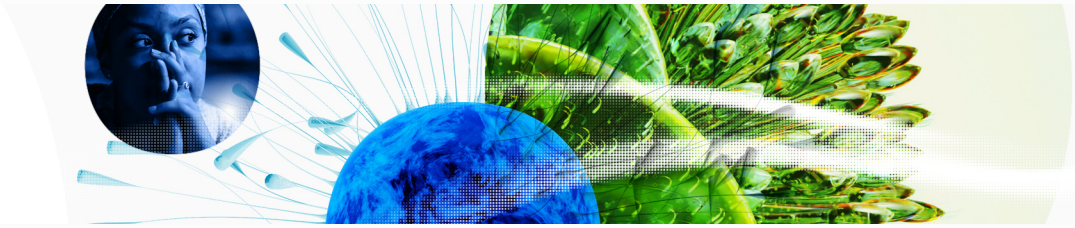
Source: Brand Finance (https://brandirectory.com/reports/gift-2022).
Note: Brand Finance only provides within economy ranks.

> 7.1.3 Top 5,000 companies in Pakistan with highest global brand value

Rank	Brand	Industry	Brand Value, mn USD
1	HBL	Banking	275.8
2	JAZZ (MOBILINK)	Telecoms	205.6
3	UNITED BANK	Banking	167.5

Source: Brand Finance (https://brandirectory.com).
Note: Rank corresponds to within economy ranks.

Global Innovation Index 2023



Pakistan

GII 2023 rank **88**

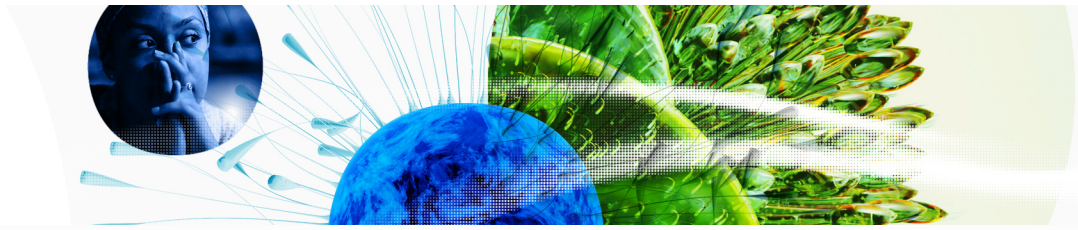
Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
68	113	Lower middle	CSA	235.8	1,512.5	6,662.1

