

# GLOBAL INNOVATION INDEX 2019

## INDIA

**52nd**

India ranks 52nd 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 India 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 India's ranking in the GII 2019 is between 44 and 53.

### India's Rankings, 2017 - 2019

	GII	Innovation Inputs	Innovation Outputs
<b>2019</b>	52	61	51
<b>2018</b>	57	63	57
<b>2017</b>	60	66	58

- India performs better in Innovation Outputs than Inputs.
- This year India ranks 61st in Innovation Inputs, better than 2018 and compared to 2017.
- As for Innovation Outputs, India ranks 51st. This position is better than 2018 and compared to 2017.

**4th**

India ranks 4th among the 26 lower middle-income economies.

**1st**

India ranks 1st among the 9 economies in Central and Southern Asia.

India ranks 52nd in the GII this year, gaining five positions since 2018. It remains 1st in the Central and Southern Asia region and moves up to the 4th position in the GII rankings among lower middle-income economies. India has also outperformed on innovation relative to its GDP per capita for nine consecutive years, a record only matched by three other countries.

It confirms its rank among the top 50 economies in the indicators that capture the sophistication of markets and the innovation outcomes such as patents or high-technology exports.

India's improvement this year is largely due to its relative performance and less so to new GII data or methods (page 9).

The economy improves in four of the seven GII areas. Among the most notable gains, India improves its rankings in IP-related variables, notably Patent applications and PCT patent applications by origin, and Intellectual property receipts (page 9). It maintains its top positions in Information and communication technology (ICT) services exports, where it ranks 1st in the world, and in Labor productivity growth (page 9). It also improves in two important variables: Gross expenditure on R&D and Global R&D companies. In the former, despite improvement, India is still 50th.

Its share in world R&D expenditures has increased since the mid-1990s, but less sharply than other middle-income countries, such as China, or other Asian powerhouses, such as the Republic of Korea. In Global R&D companies, India reaches the 15th spot as the second middle-income economy.

Thanks to higher scores in patent families in two or more offices and quality of scientific publications, India remains the 26th economy in the quality of innovation aggregate and the 2nd after China among middle-income economies. In particular, the quality of its top 3 universities - the Indian Institute of Technology (Delhi and Bombay) and the Indian Institute of Science in Bengaluru – position the economy in the 21st spot in the indicator Quality of universities. India also improves in State of cluster development, and this is confirmed in the Special Section: Cluster Rankings, highlighting the performance of Bengaluru, New Delhi, and Mumbai.

While India improved in the GII ranking, some relative weaknesses persist. These include Environmental performance, New businesses, and Entertainment and media market (pages 6 and 7).

