GLOBAL INNOVATION INDEX 2020

PARAGUAY

97th Paraguay ranks 97th 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 Paraguay 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 Paraguay in the GII 2020 is between ranks 92 and 99.

Rankings of Paraguay (2018–2020)

	GII	Innovation inputs	Innovation outputs
2020	97	98	92
2019	95	95	94
2018	89	89	86

- Paraguay performs better in innovation outputs than innovation inputs in 2020.
- This year Paraguay ranks 98th in innovation inputs, lower than last year and lower compared to 2018.
- As for innovation outputs, Paraguay ranks 92nd. This position is higher than last year and lower compared to 2018.

32nd Paraguay ranks 32nd among the 37 upper middle-income group economies.

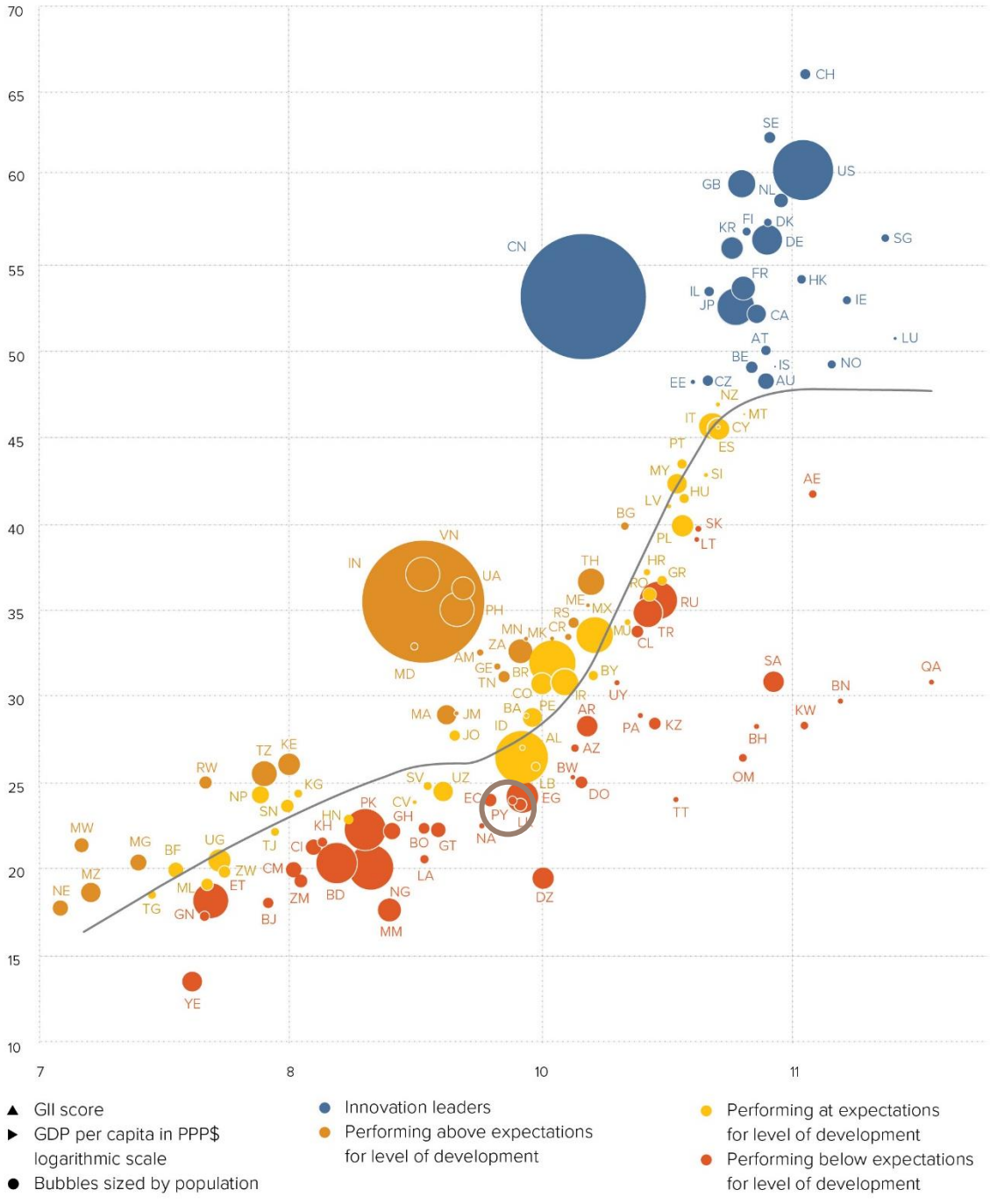
13th Paraguay ranks 13th among the 18 economies in Latin America and the Caribbean.

