GLOBAL INNOVATION INDEX 2020

BRAZIL

62nd Brazil ranks 62nd among the 131 economies featured in the GII 2020.

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 Brazil 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 Brazil in the GII 2020 is between ranks 59 and 65.

Rankings of Brazil (2018–2020)

	GII	Innovation inputs	Innovation outputs
2020	62	59	64
2019	66	60	67
2018	64	58	70

- Brazil performs better in innovation inputs than innovation outputs in 2020.
- This year Brazil ranks 59th in innovation inputs, higher than last year and lower compared to 2018.
- As for innovation outputs, Brazil ranks 64th. This position is higher than last year and higher compared to 2018.

16th Brazil ranks 16th among the 37 upper middle-income group economies.

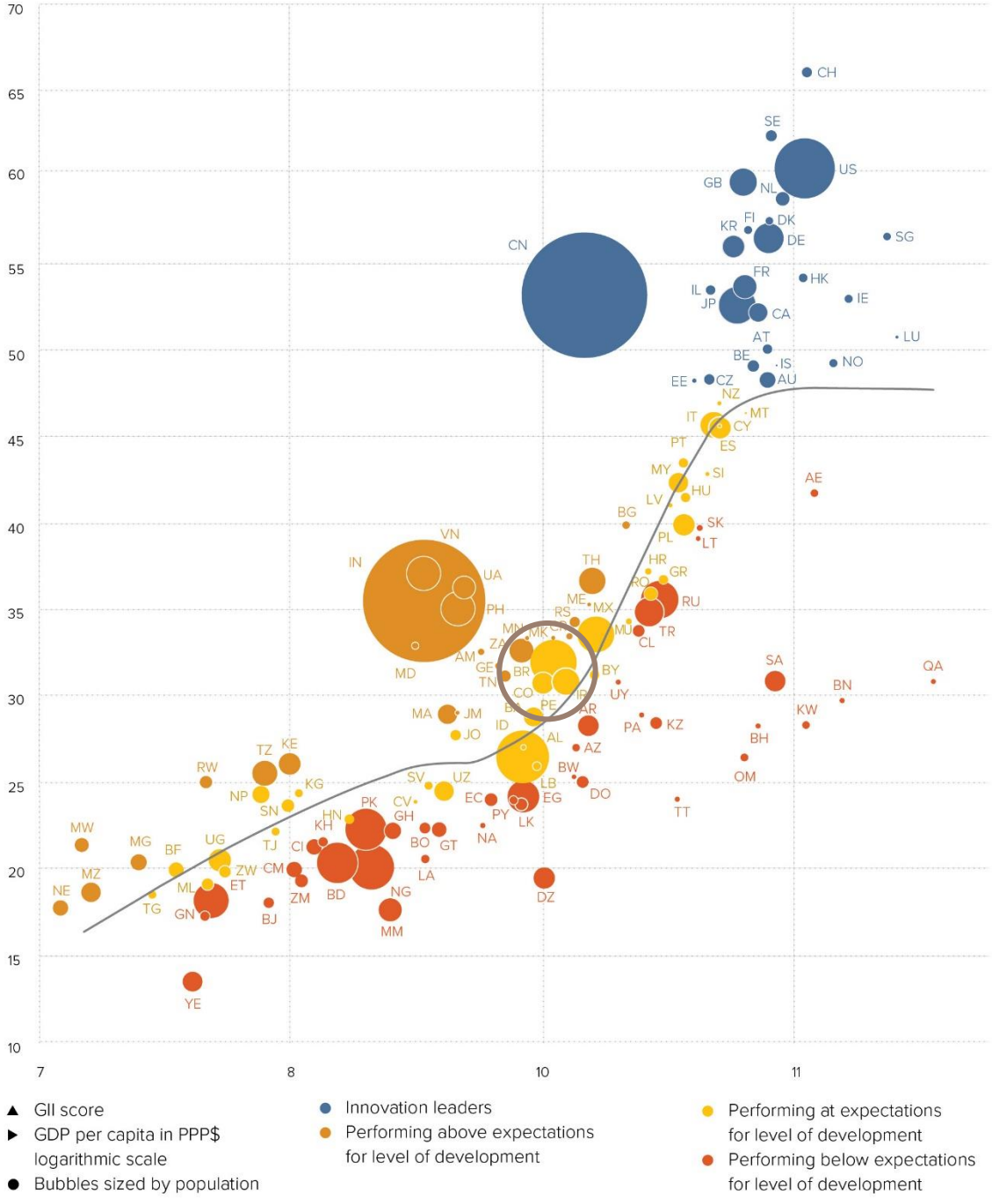
4th Brazil ranks 4th among the 18 economies in Latin America and the Caribbean.

