

## GERMANY

Germany ranks 9th 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 Germany 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 Germany's ranking in the GII 2019 is between 7 and 9.

	GII	Innovation Inputs	Innovation Outputs	
2019	9	12	9	
2018	9	17	5	
2017	9	17	7	

#### Germany's Rankings, 2017 - 2019

- Germany performs better in Innovation Outputs than Inputs.
- This year Germany ranks 12th in Innovation Inputs, better than last year and compared to 2017.
- As for Innovation Outputs, Germany ranks 9th. This position is worse than last year and compared to 2017.



7th

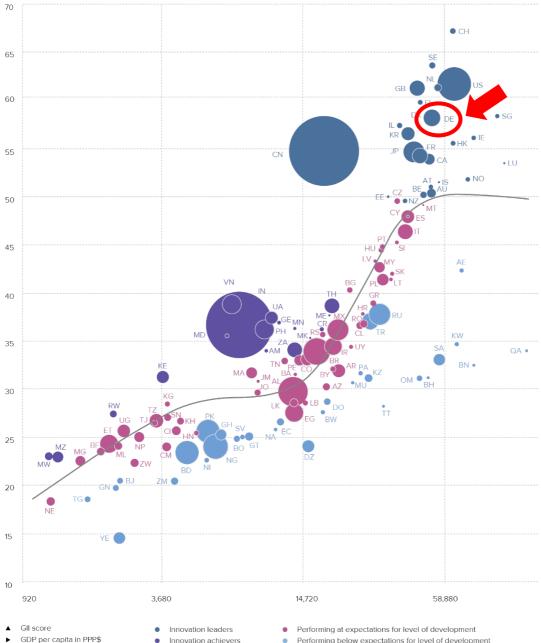
Germany ranks 7th among the 39 economies in Europe.

## **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, Germany performs well above its expected level of development.

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



GDP per capita in PPP\$ (logarithmic scale)

Performing below expectations for level of development .

# 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.

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

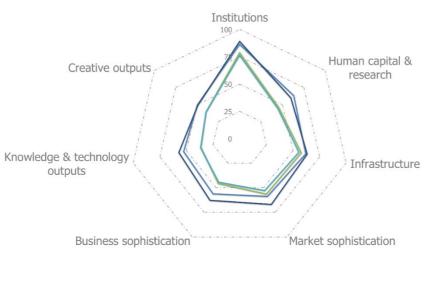
#### 70 • сн Group 2 60 Highlight 2 50 Group 3 Highlight 1 40 30 20 Group 1 B 10 0 70 20 30 40 50 60 80 • Lower-middle income Fitted values ▲ Output score • High income Input score • Upper-middle income Low income ► TZ United Republic AF United Arab Emirates CZ Czech Republic NL Netherlands DE Germany BH Bahrain OM Oman of Tanzania BN Brunei Darussalam US United States of America FI Finland QA Qatar CH Switzerland IL Israel SE Sweden VN Viet Nam CN China IN India SG Singapore ZM Zambia

KW Kuwait

TT Trinidad and Tobago

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

## BENCHMARKING GERMANY TO OTHER HIGH-INCOME ECONOMIES AND THE EUROPE REGION



Germany's scores in the seven GII pillars

-Germany -High-income -Europe -Top 10

#### **High-income economies**

Germany has high scores in all of the 7 GII pillars, which are above the average of the high-income group.

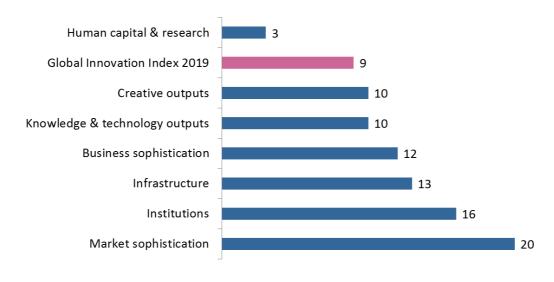
### **Europe Region**

Compared to other economies in Europe, Germany performs above average in all of the 7 GII pillars.

