

GLOBAL INNOVATION INDEX 2019

BRAZIL

66th

Brazil ranks 66th 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 Brazil 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 Brazil's ranking in the GII 2019 is between 61 and 66.

Brazil's Rankings, 2017 - 2019

	GII	Innovation Inputs	Innovation Outputs
2019	66	60	67
2018	64	58	70
2017	69	60	80

- Brazil performs better in Innovation Inputs than Outputs.
- This year Brazil ranks 60th in Innovation Inputs, worse than last year and the same compared to 2017.
- As for Innovation Outputs, Brazil ranks 67th. This position is better than last year and compared to 2017.

16th

Brazil ranks 16th among the 34 upper middle-income economies.

5th

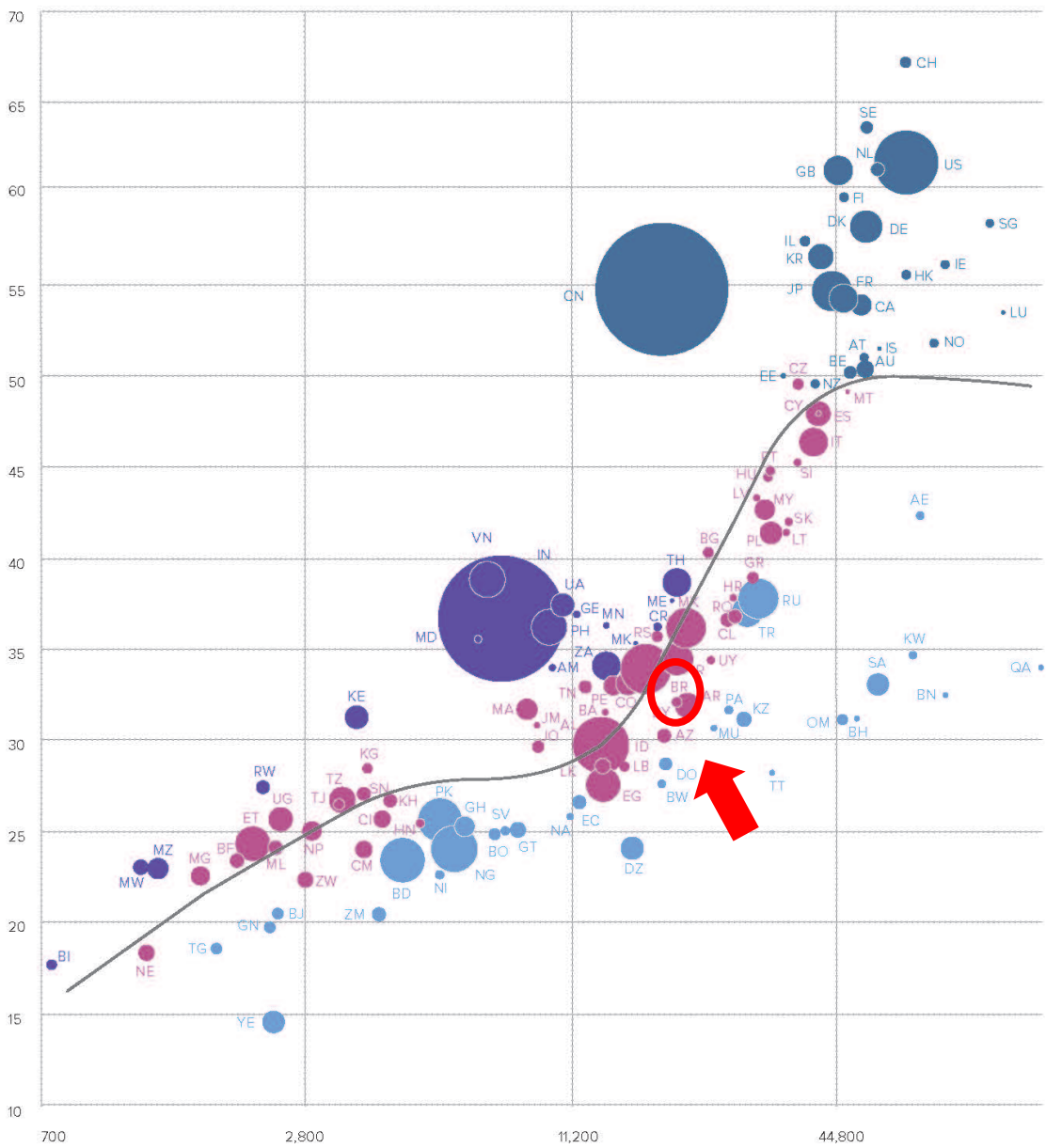
Brazil ranks 5th among the 19 economies in Latin America and the Caribbean.