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 performing below expectations.

Relative to GDP, Brazil's performance matches expectations for its level of development.

The positive relationship between innovation and development

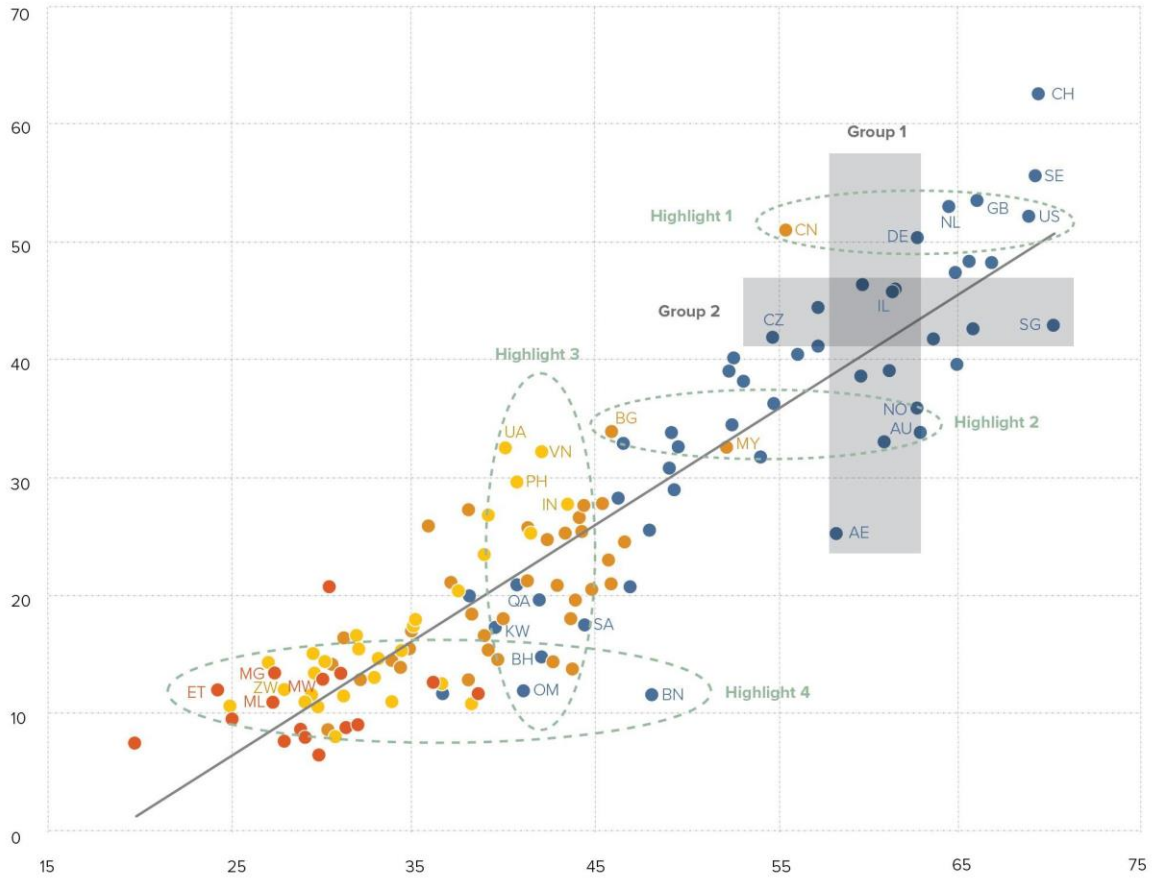


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

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

Innovation input to output performance, 2020



▲ Output score
► Input score

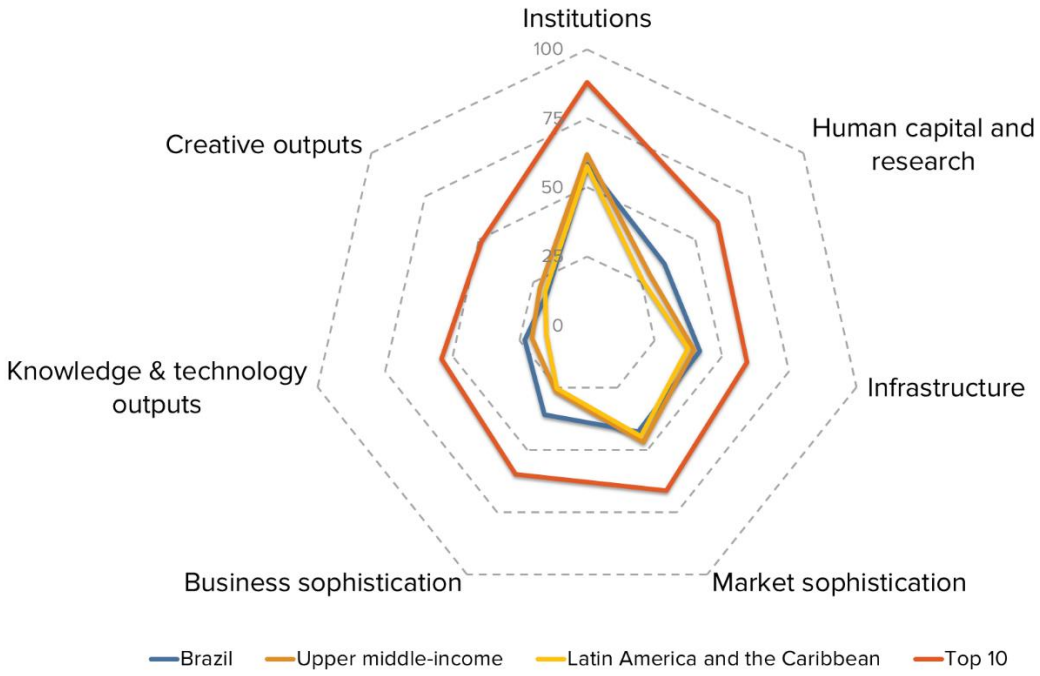
● High income group
● Upper middle-income group
● Lower middle-income group
● Low income group

— Fitted values

AU	Australia	IN	India	NL	Netherlands	CH	Switzerland
BH	Bahrain	IL	Israel	NO	Norway	UA	Ukraine
BN	Brunei Darussalam	KW	Kuwait	OM	Oman	AE	United Arab Emirates
BG	Bulgaria	MG	Madagascar	PH	Philippines	GB	United Kingdom
CN	China	MW	Malawi	QA	Qatar	US	United States of America