Germany ranks in the top 10 in sub-pillars Tertiary education, Research & development (R&D), Trade, competition, & market scale, Innovation linkages, Knowledge creation, and Intangible assets.

## **OVERVIEW OF GERMANY'S RANKINGS IN THE 7 GII AREAS**

Germany performs the best in Human capital & research and its weakest performance is in Market sophistication.



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

## **GERMANY'S INNOVATION STRENGTHS AND WEAKNESSES**

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

Strengths				
Code	Indicator name	Rank		
1.3.2	Ease of resolving insolvency*	4		
2	Human capital & research	3		
2.2	Tertiary education	5		
2.2.2	Graduates in science & engineering, %	4		
2.3.3	Global R&D companies, top 3, in mn US\$	2		
3.1.1	ICT access*	6		
3.2.2	Logistics performance*	1		
4.3	Trade, competition, & market scale	4		
4.3.3	Domestic market scale, bn PPP\$	5		
5.2.2	State of cluster development <sup>+</sup>	2		
6.1	Knowledge creation	6		
6.1.1	Patents by origin/bn PPP\$ GDP	1		
6.1.5	Citable documents H index	3		
7.1	Intangible assets	5		
7.3.2	Country-code TLDs/th pop. 15–69	6		

#### Weaknesses

Code	Indicator name	Rank
1.2.3	Cost of redundancy dismissal, salary weeks	89
1.3.1	Ease of starting a business*	88
2.1.1	Expenditure on education, % GDP	55
3.2.3	Gross capital formation, % GDP	91
4.2	Investment	79
4.2.1	Ease of protecting minority investors*	68
5.2.3	GERD financed by abroad, %	60
5.3.4	FDI net inflows, % GDP, 3-year average	86
6.2.1	Growth rate of PPP\$ GDP/worker, %, 3-year average	73
6.2.2	New businesses/th pop. 15–64	64
7.2.4	Printing & other media, % manufacturing	63

## STRENGTHS

- Gll strengths for Germany are found in all of the seven Gll pillars.
- Pillar Human capital & research (3) is a notable GII strength of Germany.
- In Human capital & research (3), additional strengths are sub-pillar Tertiary education (5) and indicators Graduates in science & engineering (4) and Global R&D companies (2).
- In Knowledge & technology outputs (10), sub-pillar Knowledge creation (6) as well as two of its indicators – Patents by origin and Quality of scientific publications - are GII strengths. In Patents by origin, Germany ranks first in the world; in Quality of scientific publications it achieves the third spot.
- In Institutions (16), indicator Ease of resolving insolvency (4) is a strength for Germany.
- In Infrastructure (13), Germany has GII strengths in indicators ICT access (6) and Logistics performance, where it positions 1st globally.
- In Market sophistication (20), sub-pillar Trade, competition, & market scale (4) and indicator Domestic market scale (5) are strength of this country.
- In Business sophistication (12), Germany's only strength is indicator State of cluster development, where it ranks 2nd in the world.
- Sub-pillar Intangible assets (5) and indicator Country-code TLDs (6) are strengths in Creative outputs (10).

## WEAKNESSES

- Germany weaknesses in the GII are found in all of the seven GII pillars.
- In Institutions (16), relative weaknesses are two indicators: Cost of redundancy dismissal (89) and Ease of starting a business (88).
- In Human capital & research (3), indicator Expenditure on education (55) is the only relative weakness for Germany.
- In Infrastructure (13), Germany shows weakness in indicator Gross capital formation (91).
- In Market sophistication (20), sub-pillar Investment (79) and its indicator Ease of protecting minority investors (68) are GII weaknesses for Germany.
- In Business sophistication (12), Germany's weaknesses are indicators R&D financed by abroad (60) and FDI inflows (86).
- Indicators Labor productivity growth (73) and New businesses (64) are relative GII weaknesses in Knowledge & technology outputs (10).
- In Creative outputs (10), Germany has only one weakness in indicator Printing & other media (63).