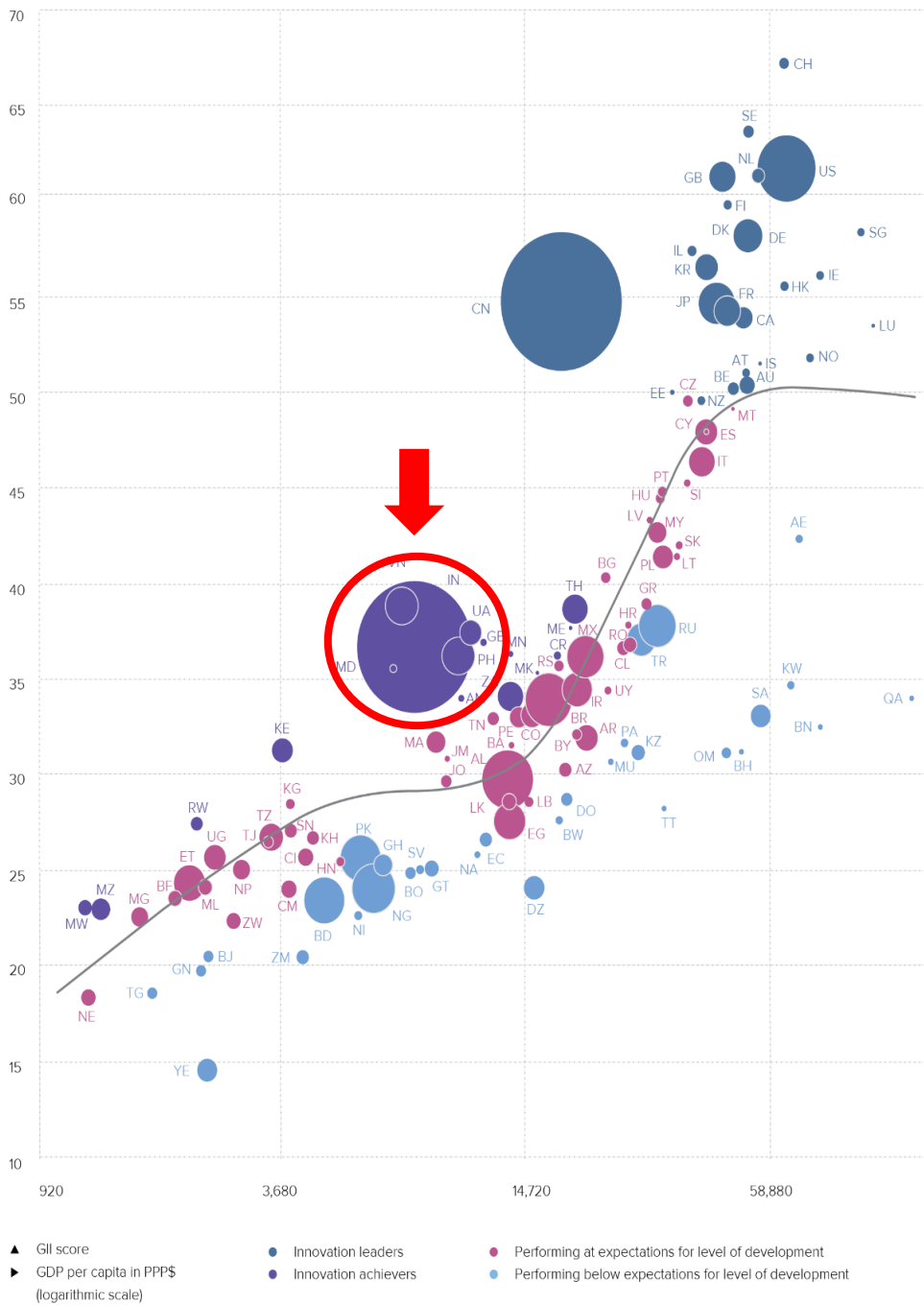
Finally, it is worth noting that while India's data coverage is among the highest in the GII, two important indicators – notably R&D financed by business and R&D financed by abroad – are still missing. Moreover, a significant number of indicators are outdated (page 9). The availability of complete innovation metrics would help obtain a fuller picture of India's performance. The economy could also benefit greatly from updating and measuring all aspects of R&D more systematically. One example is the indicator Global companies' R&D expenditures, which improved further this year, and reflects the efforts of the Indian private sector in R&D.