CZ	Czech Republic	ML	Mali	SA	Saudi Arabia	VN	Viet Nam
ET	Ethiopia	MY	Malaysia	SG	Singapore	ZW	Zimbabwe
DE	Germany			SE	Sweden		

BENCHMARKING BRAZIL AGAINST OTHER UPPER MIDDLE-INCOME GROUP ECONOMIES AND LATIN AMERICA AND THE CARIBBEAN

Brazil's scores in the seven GII pillars



Upper middle-income group economies

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

Conversely, Brazil scores below average for its income group in three pillars: Institutions, Market sophistication and Creative outputs.

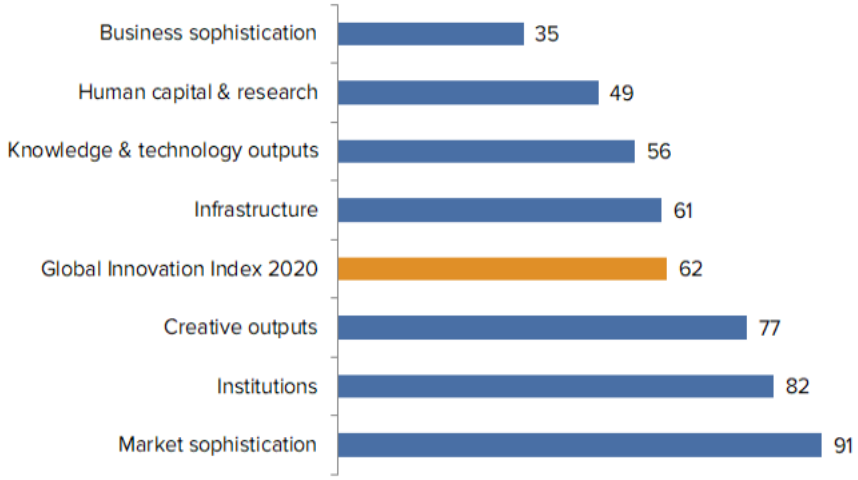
Latin America and the Caribbean

Compared to other economies in Latin America and the Caribbean, Brazil performs:

- above average in five out of the seven GII pillars: Institutions, Human capital & research, Infrastructure, Business sophistication and Knowledge & technology outputs; and
- below average in two out of the seven GII pillars: Market sophistication and Creative outputs.