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, Brazil performs at its expected level of development.

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



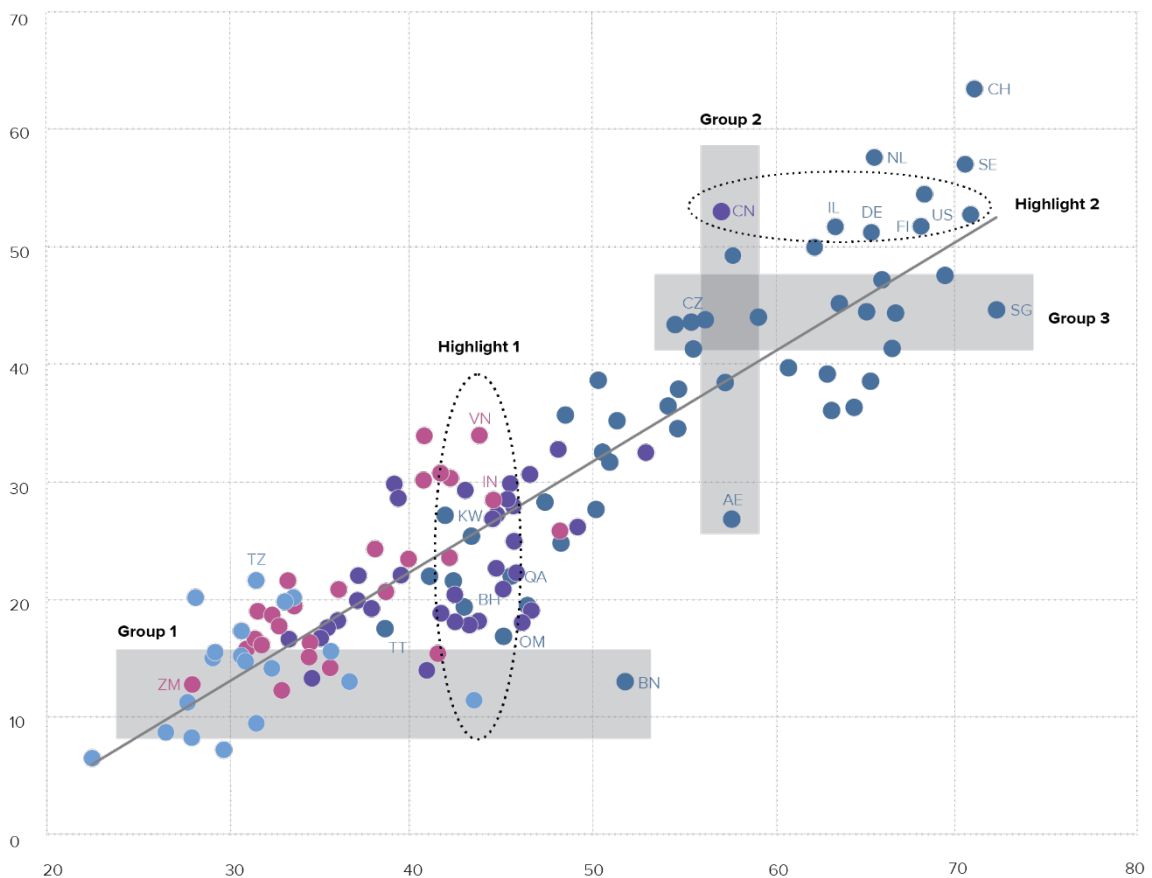
- ▲ **GII score**
- ▶ **GDP per capita in PPP\$ (logarithmic scale)**
- **Innovation leaders**
- **Innovation achievers**
- **Performing at expectations for level of development**
- **Performing below expectations for level of development**

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.