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, Paraguay's performance is below expectations for its level of development.

The positive relationship between innovation and development

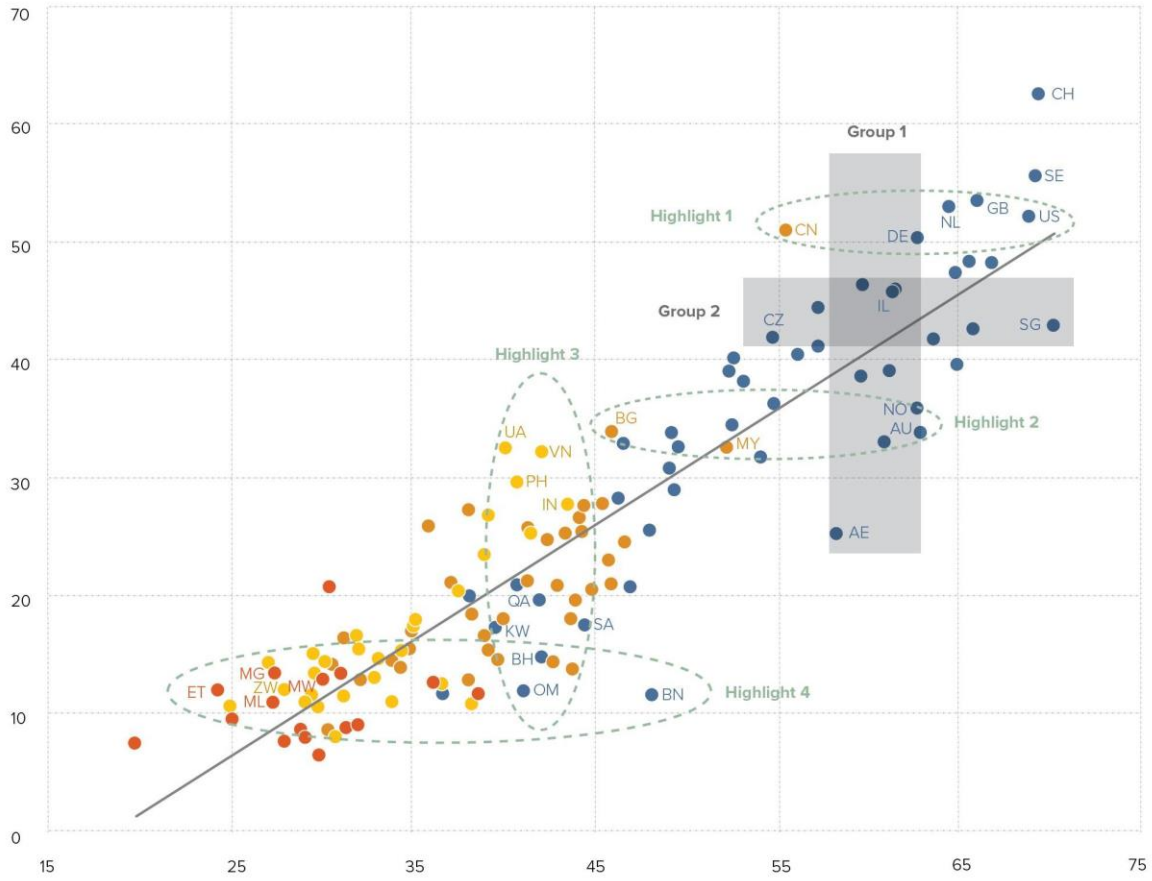


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

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

Innovation input to output performance, 2020



▲ Output score
► Input score

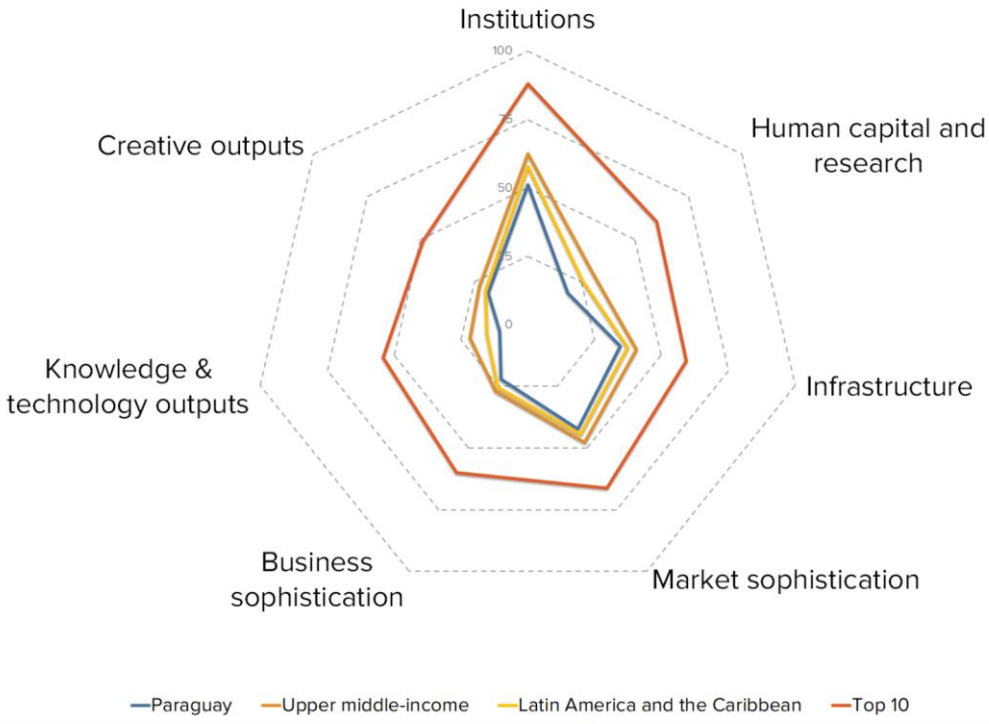
● High income group
● Upper middle-income group
● Lower middle-income group
● Low income group