OVERVIEW OF BRAZIL RANKINGS IN THE SEVEN GII AREAS

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



*The highest possible ranking in each pillar is 1.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Brazil in the GII 2020.

Strengths

Code	Indicator name	Rank
2.1.1	Expenditure on education, % GDP	12
2.3	Research & development (R&D)	34
2.3.2	Gross expenditure on R&D, % GDP	30
2.3.3	Global R&D companies, top 3, mn US$	23
2.3.4	QS university ranking, average score top 3*	28
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	Knowledge absorption	31
5.3.1	Intellectual property payments, % total trade	11
5.3.2	High-tech imports, % total trade	32
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	68
2.2.2	Graduates in science & engineering, %	81
2.2.3	Tertiary inbound mobility, %	105
3.2	General infrastructure	108
3.2.3	Gross capital formation, % GDP	118
4.1	Credit	105
4.1.1	Ease of getting credit*	94
4.3.1	Applied tariff rate, weighted avg., %	103
6.2.1	Growth rate of PPP$ GDP/worker, %	93
7.2.2	National feature films/mn pop. 15–69	86
7.2.4	Printing & other media, % manufacturing	82

STRENGTHS

GII strengths for Brazil are found in five of the seven GII pillars.

- Human capital & research (49): shows strengths in the sub-pillar Research & development (34) and in the indicators Expenditure on education (12), Gross expenditure on R&D (30), Global R&D companies (23) and QS university ranking (28).
- Infrastructure (61): demonstrates strengths in the indicators Government's online service (22) and E-participation (12).
- Market sophistication (91): the indicator Domestic market scale (8) demonstrates a strength.
- Business sophistication (35): displays strengths in the sub-pillar Knowledge absorption (31) and in the indicators Intellectual property payments (11) and High-tech imports (32).
- Knowledge & technology outputs (56): the indicator Citable documents H-index (24) demonstrates a strength.

WEAKNESSES

GII weaknesses for Brazil are found in six of the seven GII pillars.

- Institutions (82): exhibits weakness in the indicator Ease of starting a business (106).
- Human capital & research (49): shows weaknesses in the indicators PISA scales in reading, maths & science (68), Graduates in science & engineering (81) and Tertiary inbound mobility (105).
- Infrastructure (61): displays weaknesses in the sub-pillar General infrastructure (108) and in the indicator Gross capital formation (118).
- Market sophistication (91): shows weaknesses in the sub-pillar Credit (105) and in the indicators Ease of getting credit (94) and Applied tariff rate (103).
- Knowledge & technology outputs (56): the indicator Growth rate of PPP (93) reveals a weakness.
- Creative outputs (77): displays weaknesses in the indicators National feature films (86) and Printing & other media (82).

BRAZIL

GII 2020 rank

62

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
64	59	Upper middle	LCN	211.0	3,456.4	14,371.6	66