Brazil produces less innovation outputs relative to its level of innovation investments.

Innovation input/output performance by income group, 2019

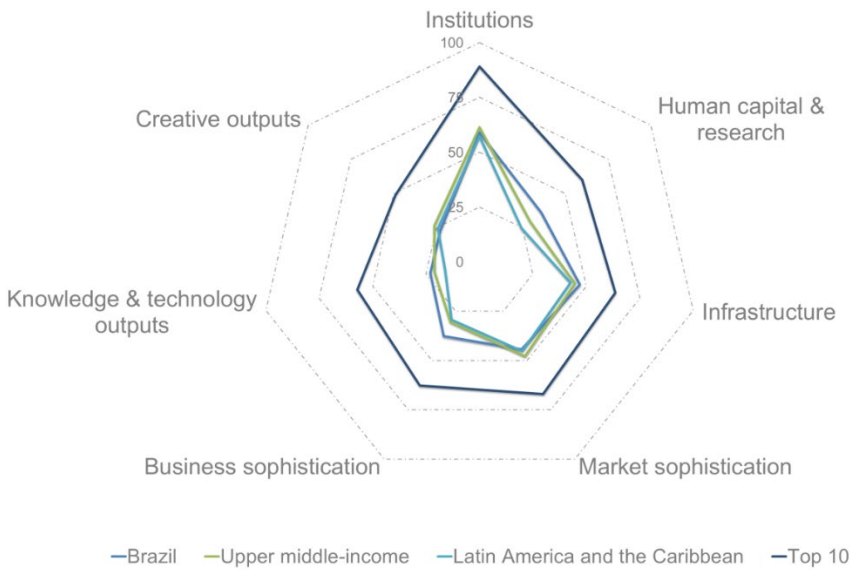


- ▲ Output score
- ▶ Input score
- High income
- Upper-middle income
- Lower-middle income
- Low income
- Fitted values

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 BRAZIL TO OTHER UPPER MIDDLE-INCOME ECONOMIES AND THE LATIN AMERICA AND THE CARIBBEAN REGION

Brazil's scores in the seven GII pillars



Upper middle-income economies

Brazil has high scores in 4 out of the 7 GII pillars: Human capital & research, Infrastructure, Business sophistication, and Knowledge & technology outputs which are above the average of the upper middle-income group.