— 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 PARAGUAY AGAINST OTHER UPPER MIDDLE-INCOME GROUP ECONOMIES AND LATIN AMERICA AND THE CARIBBEAN

Paraguay's scores in the seven GII pillars



Upper middle-income group economies

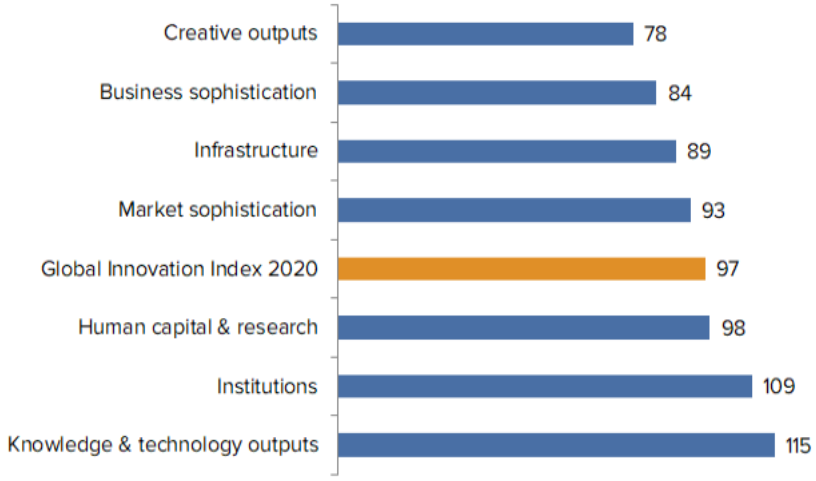
Paraguay scores below the income group average in all GII pillars.

Latin America and the Caribbean

Paraguay performs below the regional average in all GII pillars.

OVERVIEW OF PARAGUAY RANKINGS IN THE SEVEN GII AREAS

Paraguay performs best in Creative outputs and its weakest performance is in Knowledge & technology outputs.