		Score/Value	Rank	
INSTITUTIONS		**58.5**	**82**	
1.1	**Political environment**	**48.8**	**91**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	40.1	97	◇
1.2	**Regulatory environment**	**60.9**	**77**	
1.2.1	Regulatory quality*	33.5	94	
1.2.2	Rule of law*	39.4	78	
1.2.3	Cost of redundancy dismissal, salary weeks	15.4	60	
1.3	**Business environment**	**65.9**	**80**	
1.3.1	Ease of starting a business*	81.3	106	○
1.3.2	Ease of resolving insolvency*	50.4	69	
HUMAN CAPITAL & RESEARCH		**35.8**	**49**	
2.1	**Education**	**49.2**	**56**	
2.1.1	Expenditure on education, % GDP	6.2	12	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.5	41	
2.1.3	School life expectancy, years	15.4	42	
2.1.4	PISA scales in reading, maths, & science	400.0	68	○
2.1.5	Pupil-teacher ratio, secondary	16.7	82	
2.2	**Tertiary education**	**24.0**	**85**	
2.2.1	Tertiary enrolment, % gross	51.3	57	
2.2.2	Graduates in science & engineering, %	17.7	81	○
2.2.3	Tertiary inbound mobility, %	0.2	105	○ ◇
2.3	**Research & development (R&D)**	**34.3**	**34**	● ◆
2.3.1	Researchers, FTE/mn pop.	887.7	53	
2.3.2	Gross expenditure on R&D, % GDP	1.3	30	● ◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	58.6	23	● ◆
2.3.4	QS university ranking, average score top 3*	42.7	28	● ◆
INFRASTRUCTURE		**41.8**	**61**	
3.1	**Information & communication technologies (ICTs)**	**77.5**	**38**	◆
3.1.1	ICT access*	59.2	76	
3.1.2	ICT use*	61.1	56	
3.1.3	Government's online service*	92.4	22	● ◆
3.1.4	E-participation*	97.2	12	● ◆
3.2	**General infrastructure**	**18.9**	**108**	○
3.2.1	Electricity output, kWh/mn pop	2,816.2	65	
3.2.2	Logistics performance*	43.0	55	
3.2.3	Gross capital formation, % GDP	15.7	118	○ ◇
3.3	**Ecological sustainability**	**29.0**	**65**	
3.3.1	GDP/unit of energy use	10.0	55	
3.3.2	Environmental performance*	51.2	53	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	66	
MARKET SOPHISTICATION		**42.7**	**91**	
4.1	**Credit**	**30.9**	**105**	○
4.1.1	Ease of getting credit*	50.0	94	○
4.1.2	Domestic credit to private sector, % GDP	61.8	56	
4.1.3	Microfinance gross loans, % GDP	0.1	59	
4.2	**Investment**	**28.6**	**99**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	45.9	34	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	55	
4.3	**Trade, competition, and market scale**	**68.8**	**36**	
4.3.1	Applied tariff rate, weighted avg., %	8.0	103	○ ◇
4.3.2	Intensity of local competition+	68.2	67	
4.3.3	Domestic market scale, bn PPP$	3,456.4	8	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**35.8**	**35**	◆
5.1	**Knowledge workers**	**46.1**	**[32]**	
5.1.1	Knowledge-intensive employment, %	23.5	64	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	47.5	33	
5.1.5	Females employed w/advanced degrees, %	13.8	50	
5.2	**Innovation linkages**	**21.4**	**62**	
5.2.1	University/industry research collaboration+	40.0	74	
5.2.2	State of cluster development+	48.7	55	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	87	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	55	
5.3	**Knowledge absorption**	**40.0**	**31**	● ◆
5.3.1	Intellectual property payments, % total trade	2.2	11	● ◆
5.3.2	High-tech imports, % total trade	10.0	32	●
5.3.3	ICT services imports, % total trade	1.7	35	
5.3.4	FDI net inflows, % GDP	3.9	38	
5.3.5	Research talent, % in business enterprise	26.6	49	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**23.3**	**56**	
6.1	**Knowledge creation**	**20.6**	**48**	
6.1.1	Patents by origin/bn PPP$ GDP	1.5	52	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	50	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	29	
6.1.4	Scientific & technical articles/bn PPP$ GDP	10.5	50	
6.1.5	Citable documents H-index	37.4	24	● ◆
6.2	**Knowledge impact**	**22.8**	**69**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.0	93	○
6.2.2	New businesses/th pop. 15-64	1.3	76	
6.2.3	Computer software spending, % GDP	0.0	75	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.9	56	
6.2.5	High- and medium-high-tech manufacturing, %	34.5	31	
6.3	**Knowledge diffusion**	**26.4**	**53**	
6.3.1	Intellectual property receipts, % total trade	0.3	30	◆
6.3.2	High-tech net exports, % total trade	4.2	38	
6.3.3	ICT services exports, % total trade	1.0	83	
6.3.4	FDI net outflows, % GDP	0.7	67	
CREATIVE OUTPUTS		**18.6**	**77**	
7.1	**Intangible assets**	**25.8**	**71**	
7.1.1	Trademarks by origin/bn PPP$ GDP	52.3	43	
7.1.2	Global brand value, top 5,000, % GDP	33.8	43	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	66	
7.1.4	ICTs & organizational model creation+	52.6	69	
7.2	**Creative goods and services**	**6.5**	**98**	
7.2.1	Cultural & creative services exports, % total trade	0.5	52	
7.2.2	National feature films/mn pop. 15-69	1.1	86	○
7.2.3	Entertainment & Media market/th pop. 15-69	7.4	42	
7.2.4	Printing and other media, % manufacturing	0.6	82	○
7.2.5	Creative goods exports, % total trade	0.3	73	
7.3	**Online creativity**	**16.4**	**65**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.5	88	
7.3.2	Country-code TLDs/th pop. 15-69	8.1	43	
7.3.3	Wikipedia edits/mn pop. 15-69	46.4	67	
7.3.4	Mobile app creation/bn PPP$ GDP	12.3	39	

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 either missing or outdated for Brazil.