## GERMANY

9

rank

Outp	out rank	Input rank	Income	Region	Pop	oulation (	mn)	GDP, PPP\$	GDP per capita, PPP\$	GII 2	018 ra
	9	12	High	EUR		82.3		4,379.1	52,558.7		9
				Score/Value	Rank				S	core/Value	Rank
	INSTIT	JTIONS		86.4	16		BUS		STICATION	56.1	12
1.1					13	5.1					13
1.1.1			tability*		18	5.1.1		0	employment, %		17
1.1.2	Governm	ient effectiveness	s*	88.2	11	5.1.2 5.1.3			raining, % firms usiness, % GDP		n/a 7
1.2	Regulate	orv environment		84.4	23	5.1.4			siness, %		7
1.2.1					11	5.1.5			advanced degrees, %		51
1.2.2					16						
1.2.3	Cost of r	edundancy dismi	ssal, salary weeks	21.6	89 0 ◊	5.2					10
4.2						5.2.1			earch collaboration <sup>+</sup>		6
<b>1.3</b> 1.3.1			S*		<b>15</b> 88 ⊖ ♦	5.2.2 5.2.3			opment <sup>+</sup> road, %		2 60
1.3.1			s 1су*		$4 \bullet \bullet$	5.2.4			leals/bn PPP\$ GDP		32
1.0.2	Euse of i	esoning insolver	icy		- <b>T</b> • •	5.2.5		0	ces/bn PPP\$ GDP		9
223	HUMA	N CAPITAL & R	ESEARCH	63.2	3●♦	5.3	Knov	wledge absorptio	on	47.5	22
						5.3.1		• •	ayments, % total trade		
2.1	Educatio	on		57.8	33	5.3.2	High	i-tech imports, % t	otal trade	9.6	
2.1.1			ı, % GDP		55 O	5.3.3			% total trade		
2.1.2			l, secondary, % GDP/		34	5.3.4			Ρ		86
2.1.3			ears		17	5.3.5	Rese	earch talent, % in I	business enterprise	59.7	15
2.1.4			aths, & science		11						
2.1.5	Pupii-tea	cher ratio, secon	dary.	12.0	48	5	KNC	OWLEDGE & TE	ECHNOLOGY OUTPUT	527	10
										JJZ./	
2.2			~		5 \bullet 🔶	-					
2.2.1	Tertiary e	enrolment, % gros	<sub>SS</sub> .⊕		31	6.1	Know	wledge creation.		66.6	6
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2.2.1 2.2.2 2.2.3 2.3.1 2.3.2 2.3.3 2.3.4 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 3.2.1 3.2.2	Tertiary of Graduate Tertiary i Researct Gross ex Global R QS unive INFRAS INFRAS INFRAS INFRAS INFRAS Governm E-particip Electricit Logistics Gross ca	enrolment, % gros es in science & er nbound mobility, <b>h &amp; developmen</b> ners, FTE/mn pop penditure on R&I &D companies, av ersity ranking, ave <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b> <b>STRUCTURE</b>	ss.