*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 Paraguay in the GII 2020.

Strengths

Code	Indicator name	Rank
3.2	General infrastructure	66
3.2.1	Electricity output, GWh/mn pop	18
3.3.1	GDP/unit of energy use	42
3.3.2	Environmental performance*	67
4.1.3	Microfinance gross loans, % GDP	9
5.1.2	Firms offering formal training, %	20
5.3	Knowledge absorption	58
5.3.2	High-tech imports, % total trade	11
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	66
7.1	Intangible assets	55
7.1.1	Trademarks by origin/bn PPP$ GDP	6
7.1.3	Industrial designs by origin/bn PPP$ GDP	52
7.2.4	Printing and other media, % manufacturing	32

Weaknesses

Code	Indicator name	Rank
2.3.3	Global R&D companies, top 3, mn US$	42
5.1.3	GERD performed by business, % GDP	88
5.1.4	GERD financed by business, %	99
5.2.1	University/industry research collaboration†	125
5.2.5	Patent families 2+ offices/bn PPP$ GDP	101
5.3.3	ICT services imports, % total trade	129
6.1.4	Scientific & technical articles/bn PPP$ GDP	124
6.3.3	ICT services exports, % total trade	123
7.1.2	Global brand value, top 5000, % GDP	80
7.2.1	Cultural & creative services exports, % total trade	109

STRENGTHS

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

- Infrastructure (89): demonstrates strengths in the sub-pillar General infrastructure (66) and in the indicators Electricity output (18), GDP/unit of energy use (42) and Environmental performance (67).
- Market sophistication (93): shows strengths in the indicator Microfinance gross loans (9).
- Business sophistication (84): exhibits strengths in the sub-pillar Knowledge absorption (58) and in the indicators Firms offering formal training (20) and High-tech imports (11).
- Knowledge & technology outputs (115): reveals strengths in the indicator ISO 9001 quality certificates (66).
- Creative outputs (78): displays strengths in the sub-pillar Intangible assets (55) and in the indicators Trademarks by origin (6), Industrial designs by origin (52) and Printing and other media (32).

WEAKNESSES

GII weaknesses for Paraguay are found in four of the seven GII pillars.

- Human capital & research (98): shows weaknesses in the indicator Global R&D companies (42).
- Business sophistication (84): demonstrates weaknesses in the indicators GERD performed by business (88), GERD financed by business (99), University/industry research collaboration (125), Patent families 2+ offices (101) and ICT services imports (129).
- Knowledge & technology outputs (115): exhibits weaknesses in the indicators Scientific & technical articles (124) and ICT services exports (123).
- Creative outputs (78): reveals weaknesses in the indicators Global brand value (80) and Cultural & creative services exports (109).

PARAGUAY

GII 2020 rank

97

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
92	98	Upper middle	LCN	7.0	97.2	11,859.3	95