# 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, India performs well above its expected level of development.

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

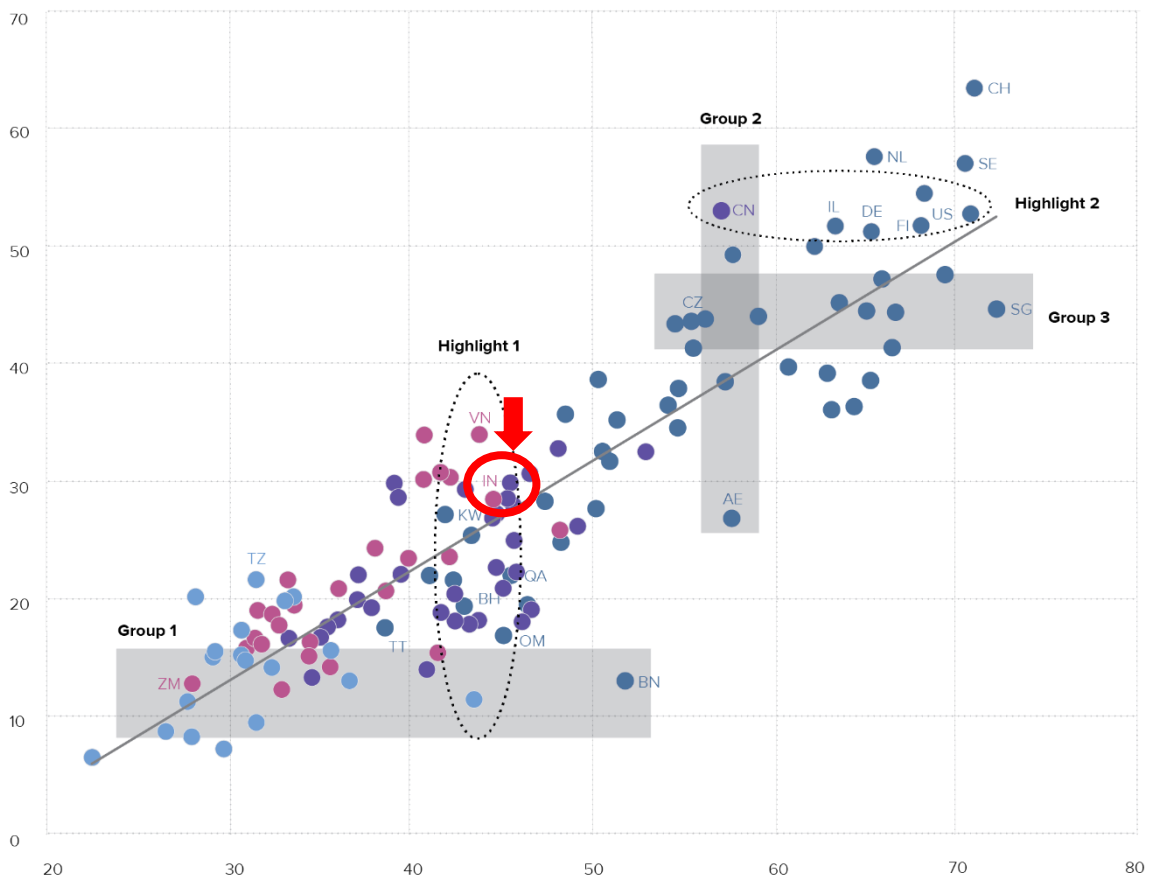


# EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

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

## Innovation input/output performance by income group, 2019

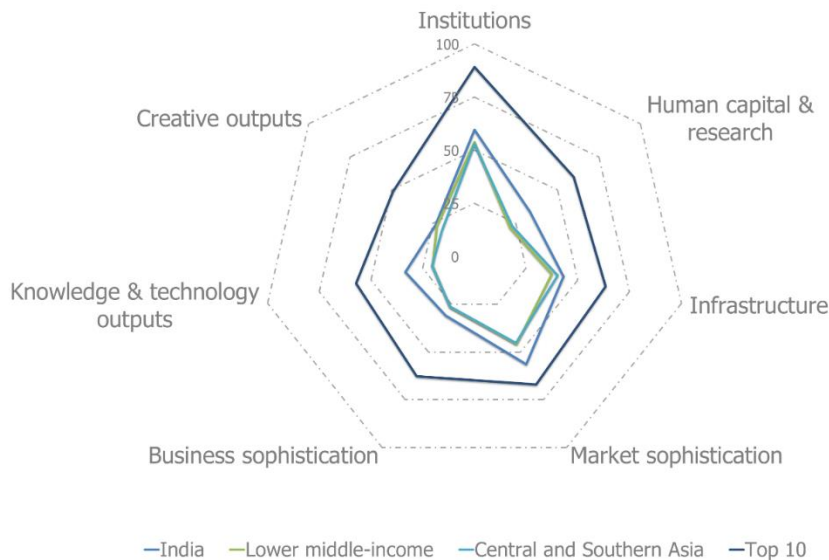


- ▲ Output score
- ▶ Input score
- High income
- Upper-middle income
- Lower-middle income
- Low income
- Fitted values

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	

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

## India's scores in the seven GII pillars



### Lower middle-income economies

India has high scores in all seven GII areas. All are above the average of the lower middle-income group.