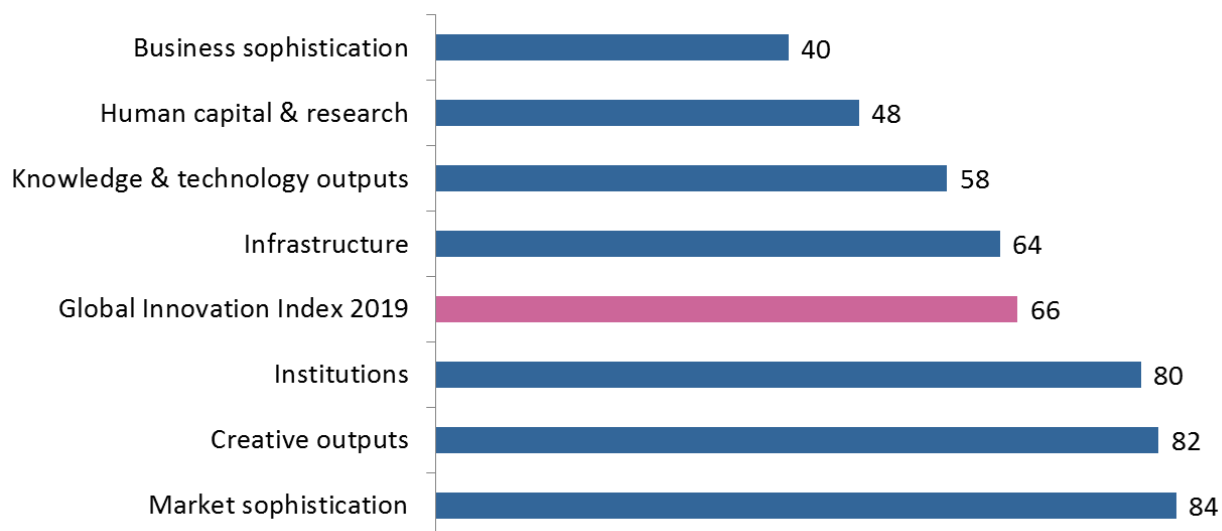
Latin America and the Caribbean Region

Compared to other economies in the Latin America and the Caribbean region, Brazil performs above average in 5 out of the 7 GII pillars: Institutions, Human capital & research, Infrastructure, Business sophistication, and Knowledge & technology outputs.

Top ranks are found in areas such as Research and development (R&D), Information & communication technologies (ICTs), Trade, competition, & market scale, Knowledge workers, Knowledge absorption, and Knowledge creation, where Brazil ranks in the top 50 worldwide.

OVERVIEW OF BRAZIL'S RANKINGS IN THE 7 GII AREAS

Brazil performs the best in Business sophistication and its weakest performance is in Market sophistication.



*The highest possible ranking in each pillar is 1.

BRAZIL'S INNOVATION STRENGTHS AND WEAKNESSES

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

Strengths

Code	Indicator name	Rank
2.1.1	Expenditure on education, % GDP	18
2.3.2	Gross expenditure on R&D, % GDP	28
2.3.3	Global R&D companies, top 3, in mn US\$	22
2.3.4	QS university ranking, average score top 3*	25
3.1.3	Government's online service*	22
3.1.4	E-participation*	12
4.3.3	Domestic market scale, bn PPP\$	8
5.3.1	Intellectual property payments, % total trade	10
5.3.2	High-tech imports, % total trade	28
6.1.5	Citable documents H index	24

Weaknesses

Code	Indicator name	Rank
1.3.1	Ease of starting a business*	106
2.1.4	PISA scales in reading, maths & science	64
2.2.3	Tertiary inbound mobility, %	105
3.2	General infrastructure	102
3.2.3	Gross capital formation, % GDP	115
4.1	Credit	105
4.1.3	Microfinance gross loans, % GDP	74
4.2.3	Venture capital deals/bn PPP\$ GDP	61
4.3.1	Applied tariff rate, weighted mean, %	104
6.2.1	Growth rate of PPP\$ GDP/worker, %, 3-year average	96
6.2.2	New businesses/th pop. 15–64	98
7.2.4	Printing & other media, % manufacturing	86

STRENGTHS

- GII strengths for Brazil are found in five of the seven GII pillars.
- Human capital & research (48) is the pillar with the highest number of relative strengths of Brazil. Here, the country's strengths are four indicators: Expenditure on education (18), R&D expenditures (28), Global R&D companies' expenditures (22), and Quality of universities (25).
- In Infrastructure (64), Brazil's strengths are indicators Government's online service (22) and E-participation (12).
- In Business sophistication (40), two strengths are found in indicators Intellectual property payments (10) and High-tech imports (28).
- Other relative strengths of Brazil are indicators Domestic market scale (8) in Market sophistication (84) and Quality of scientific publications (24) in Knowledge & technology outputs (58).