		Score/Value	Rank	
INSTITUTIONS		**51.1**	**109**	◇
1.1	**Political environment**	**47.7**	**96**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	38.6	99	◇
1.2	**Regulatory environment**	**46.6**	**111**	◇
1.2.1	Regulatory quality*	38.5	81	
1.2.2	Rule of law*	32.6	97	
1.2.3	Cost of redundancy dismissal, salary weeks	29.4	116	◇
1.3	**Business environment**	**59.0**	**107**	◇
1.3.1	Ease of starting a business*	76.0	117	◇
1.3.2	Ease of resolving insolvency*	42.1	94	
HUMAN CAPITAL & RESEARCH		**18.7**	**98**	◇
2.1	**Education**	**29.4**	**108**	◇
2.1.1	Expenditure on education, % GDP	3.4	90	
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.9	87	
2.1.3	School life expectancy, years	12.2	89	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.4	90	
2.2	**Tertiary education**	**24.9**	**[84]**	
2.2.1	Tertiary enrolment, % gross	34.6	77	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**1.9**	**96**	
2.3.1	Researchers, FTE/mn pop.	135.1	85	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	97	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	3.5	74	
INFRASTRUCTURE		**34.8**	**89**	
3.1	**Information & communication technologies (ICTs)**	**50.0**	**98**	◇
3.1.1	ICT access*	43.6	101	◇
3.1.2	ICT use*	43.4	92	◇
3.1.3	Government's online service*	55.6	99	
3.1.4	E-participation*	57.3	96	
3.2	**General infrastructure**	**26.8**	**66**	●
3.2.1	Electricity output, kWh/mn pop	8,764.4	18	● ◆
3.2.2	Logistics performance*	33.4	73	
3.2.3	Gross capital formation, % GDP	22.4	74	
3.3	**Ecological sustainability**	**27.5**	**71**	
3.3.1	GDP/unit of energy use	11.2	42	●
3.3.2	Environmental performance*	46.4	67	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	98	
MARKET SOPHISTICATION		**42.3**	**93**	
4.1	**Credit**	**35.5**	**85**	
4.1.1	Ease of getting credit*	40.0	113	◇
4.1.2	Domestic credit to private sector, % GDP	42.9	77	
4.1.3	Microfinance gross loans, % GDP	4.2	9	● ◆
4.2	**Investment**	**34.0**	**[78]**	
4.2.1	Ease of protecting minority investors*	34.0	118	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**57.5**	**88**	
4.3.1	Applied tariff rate, weighted avg., %	5.0	91	
4.3.2	Intensity of local competition+	65.6	78	
4.3.3	Domestic market scale, bn PPP$	97.2	82	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.2**	**84**	
5.1	**Knowledge workers**	**21.4**	**96**	
5.1.1	Knowledge-intensive employment, %	18.3	82	
5.1.2	Firms offering formal training, %	46.4	20	●
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	0.2	99	○ ◇
5.1.5	Females employed w/advanced degrees, %	9.6	69	
5.2	**Innovation linkages**	**14.3**	**115**	
5.2.1	University/industry research collaboration+	23.3	125	○ ◇
5.2.2	State of cluster development+	35.6	111	◇
5.2.3	GERD financed by abroad, % GDP	0.0	67	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**30.7**	**58**	●
5.3.1	Intellectual property payments, % total trade	0.1	97	
5.3.2	High-tech imports, % total trade	16.6	11	● ◆
5.3.3	ICT services imports, % total trade	0.0	129	○ ◇
5.3.4	FDI net inflows, % GDP	1.3	103	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.4**	**115**	◇
6.1	**Knowledge creation**	**2.7**	**[124]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	88	
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 & technical articles/bn PPP$ GDP	1.2	124	○ ◇
6.1.5	Citable documents H-index	4.2	113	
6.2	**Knowledge impact**	**14.3**	**104**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.5	76	
6.2.2	New businesses/th pop. 15-64	0.2	110	
6.2.3	Computer software spending, % GDP	0.0	100	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.6	66	●
6.2.5	High- and medium-high-tech manufacturing, %	14.1	70	
6.3	**Knowledge diffusion**	**14.1**	**100**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.7	73	
6.3.3	ICT services exports, % total trade	0.1	123	○
6.3.4	FDI net outflows, % GDP	0.1	111	
CREATIVE OUTPUTS		**18.5**	**78**	
7.1	**Intangible assets**	**29.5**	**55**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	127.9	6	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.7	52	●
7.1.4	ICTs & organizational model creation+	41.8	110	◇
7.2	**Creative goods and services**	**5.8**	**100**	
7.2.1	Cultural & creative services exports, % total trade	0.0	109	○
7.2.2	National feature films/mn pop. 15-69	1.3	80	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.3	32	●
7.2.5	Creative goods exports, % total trade	0.0	118	
7.3	**Online creativity**	**9.3**	**87**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.7	84	
7.3.2	Country-code TLDs/th pop. 15-69	1.4	77	
7.3.3	Wikipedia edits/mn pop. 15-69	37.5	83	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	95	

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 Paraguay.