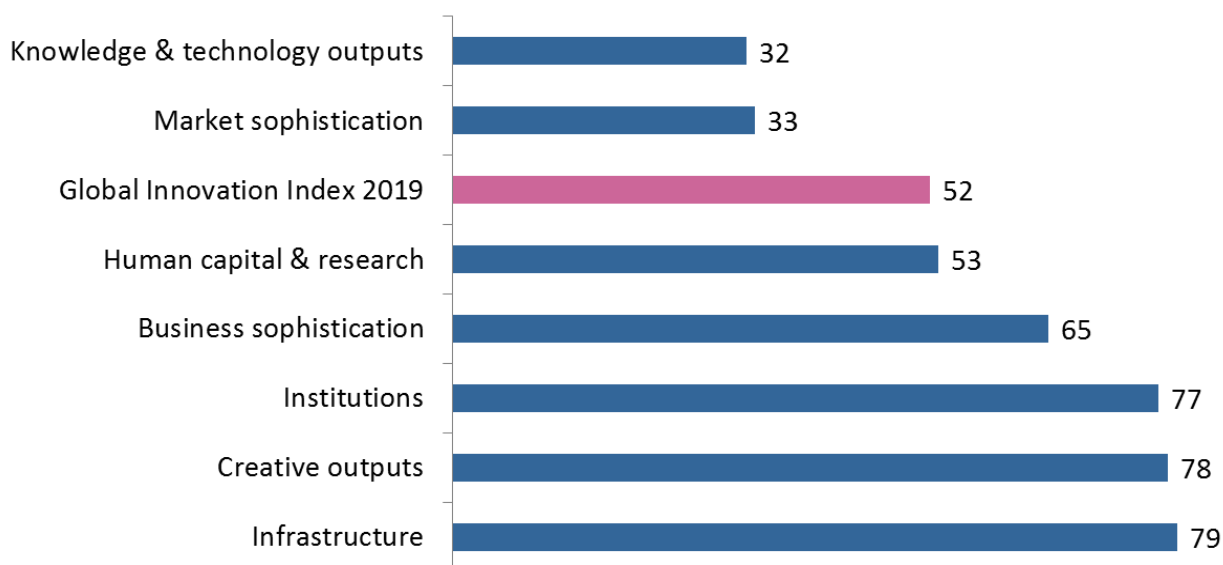
### Central and Southern Asia Region

Compared to other economies in the Central and Southern Asia region, India performs above average in all seven GII areas.

Top ranks are found in areas such as Tertiary education, Research and development (R&D), General Infrastructure, Innovation Linkages, Knowledge creation, Knowledge impact, and Knowledge diffusion, where the country ranks in the top 50 worldwide.

## OVERVIEW OF INDIA'S RANKINGS IN THE 7 GII AREAS

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



\*The highest possible ranking in each pillar is 1.

## INDIA'S INNOVATION STRENGTHS AND WEAKNESSES

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

Strengths			Weaknesses		
Code	Indicator name	Rank	Code	Indicator name	Rank
2.2.2	Graduates in science & engineering, %	7	2.1	Education	110
2.3.3	Global R&D companies, top 3, in mn US\$	15	2.1.4	PISA scales in reading, maths & science	71
2.3.4	QS university ranking, average score top 3*	21	2.1.5	Pupil-teacher ratio, secondary	104
3.1.3	Government's online service*	9	2.2.3	Tertiary inbound mobility, %	107
3.1.4	E-participation*	15	3.1.1	ICT access*	105
3.2.3	Gross capital formation, % GDP	17	3.1.2	ICT use*	106
4.2.1	Ease of protecting minority investors*	6	3.3	Ecological sustainability	117
4.3	Trade, competition, & market scale	9	3.3.2	Environmental performance*	125
4.3.3	Domestic market scale, bn PPP\$	3	5.1.5	Females employed w/advanced degrees, %	103
6.1.5	Citable documents H index	21	6.2.2	New businesses/th pop. 15-64	100
6.2.1	Growth rate of PPP\$ GDP/worker, %, 3-year average	4	7.2.3	Entertainment & Media market/th pop. 15-69	60
6.3.3	ICT services exports, % total trade	1	7.2.4	Printing & other media, % manufacturing	88