WEAKNESSES

- Brazil's weaknesses in the GII are found in six of the seven GII pillars.
- Market sophistication (84) is the area with the highest number of relative weaknesses. Here, Brazil's weaknesses are sub-pillar Credit (105) and indicators Microfinance gross loans (74), Venture capital deals (61), and Applied tariff rate (104).
- Other two relative weaknesses for Brazil are in Human capital & research (48). These are indicators PISA results (64) and Tertiary inbound mobility (105).
- In Infrastructure (64), Brazil's weaknesses are sub-pillar General infrastructure (102) and one of its indicators - Gross capital formation (115).
- In Knowledge & technology outputs (58), GII weaknesses are indicators Labor productivity growth (96) and New businesses (98).
- The last two weaknesses are indicators Ease of starting a business (106) in Institutions (80) and Printing & other media (86) in Creative outputs (82).

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$	GDP per capita, PPP\$	GII 2018 rank
67	60	Upper middle	LCN	210.9	3,370.6	16,154.3	64
				Score/Value	Rank		
INSTITUTIONS				58.9	80		
1.1	Political environment		48.6	88			
1.1.1	Political and operational stability*.....		66.7	74			
1.1.2	Government effectiveness*.....		39.6	87			
1.2	Regulatory environment		63.8	72			
1.2.1	Regulatory quality*.....		38.9	76			
1.2.2	Rule of law*.....		38.9	78			
1.2.3	Cost of redundancy dismissal, salary weeks.....		15.4	62			
1.3	Business environment		64.4	83			
1.3.1	Ease of starting a business*.....		80.2	106 ○			
1.3.2	Ease of resolving insolvency*.....		48.5	69			
HUMAN CAPITAL & RESEARCH				36.0	48		
2.1	Education		50.1	59			
2.1.1	Expenditure on education, % GDP.....		6.2	18 ● ◆			
2.1.2	Government funding/pupil, secondary, % GDP/cap... ..		21.7	44			
2.1.3	School life expectancy, years.....		15.3	44			
2.1.4	PISA scales in reading, maths, & science.....		395.0	64 ○			
2.1.5	Pupil-teacher ratio, secondary.....		16.6	73			
2.2	Tertiary education		22.3	85			
2.2.1	Tertiary enrolment, % gross.....		50.5	56			
2.2.2	Graduates in science & engineering, %.....		17.7	75			
2.2.3	Tertiary inbound mobility, %.....		0.2	105 ○ ◆			
2.3	Research & development (R&D)		35.6	32 ◆			
2.3.1	Researchers, FTE/mn pop.....		881.4	53			
2.3.2	Gross expenditure on R&D, % GDP.....		1.3	28 ● ◆			
2.3.3	Global R&D companies, avg. exp. top 3, mn US\$.....		61.5	22 ● ◆			
2.3.4	QS university ranking, average score top 3*.....		43.0	25 ● ◆			
INFRASTRUCTURE				46.8	64		
3.1	Information & communication technologies (ICTs)		77.9	36 ◆			
3.1.1	ICT access*.....		61.9	72			
3.1.2	ICT use*.....		60.2	57			
3.1.3	Government's online service*.....		92.4	22 ● ◆			
3.1.4	E-participation*.....		97.2	12 ● ◆			
3.2	General infrastructure		24.4	102 ○			
3.2.1	Electricity output, kWh/mn pop.....		2,787.8	64			
3.2.2	Logistics performance*.....		43.1	55			
3.2.3	Gross capital formation, % GDP.....		16.1	115 ○ ◆			
3.3	Ecological sustainability		38.2	65			
3.3.1	GDP/unit of energy use.....		10.0	52			
3.3.2	Environmental performance*.....		60.7	62			
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP..		0.9	68			
MARKET SOPHISTICATION				44.2	84		
4.1	Credit		25.8	105 ○			
4.1.1	Ease of getting credit*.....		50.0	87			
4.1.2	Domestic credit to private sector, % GDP.....		59.7	56			
4.1.3	Microfinance gross loans, % GDP.....		0.0	74 ○			