Missing data

Code	Indicator name	Country year	Model year	Source
5.1.2	Firms offering formal training, %	n/a	2018	World Bank
5.1.3	GERD performed by business, % GDP	n/a	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
5.2.3	GERD financed by abroad, % GDP	n/a	2017	UNESCO Institute for Statistics

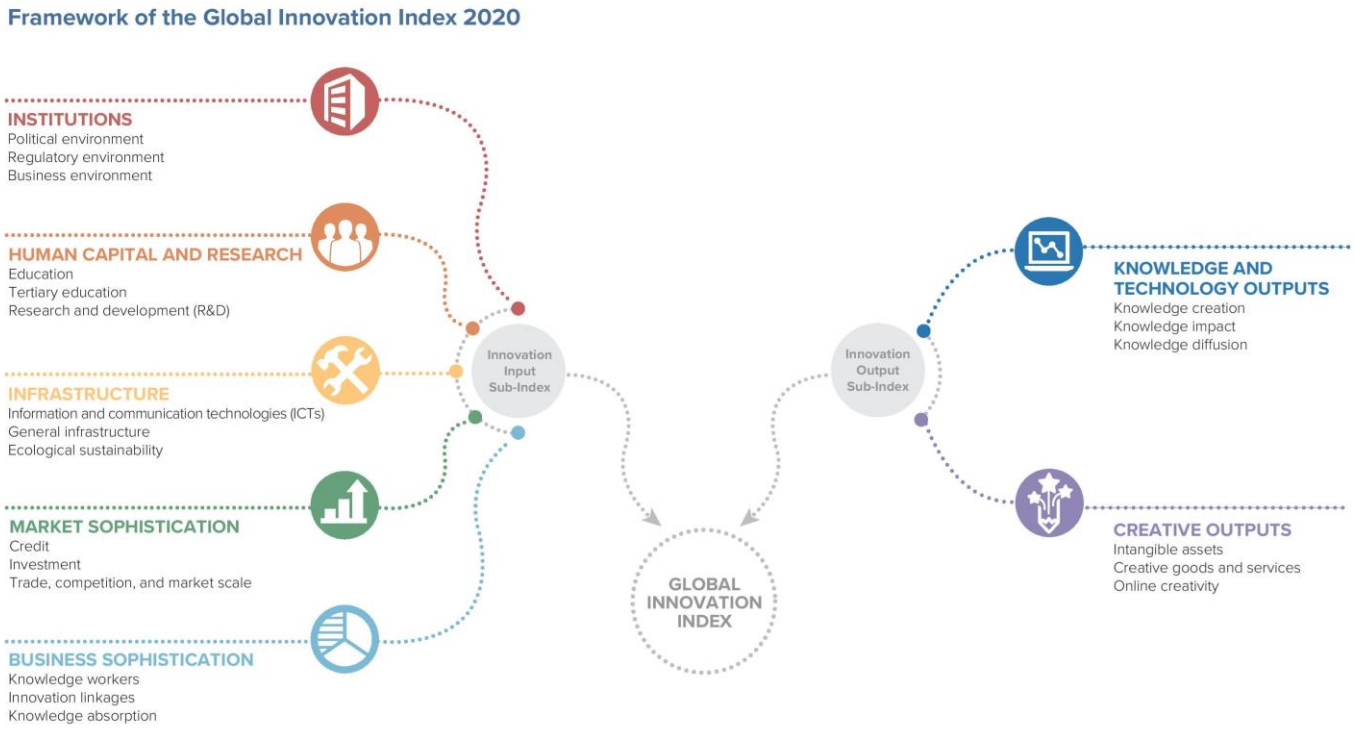
Outdated data

Code	Indicator name	Country year	Model year	Source
2.1.1	Expenditure on education, % GDP	2015	2018	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	2015	2016	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2017	2018	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2014	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2017	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
5.3.5	Research talent, % in business enterprise	2014	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators

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 2020, the GII presents its 13th edition devoted to the theme *Who Will Finance Innovation?*

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.



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.