## **STRENGTHS**

- India's relative strengths are scattered across four of the seven GII pillars.
- In Human capital & research (53), India exhibits strengths in indicators Graduates in science & engineering (7), Global R&D companies' expenditures (15), and Quality of universities (21).
- In Infrastructure (79), the indicators Government's online service (9), E-participation (15), and Gross capital formation (17) are relative strengths for the economy.
- In Market sophistication (33), India has a relative strength in the sub-pillar Trade, competition & market scale (9). At the indicator level, the indicators Ease of protecting minority investors (6) and Domestic market scale (3) are relative strengths.
- In Knowledge & technology outputs (32), the indicators Quality of scientific publications (21), Productivity growth (4), and ICT services exports – where it ranks 1st in the world; are notable relative strengths.

## **WEAKNESSES**

- India's relative weaknesses in the GII are present in five of the seven GII pillars.
- In Human capital & research (53), India exhibits weaknesses in sub-pillar Education (110) and two of its five indicators - PISA results (71) and Pupil-teacher ratio (104). The indicator Tertiary inbound mobility (107) is also a relative weakness for the economy.
- In Infrastructure (79), India shows weaknesses in the sub-pillar Ecological sustainability (117) as well as in three indicators: ICT access (105), ICT use (106), and Environmental performance (125).
- In Creative outputs (78), the economy presents relative weaknesses in indicators Entertainment & Media market (60) and Printing & other media (88).
- Other relative weaknesses for India are in indicators Females employed with advanced degrees (103) and New businesses (100).