	Score / Value	Rank
Institutions	**33.7**	**113**
1.1 Institutional environment	**28.1**	**105**
1.1.1 Operational stability for businesses*	30.6	117
1.1.2 Government effectiveness*	25.6	93
1.2 Regulatory environment	**42.0**	**116**
1.2.1 Regulatory quality*	23.1	113
1.2.2 Rule of law*	21.1	104
1.2.3 Cost of redundancy dismissal	27.2	109
1.3 Business environment	**31.1**	**98**
1.3.1 Policies for doing business†	53.5	55
1.3.2 Entrepreneurship policies and culture†	8.6	80 ○ ◇
Human capital and research	**14.8**	**117**
2.1 Education	**29.6**	**121**
2.1.1 Expenditure on education, % GDP	2.1	117 ○ ◇
2.1.2 Government funding/pupil, secondary, % GDP/cap	17.1	65
2.1.3 School life expectancy, years	8.7	110 ○ ◇
2.1.4 PISA scales in reading, maths and science	n/a	n/a
2.1.5 Pupil-teacher ratio, secondary	17.0	86
2.2 Tertiary education	**5.4**	**119**
2.2.1 Tertiary enrolment, % gross	12.2	109
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)	**9.5**	**62**
2.3.1 Researchers, FTE/mn pop.	422.8	73
2.3.2 Gross expenditure on R&D, % GDP	0.2	95
2.3.3 Global corporate R&D investors, top 3, mn US$	0.0	40 ○ ◇
2.3.4 QS university ranking, top 3*	30.8	42 ●
Infrastructure	**19.7**	**120** ◇
3.1 Information and communication technologies (ICTs)	**41.8**	**107**
3.1.1 ICT access*	45.4	113
3.1.2 ICT use*	35.1	112 ◇
3.1.3 Government's online service*	52.0	88
3.1.4 E-participation*	34.9	96
3.2 General infrastructure	**4.2**	**132** ◇
3.2.1 Electricity output, GWh/mn pop.	601.3	107
3.2.2 Logistics performance*	n/a	n/a
3.2.3 Gross capital formation, % GDP	15.1	119 ○ ◇
3.3 Ecological sustainability	**13.2**	**113**
3.3.1 GDP/unit of energy use	10.8	58
3.3.2 Environmental performance*	9.7	128 ○ ◇
3.3.3 ISO 14001 environment/bn PPP$ GDP	0.7	77
Market sophistication	**24.7**	**97**
4.1 Credit	**13.7**	**103**
4.1.1 Finance for startups and scaleups†	28.9	72
4.1.2 Domestic credit to private sector, % GDP	15.0	119 ○
4.1.3 Loans from microfinance institutions, % GDP	0.7	34
4.2 Investment	**4.6**	**81**
4.2.1 Market capitalization, % GDP	n/a	n/a
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	0.0	85
4.2.3 VC recipients, deals/bn PPP$ GDP	0.0	73
4.2.4 VC received, value, % GDP	0.0	61
4.3 Trade, diversification, and market scale	**55.9**	**75**
4.3.1 Applied tariff rate, weighted avg., %	8.7	110
4.3.2 Domestic industry diversification	91.4	43
4.3.3 Domestic market scale, bn PPP$	1,512.5	22 ●

	Score / Value	Rank
Business sophistication	**26.6**	**72**
5.1 Knowledge workers	**19.0**	**101**
5.1.1 Knowledge-intensive employment, %	11.4	102
5.1.2 Firms offering formal training, %	32.0	50
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, %	2.0	109
5.2 Innovation linkages	**25.0**	**54**
5.2.1 University-industry R&D collaboration†	59.2	35 ●
5.2.2 State of cluster development†	55.2	39 ●
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	89
5.3 Knowledge absorption	**35.8**	**57**
5.3.1 Intellectual property payments, % total trade	0.5	74
5.3.2 High-tech imports, % total trade	16.2	14 ●
5.3.3 ICT services imports, % total trade	1.1	81
5.3.4 FDI net inflows, % GDP	0.7	108
5.3.5 Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs	**21.9**	**69**
6.1 Knowledge creation	**19.2**	**57**
6.1.1 Patents by origin/bn PPP$ GDP	0.3	89
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	n/a	n/a
6.1.5 Citable documents H-index	19.5	43 ●
6.2 Knowledge impact	**27.3**	**63**
6.2.1 Labor productivity growth, %	0.9	70
6.2.2 Unicorn valuation, % GDP	0.0	48 ○ ◇
6.2.3 Software spending, % GDP	0.3	31 ●
6.2.4 High-tech manufacturing, %	21.1	60
6.3 Knowledge diffusion	**19.3**	**79**
6.3.1 Intellectual property receipts, % total trade	0.0	87
6.3.2 Production and export complexity	42.4	87
6.3.3 High-tech exports, % total trade	0.7	82
6.3.4 ICT services exports, % total trade	4.4	23 ●
6.3.5 ISO 9001 quality/bn PPP$ GDP	2.4	83
Creative outputs	**23.5**	**70**
7.1 Intangible assets	**36.6**	**52**
7.1.1 Intangible asset intensity, top 15, %	53.8	44
7.1.2 Trademarks by origin/bn PPP$ GDP	32.4	72
7.1.3 Global brand value, top 5,000	n/a	n/a
7.1.4 Industrial designs by origin/bn PPP$ GDP	0.3	92
7.2 Creative goods and services	**0.8**	**117**
7.2.1 Cultural and creative services exports, % total trade	0.1	81
7.2.2 National feature films/mn pop. 15-69	0.0	81 ○ ◇
7.2.3 Entertainment and media market/th pop. 15-69	0.0	61 ○ ◇
7.2.4 Creative goods exports, % total trade	0.1	110
7.3 Online creativity	**20.0**	**65**
7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	0.6	107
7.3.2 Country-code TLDs/th pop. 15-69	0.2	111
7.3.3 GitHub commits/mn pop. 15-69	1.4	108
7.3.4 Mobile app creation/bn PPP$ GDP	77.6	13 ●