4.2	Investment		36.8	91			
4.2.1	Ease of protecting minority investors*.....		65.0	45			
4.2.2	Market capitalization, % GDP.....		38.6	40			
4.2.3	Venture capital deals/bn PPP\$ GDP.....		0.0	61 ○			
4.3	Trade, competition, & market scale		70.1	33			
4.3.1	Applied tariff rate, weighted avg., %.....		8.6	104 ○ ◆			
4.3.2	Intensity of local competition*.....		68.2	67			
4.3.3	Domestic market scale, bn PPP\$.....		3,370.6	8 ● ◆			
BUSINESS SOPHISTICATION				37.6	40 ◆		
5.1	Knowledge workers		46.3	42			
5.1.1	Knowledge-intensive employment, %.....		23.1	65			
5.1.2	Firms offering formal training, % firms.....		42.2	30			
5.1.3	GERD performed by business, % GDP.....		n/a	n/a			
5.1.4	GERD financed by business, %.....		45.0	35			
5.1.5	Females employed w/advanced degrees, %.....		12.5	55			
5.2	Innovation linkages		25.0	66			
5.2.1	University/industry research collaboration*.....		42.5	58			
5.2.2	State of cluster development*.....		49.7	50			
5.2.3	GERD financed by abroad, %.....		n/a	n/a			
5.2.4	JV-strategic alliance deals/bn PPP\$ GDP.....		0.0	82			
5.2.5	Patent families 2+ offices/bn PPP\$ GDP.....		0.1	55			
5.3	Knowledge absorption		41.7	36 ◆			
5.3.1	Intellectual property payments, % total trade.....		2.3	10 ● ◆			
5.3.2	High-tech imports, % total trade.....		10.1	28 ●			
5.3.3	ICT services imports, % total trade.....		1.6	35			
5.3.4	FDI net inflows, % GDP.....		4.0	41			
5.3.5	Research talent, % in business enterprise.....		26.6	45			
KNOWLEDGE & TECHNOLOGY OUTPUTS				23.0	58		
6.1	Knowledge creation		19.8	47			
6.1.1	Patents by origin/bn PPP\$ GDP.....		1.7	50			
6.1.2	PCT patents by origin/bn PPP\$ GDP.....		0.2	53			
6.1.3	Utility models by origin/bn PPP\$ GDP.....		0.9	25			
6.1.4	Scientific & technical articles/bn PPP\$ GDP.....		9.7	50			
6.1.5	Citable documents H-index.....		36.3	24 ● ◆			
6.2	Knowledge impact		31.9	86			
6.2.1	Growth rate of PPP\$ GDP/worker, %.....		-0.3	96 ○			
6.2.2	New businesses/th pop. 15-64.....		0.1	98 ○			
6.2.3	Computer software spending, % GDP.....		0.2	74			
6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP.....		5.4	58			
6.2.5	High- & medium-high-tech manufactures, %.....		0.3	32			
6.3	Knowledge diffusion		17.4	66			
6.3.1	Intellectual property receipts, % total trade.....		0.3	31 ◆			
6.3.2	High-tech net exports, % total trade.....		4.5	32			
6.3.3	ICT services exports, % total trade.....		0.9	84			
6.3.4	FDI net outflows, % GDP.....		0.6	63			
CREATIVE OUTPUTS				22.8	82		
7.1	Intangible assets		38.9	73			
7.1.1	Trademarks by origin/bn PPP\$ GDP.....		49.0	50			
7.1.2	Industrial designs by origin/bn PPP\$ GDP.....		1.1	64			
7.1.3	ICTs & business model creation*.....		61.1	57			
7.1.4	ICTs & organizational model creation*.....		52.6	69			
7.2	Creative goods & services		7.0	94			
7.2.1	Cultural & creative services exports, % total trade.....		0.5	50			
7.2.2	National feature films/mn pop. 15-69.....		1.0	81			
7.2.3	Entertainment & Media market/th pop. 15-69.....		8.5	39 ◆			
7.2.4	Printing & other media, % manufacturing.....		0.6	86 ○			
7.2.5	Creative goods exports, % total trade.....		0.2	77			
7.3	Online creativity		6.4	61			
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69.....		1.5	87			
7.3.2	Country-code TLDs/th pop. 15-69.....		7.2	44			
7.3.3	Wikipedia edits/mn pop. 15-69.....		6.3	71			
7.3.4	Mobile app creation/bn PPP\$ GDP.....		12.7	36			