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$	GDP per capita, PPP\$	GII 2018 rank
51	61	Lower middle	CSA	1,354.1	10,401.4	7,873.7	57
				Score/Value	Rank		
<b>INSTITUTIONS</b> .....				59.5	77		
<b>1.1</b>	<b>Political environment</b> .....	<b>53.0</b>	<b>71</b>				
1.1.1	Political and operational stability*.....	61.4	91				
1.1.2	Government effectiveness*.....	48.8	65	◆			
<b>1.2</b>	<b>Regulatory environment</b> .....	<b>64.5</b>	<b>69</b>				
1.2.1	Regulatory quality*.....	35.1	90				
1.2.2	Rule of law*.....	46.5	64	◆			
1.2.3	Cost of redundancy dismissal, salary weeks.....	15.8	63				
<b>1.3</b>	<b>Business environment</b> .....	<b>60.9</b>	<b>101</b>				
1.3.1	Ease of starting a business*.....	81.0	104				
1.3.2	Ease of resolving insolvency*.....	40.8	95				
<b>HUMAN CAPITAL &amp; RESEARCH</b> .....				33.5	53	◆	
<b>2.1</b>	<b>Education</b> .....	<b>28.0</b>	<b>110</b>	○			
2.1.1	Expenditure on education, % GDP.....	3.8	84				
2.1.2	Government funding/pupil, secondary, % GDP/cap.....	16.8	72				
2.1.3	School life expectancy, years.....	12.3	87				
2.1.4	PISA scales in reading, maths, & science.....	336.0	71	○ ◆			
2.1.5	Pupil-teacher ratio, secondary.....	28.5	104	○ ◆			
<b>2.2</b>	<b>Tertiary education</b> .....	<b>38.4</b>	<b>40</b>	◆			
2.2.1	Tertiary enrolment, % gross.....	27.5	86				
2.2.2	Graduates in science & engineering, %.....	32.6	7	◆			
2.2.3	Tertiary inbound mobility, %.....	0.1	107	○			
<b>2.3</b>	<b>Research &amp; development (R&amp;D)</b> .....	<b>34.2</b>	<b>35</b>	◆			
2.3.1	Researchers, FTE/mn pop.....	216.2	77				
2.3.2	Gross expenditure on R&D, % GDP.....	0.6	50	◆			
2.3.3	Global R&D companies, avg. exp. top 3, mn US\$.....	73.9	15	◆ ◆			
2.3.4	QS university ranking, average score top 3*.....	47.3	21	◆ ◆			
<b>INFRASTRUCTURE</b> .....				43.0	79		
<b>3.1</b>	<b>Information &amp; communication technologies (ICTs)</b> .....	<b>62.5</b>	<b>75</b>				
3.1.1	ICT access*.....	38.5	105	○			
3.1.2	ICT use*.....	20.8	106	○			
3.1.3	Government's online service*.....	95.1	9	◆ ◆			
3.1.4	E-participation*.....	95.5	15	◆ ◆			
<b>3.2</b>	<b>General infrastructure</b> .....	<b>41.9</b>	<b>42</b>	◆			
3.2.1	Electricity output, kWh/mn pop.....	1,115.8	92				
3.2.2	Logistics performance*.....	52.1	43	◆			
3.2.3	Gross capital formation, % GDP.....	31.5	17	●			
<b>3.3</b>	<b>Ecological sustainability</b> .....	<b>24.7</b>	<b>117</b>	○			
3.3.1	GDP/unit of energy use.....	9.2	62				
3.3.2	Environmental performance*.....	30.6	125	○ ◆			
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP.....	0.8	70				
<b>MARKET SOPHISTICATION</b> .....				56.3	33	◆	
<b>4.1</b>	<b>Credit</b> .....	<b>38.7</b>	<b>57</b>				
4.1.1	Ease of getting credit*.....	80.0	20				
4.1.2	Domestic credit to private sector, % GDP.....	49.7	69				
4.1.3	Microfinance gross loans, % GDP.....	0.8	23				
<b>4.2</b>	<b>Investment</b> .....	<b>50.8</b>	<b>37</b>				
4.2.1	Ease of protecting minority investors*.....	80.0	6	◆ ◆			
4.2.2	Market capitalization, % GDP.....	76.9	20	◆			
4.2.3	Venture capital deals/bn PPP\$ GDP.....	0.0	30	◆			
<b>4.3</b>	<b>Trade, competition, &amp; market scale</b> .....	<b>79.4</b>	<b>9</b>	◆ ◆			
4.3.1	Applied tariff rate, weighted avg., %.....	5.8	93				
4.3.2	Intensity of local competition*.....	67.6	70				
4.3.3	Domestic market scale, bn PPP\$.....	10,401.4	3	◆ ◆			
<b>BUSINESS SOPHISTICATION</b> .....				31.0	65		
<b>5.1</b>	<b>Knowledge workers</b> .....	<b>24.1</b>	<b>99</b>				
5.1.1	Knowledge-intensive employment, %.....	14.2	91				
5.1.2	Firms offering formal training, % firms.....	35.9	38				
5.1.3	GERD performed by business, % GDP.....	0.3	49	◆			
5.1.4	GERD financed by business, %.....	n/a	n/a				
5.1.5	Females employed w/advanced degrees, %.....	1.6	103	○			
<b>5.2</b>	<b>Innovation linkages</b> .....	<b>33.6</b>	<b>41</b>	◆			
5.2.1	University/industry research collaboration*.....	60.1	23	◆			
5.2.2	State of cluster development*.....	60.4	25	◆			
5.2.3	GERD financed by abroad, %.....	n/a	n/a				
5.2.4	JV-strategic alliance deals/bn PPP\$ GDP.....	0.0	48				
5.2.5	Patent families 2+ offices/bn PPP\$ GDP.....	0.2	46	◆			
<b>5.3</b>	<b>Knowledge absorption</b> .....	<b>35.4</b>	<b>56</b>				
5.3.1	Intellectual property payments, % total trade.....	1.2	29	◆			
5.3.2	High-tech imports, % total trade.....	10.3	27				
5.3.3	ICT services imports, % total trade.....	1.2	62				
5.3.4	FDI net inflows, % GDP.....	1.9	83				
5.3.5	Research talent, % in business enterprise.....	26.4	46				
<b>KNOWLEDGE &amp; TECHNOLOGY OUTPUTS</b> .....				33.5	32	◆	
<b>6.1</b>	<b>Knowledge creation</b> .....	<b>20.9</b>	<b>42</b>				
6.1.1	Patents by origin/bn PPP\$ GDP.....	1.6	52				
6.1.2	PCT patents by origin/bn PPP\$ GDP.....	0.2	51	◆			
6.1.3	Utility models by origin/bn PPP\$ GDP.....	n/a	n/a				
6.1.4	Scientific & technical articles/bn PPP\$ GDP.....	5.3	77				
6.1.5	Citable documents H-index.....	38.9	21	◆ ◆			
<b>6.2</b>	<b>Knowledge impact</b> .....	<b>43.4</b>	<b>35</b>				
6.2.1	Growth rate of PPP\$ GDP/worker, %.....	5.9	4	◆ ◆			
6.2.2	New businesses/th pop. 15-64.....	0.1	100	○			
6.2.3	Computer software spending, % GDP.....	0.2	65				
6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP.....	3.8	65				
6.2.5	High- & medium-high-tech manufactures, %.....	0.3	33	◆			
<b>6.3</b>	<b>Knowledge diffusion</b> .....	<b>36.1</b>	<b>23</b>	◆			
6.3.1	Intellectual property receipts, % total trade.....	0.1	50				
6.3.2	High-tech net exports, % total trade.....	2.8	46				
6.3.3	ICT services exports, % total trade.....	10.4	1	◆ ◆			
6.3.4	FDI net outflows, % GDP.....	0.3	76				
<b>CREATIVE OUTPUTS</b> .....				23.5	78		
<b>7.1</b>	<b>Intangible assets</b> .....	<b>37.8</b>	<b>81</b>				
7.1.1	Trademarks by origin/bn PPP\$ GDP.....	25.6	79				
7.1.2	Industrial designs by origin/bn PPP\$ GDP.....	0.8	77				
7.1.3	ICTs & business model creation*.....	61.1	58				
7.1.4	ICTs & organizational model creation*.....	59.6	47	◆			
<b>7.2</b>	<b>Creative goods &amp; services</b> .....	<b>15.2</b>	<b>66</b>				
7.2.1	Cultural & creative services exports, % total trade.....	0.7	39	◆			
7.2.2	National feature films/mn pop. 15-69.....	2.2	60				
7.2.3	Entertainment & Media market/th pop. 15-69.....	0.5	60	○			
7.2.4	Printing & other media, % manufacturing.....	0.6	88	○			
7.2.5	Creative goods exports, % total trade.....	2.7	22				
<b>7.3</b>	<b>Online creativity</b> .....	<b>3.2</b>	<b>76</b>				
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69.....	0.9	98				
7.3.2	Country-code TLDs/th pop. 15-69.....	0.6	91				
7.3.3	Wikipedia edits/mn pop. 15-69.....	1.0	105				
7.3.4	Mobile app creation/bn PPP\$ GDP.....	10.7	42				