@ ngineering, % % t (R&D) D, % GDP yg. exp. top 3, mn US erage score top 3* eration technologies(I ice*		31 4 • $\diamond$ 28 7 12 8 2 • $\diamond$ 11 13 15 6 • 22 17 23 26 22 1 • $\diamond$	6.1.1 6.1.2 6.1.3 6.1.4 6.1.5 6.2 6.2.1 6.2.2 6.2.3 6.2.4 6.2.5 6.3 6.3.1 6.3.2 6.3.3 6.3.4	Knov Pate PCT Sciee Citat Knov Com ISO 9 High Knov INT High ICT 9 FDI r	wledge creation. Ints by origin/bn P patents by origin y models by origin intific & technical a ble documents H- wledge impact th rate of PPP\$ 0 ibusinesses/th pc puter software sp 9001 quality certifi- a medium-high- wledge diffusion lectual property ra- tech net exports, services exports, Services exports, Service	PPP\$ GDP /bn PPP\$ GDP n/bn PPP\$ GDP articles/bn PPP\$ GDP index GDP/worker, % Sending, % GDP icates/bn PPP\$ GDP icates/bn PPP\$ GDP tech manufactures, % ecceipts, % total trade % total trade DP		1 9 9 35 3 73 64 18 22 6 17 17 14 46 22 10
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2.2.1 2.2.2 2.2.3 2.3.1 2.3.2 2.3.3 2.3.4 <b>3.1</b> 3.1.1 3.1.2 3.1.3 3.1.4 <b>3.2</b> 3.2.1 3.2.2 3.2.3 <b>3.3</b>	Tertiary of Graduate Tertiary i Researct Gross ex Global R QS unive INFRAS Informat ICT acce Governm E-particip Electricit Logistics Gross ca Ecologic GDP/uni Environn	enrolment, % gros es in science & er nbound mobility, <b>h &amp; developmen</b> hers, FTE/mn pop penditure on R&E &D companies, av ersity ranking, ave <b>STRUCTURE</b> <b>STRUCTURE</b> <b>infrastructure</b> y output, kWh/mn performance* pital formation, % <b>cal sustainability.</b> t of energy use ental performance	ss.@ ngineering, % %		31 4 • $\bullet$ 28 7 12 8 2 • $\bullet$ 11 13 15 6 • 22 17 23 26 22 1 • $\bullet$ 91 $\bigcirc$ 29	6.1.1 6.1.2 6.1.3 6.1.4 6.1.5 6.2 6.2.1 6.2.2 6.2.3 6.2.4 6.2.5 6.3 6.3.1 6.3.2 6.3.3 6.3.4 <b>č</b> .2 6.3.3 6.3.4 <b>č</b> .2 7.1	Knov Pate PCT Vitiliti Sciee Citat Knov New Com ISO <sup>1</sup> High High High ICT <sup>§</sup> FDI r CRE Intar Tradu	wledge creation. Ints by origin/bn P patents by origin y models by origin tific & technical a ble documents H- wledge impact vth rate of PPP\$ 0 puter software sp 9001 quality certif - & medium-high- wledge diffusion lectual property ra -tech net exports, services exports, het outflows, % GI CATIVE OUTPU rgible assets emarks by origin/ strial designs by or	PPP\$ GDP /bn PPP\$ GDP n/bn PPP\$ GDP articles/bn PPP\$ GDP op. 15-64 exending, % GDP ficates/bn PPP\$ GDP tech manufactures, % % total trade % total trade bto PPP\$ GDP		1 9 9 35 3 17 73 64 18 22 6 17 17 14 46 22 10 5 30