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

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

Missing data

Code	Indicator name	Country year	Model year	Source
5.1.3	GERD performed by business, % GDP	n/a	2017	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

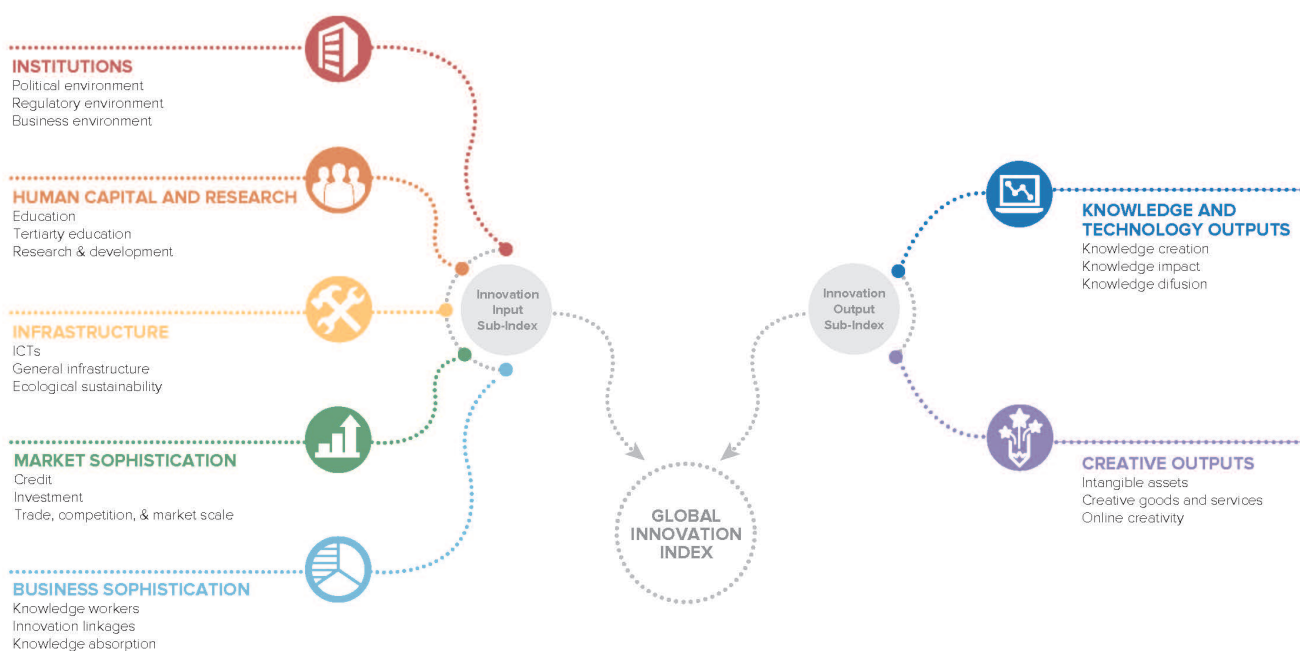
Code	Indicator name	Country year	Model year	Source
2.1.3	School life expectancy, years	2015	2016	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2016	2017	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2016	2017	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2014	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2016	2017	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.2	Firms offering formal training, % firms	2009	2013	World Bank
5.3.5	Research talent, % in business enterprise	2014	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
7.2.4	Printing & other media, % manufacturing	2015	2016	United Nations Industrial Development Organization

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 12th 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.

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