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 AND GII MODEL

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

### Missing data

Code	Indicator name	Country year	Model year	Source
5.1.4	GERD financed by business, %	n/a	2016	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.2.3	GERD financed by abroad, %	n/a	2016	UNESCO Institute for Statistics

### Outdated data

Code	Indicator name	Country year	Model year	Source
2.1.1	Expenditure on education, % GDP	2013	2015	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	2013	2015	UNESCO Institute for Statistics
2.1.4	PISA scales in reading, maths & science	2010	2015	OECD Programme for International Student Assessment (PISA)
2.1.5	Pupil-teacher ratio, secondary	2016	2017	UNESCO Institute for Statistics
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
5.1.1	Knowledge-intensive employment, %	2012	2017	Source: International Labour Organization
5.1.3	GERD performed by business, % GDP	2015	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.5	Females employed w/advanced degrees, %	2012	2017	International Labour Organization
5.3.5	Research talent, % in business enterprise	2015	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
6.2.5	High- & medium-high-tech manufactures, %	2015	2016	United Nations Industrial Development Organization
7.2.2	National feature films/mn pop. 15–69	2016	2017	UNESCO Institute for Statistics
7.2.4	Printing & other media, % manufacturing	2015	2016	United Nations Industrial Development Organization

### Model changes

The table below provides a summary of the adjustments to the GII 2019 framework.