**.** 4.1 28 4.1.1 40 4.1.2 39  $\diamond$ Microfinance gross loans, % GDP......n/a 4.1.3 n/a 4.2 Investment39.7Ease of protecting minority investors\*58.3 79 ○ ◊ 68 O 421 Market capitalization, % GDP...... 53.9 4.2.2 31 4.2.3 Venture capital deals/bn PPP\$ GDP...... 0.1 20 4.3 4 4.3.1 23 4.3.2 18 4.3.3 5 • •

/a 7 7 51  $\diamond$ 10 6 2 • • 50 O 32  $\diamond$ 9 22 51 37 25 36 O 15

5.1	Knowledge creation	66.6	6	
5.1.1	Patents by origin/bn PPP\$ GDP	17.5	1	• •
5.1.2	PCT patents by origin/bn PPP\$ GDP	4.5	9	
5.1.3	Utility models by origin/bn PPP\$ GDP	2.3	9	
5.1.4	Scientific & technical articles/bn PPP\$ GDP	15.7	35	
5.1.5	Citable documents H-index	87.9	3	• •
5.2	Knowledge impact	48.7	17	
5.2.1	Growth rate of PPP\$ GDP/worker, %	0.6	73	0
5.2.2	New businesses/th pop. 15-64	1.3	64	0
5.2.3	Computer software spending, % GDP	0.6	18	
5.2.4	ISO 9001 quality certificates/bn PPP\$ GDP	15.4	22	
5.2.5	High- & medium-high-tech manufactures, %	0.6	6	
5.3	Knowledge diffusion	42.7	17	
5.3.1	Intellectual property receipts, % total trade	1.2	17	
5.3.2	High-tech net exports, % total trade	11.5	14	
5.3.3	ICT services exports, % total trade	2.3	46	
5.3.4	FDI net outflows, % GDP	3.3	22	

1	CREATIVE OUTPUTS	19.6	10
7.1	Intangible assets	63.8	5●♦
7.1.1	Trademarks by origin/bn PPP\$ GDP		30
7.1.2	Industrial designs by origin/bn PPP\$ GDP	14.5	6 🔶
7.1.3	ICTs & business model creation <sup>+</sup>	78.4	12
7.1.4	ICTs & organizational model creation <sup>+</sup>	78.0	8
7.2	Creative goods & services	26.3	41
7.2.1	Cultural & creative services exports, % total trade	0.9	33
7.2.2	National feature films/mn pop. 15-69	4.1	47
7.2.2	Entertainment & Media market/th pop. 15-69	58.7	12
7.2.3	Printing & other media, % manufacturing	1.0	63 O
7.2.5	Creative goods exports, % total trade		· · •
7.2.5	creative goods exports, % total trade	2.2	26
7.3	Online creativity	44.4	14
7.3.1		52.9	14
7.3.2	Country-code TLDs/th pop. 15-69	77.6	6 • •
7.3.3	Wikipedia edits/mn pop. 15-69	52.1	22
7.3.4	Mobile app creation/bn PPP\$ GDP	11.9	40

NOTES: 
Mind indicates a strength; O a weakness; 
A a strength relative to the other top 25-ranked GII economies; 
a weakness relative to the other top 25-ranked GII economies; 
a mind indicates a strength; O a weakness; 
A mind indicates a strength; 
A mind indicates a strength; 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 Germany.

#### **Missing data**

Code	Indicator name	Country year	Model year	Source
4.1.3	Microfinance gross loans, % GDP	n/a	2017	Microfinance Information Exchange
5.1.2	Firms offering formal training, % firms	n/a	2013	World Bank

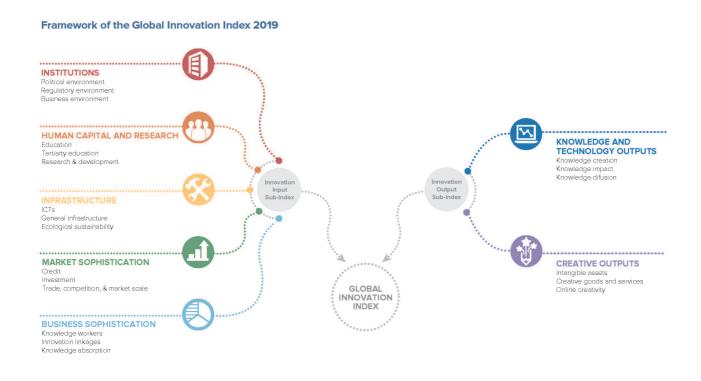
## **Outdated data**

Code	Indicator name	Country	Model	Source
		year	year	
2.1.5	Pupil-teacher ratio, secondary	2016	2017	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2016	2017	UNESCO Institute for Statistics

## **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 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 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.