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/gii-ranking. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Global Innovation Index 2023



→ Data availability

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

> Pakistan has missing data for eleven indicators and outdated data for fourteen indicators.

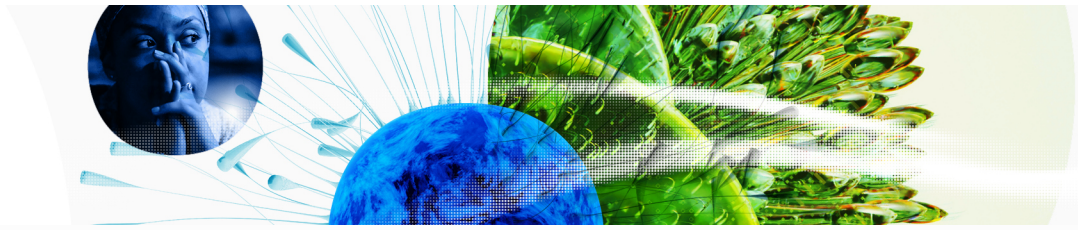
> Missing data for Pakistan

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; Eurostat; OECD
2.2.3	Tertiary inbound mobility, %	n/a	2020	UNESCO Institute for Statistics
3.2.2	Logistics performance	n/a	2023	World Bank, Logistics Performance Index 2023 (https://lpi.worldbank.org/); and World Bank 2023, Connecting to Compete 2023: Trade Logistics in the Global Economy ÔÇô The Logistics Performance Index and its Indicators.
4.2.1	Market capitalization, % GDP	n/a	2020	World Federation of Exchanges; World Bank
5.1.3	GERD performed by business, % GDP	n/a	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.1.4	GERD financed by business, %	n/a	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.3.5	Research talent, % in businesses	n/a	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	2022	World Intellectual Property Organization; International Monetary Fund
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2021	World Intellectual Property Organization; International Monetary Fund
7.1.3	Global brand value, top 5,000	n/a	2023	Brand Finance; International Monetary Fund

> Outdated data for Pakistan

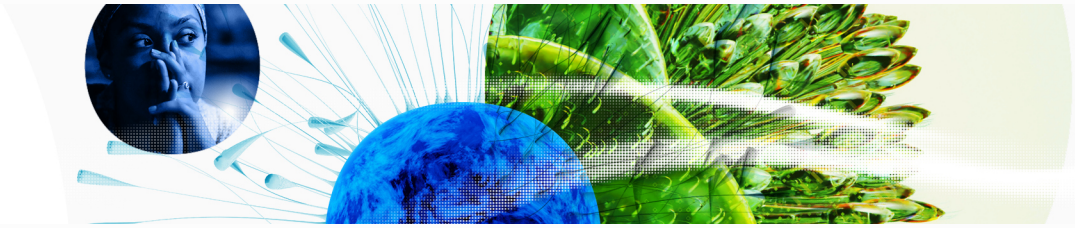
Code	Indicator name	Economy Year	Model Year	Source
1.3.2	Entrepreneurship policies and culture	2019	2022	Global Entrepreneurship Monitor
2.1.2	Government funding/pupil, secondary, % GDP/cap	2015	2019	UNESCO Institute for Statistics
2.1.3	School life expectancy, years	2019	2020	UNESCO Institute for Statistics