#### Changes to the GII 2019 framework

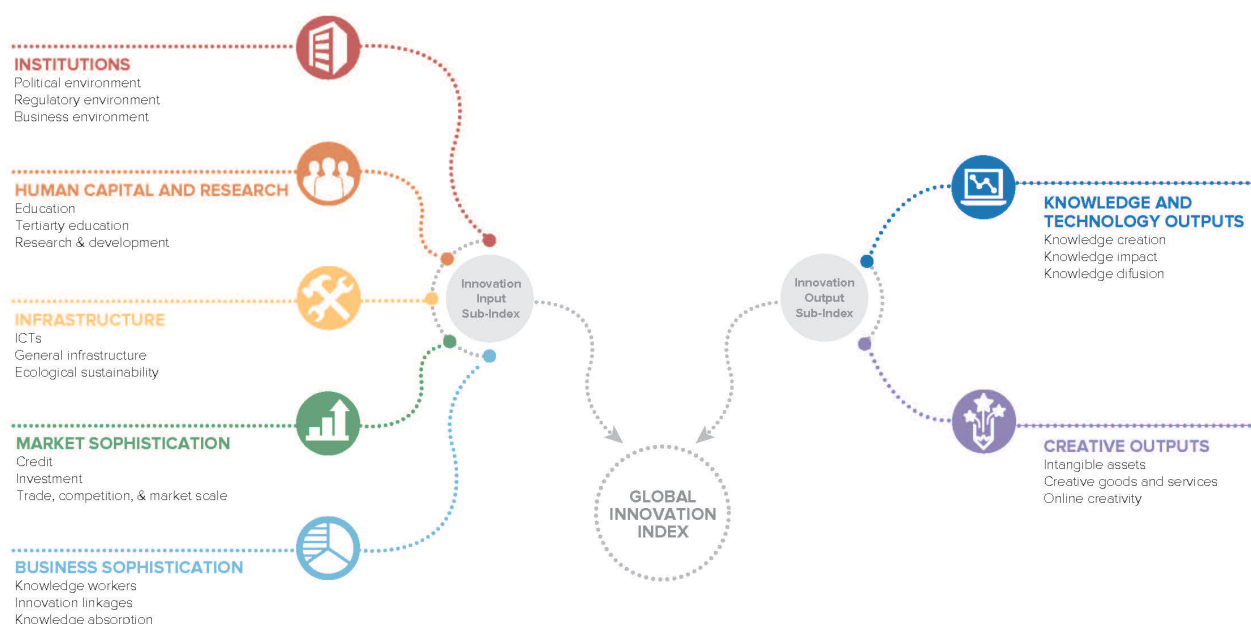
	GII 2018	Adjustment		GII 2019
1.1.1	Political stability & safety	Replaced	1.1.1	Political & operational stability
3.3.2	Environmental performance	Indicator changed at source	3.3.2	Environmental performance
5.3.1	Intellectual property payments, % total trade	Methodology change	5.3.1	Intellectual property payments, % total trade (3 year avg.)
5.3.2	High-tech imports, % total trade	Methodology change	5.3.2	High-tech imports, % total trade
6.2.1	Growth rate of PPP\$ GDP/worker, %	Methodology change	6.2.1	Growth rate of PPP\$ GDP/worker, % (3 year avg.)
6.3.1	Intellectual property receipts, % total trade	Methodology change	6.3.1	Intellectual property receipts, % total trade (3 year avg.)
7.3.4	Mobile app creation/bn PPP\$ GDP	Methodology change	7.3.4	Mobile app creation/bn PPP\$ GDP

## 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 GI presents its 12<sup>th</sup> edition devoted to the theme **Creating Healthy Lives—The Future of Medical Innovation**.

Recognizing that innovation is a key driver of economic development, the GI aims to provide a rich innovation ranking and analysis referencing around 130 economies. Over the last decade, the GI has established itself as both a leading reference on innovation and a “tool for action” for countries that incorporate the GI into their innovation agendas.

### Framework of the Global Innovation Index 2019



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 GI has two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index, and seven pillars, each containing three sub-pillars.