Global Innovation Index 2023



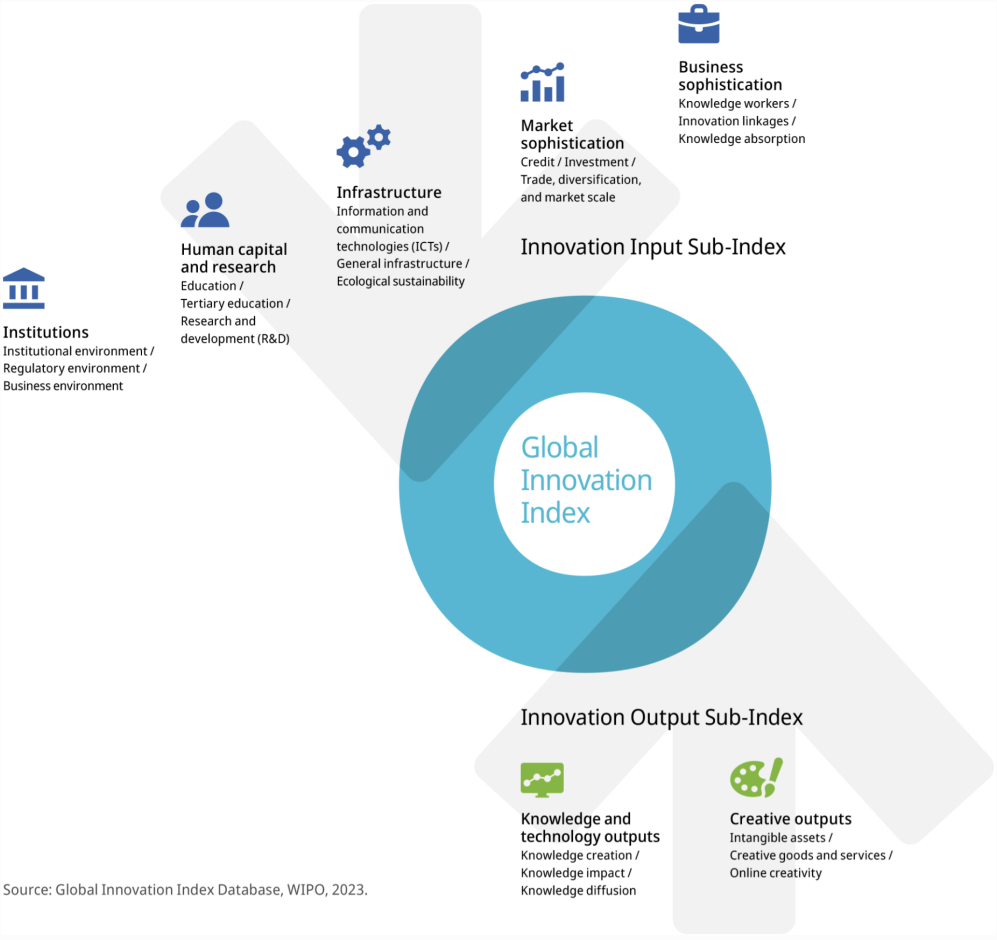
Code	Indicator name	Economy Year	Model Year	Source
2.1.5	Pupil-teacher ratio, secondary	2019	2020	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2019	2020	UNESCO Institute for Statistics
3.2.1	Electricity output, GWh/mn pop.	2020	2021	International Energy Agency
4.1.1	Finance for startups and scaleups	2019	2022	Global Entrepreneurship Monitor
4.3.2	Domestic industry diversification	2016	2020	United Nations Industrial Development Organization
5.1.1	Knowledge-intensive employment, %	2021	2022	International Labour Organization
5.1.2	Firms offering formal training, %	2013	2019	World Bank Enterprise Surveys
5.1.5	Females employed w/advanced degrees, %	2021	2022	International Labour Organization
5.2.3	GERD financed by abroad, % GDP	2017	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
6.2.1	Labor productivity growth, %	2020	2022	The Conference Board
6.2.4	High-tech manufacturing, %	2016	2020	United Nations Industrial Development Organization

Global Innovation Index 2023



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 Database, WIPO, 2023.

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.