Missing data

Code	Indicator name	Country year	Model year	Source
2.1.4	PISA scales in reading, maths, & science	n/a	2018	OECD Programme for International Student Assessment (PISA)
2.2.2	Graduates in science & engineering, %	n/a	2017	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	n/a	2017	UNESCO Institute for Statistics
4.2.2	Market capitalization, % GDP	n/a	2018	World Federation of Exchanges
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	2019	Thomson Reuters
5.2.4	JV–strategic alliance deals/bn PPP$ GDP	n/a	2019	Thomson Reuters
5.3.5	Research talent, % in business enterprise	n/a	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	2019	World Intellectual Property Organization
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2018	World Intellectual Property Organization
6.3.1	Intellectual property receipts, % total trade	n/a	2018	World Trade Organization
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	2018	PwC

Outdated data

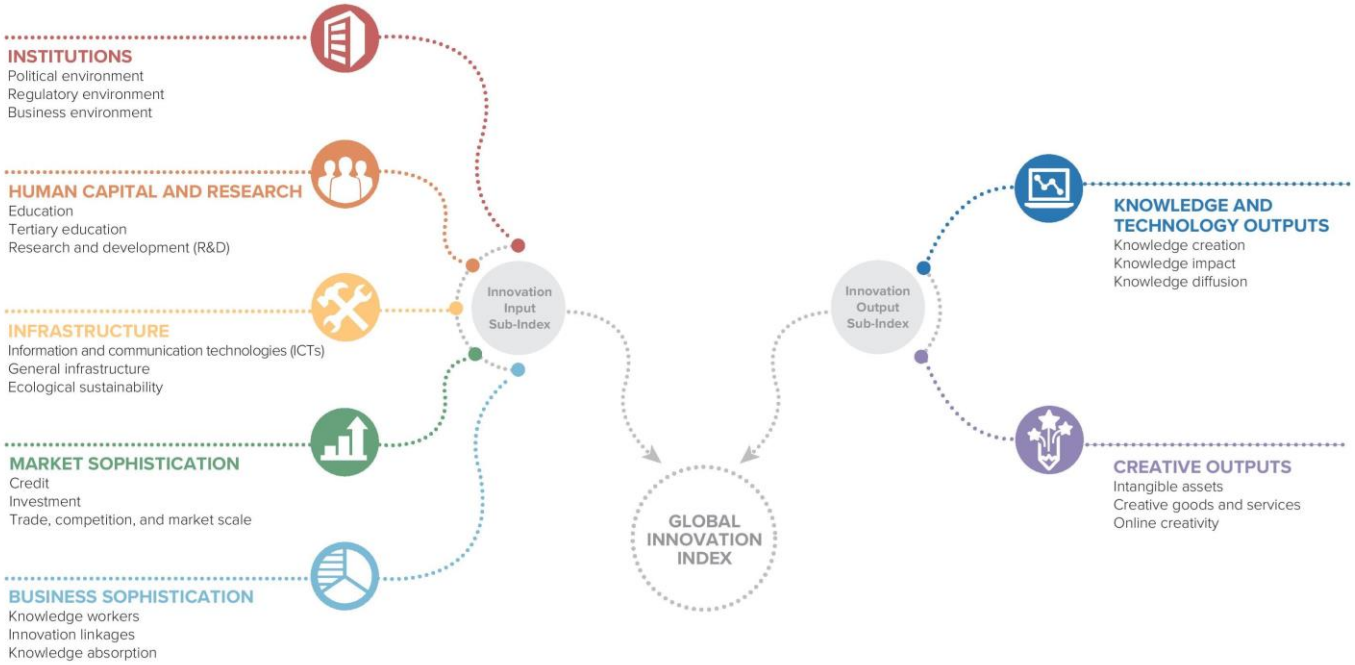
Code	Indicator name	Country year	Model year	Source
2.1.1	Expenditure on education, % GDP	2016	2018	UNESCO Institute for Statistics
2.1.3	School life expectancy, years	2010	2017	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2012	2018	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2010	2017	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2017	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
5.1.2	Firms offering formal training, %	2016	2018	World Bank
5.1.3	GERD performed by business, % GDP	2011	2018	UNESCO Institute for Statistics; Eurostat; OECD – Main Science and Technology Indicators
5.1.5	Females employed w/advanced degrees, %	2017	2018	International Labour Organization
6.1.1	Patents by origin/bn PPP$ GDP	2010	2018	World Intellectual Property Organization
6.2.5	High- and medium-high-tech manufacturing, %	2010	2017	United Nations Industrial Development Organization
7.2.2	National feature films/mn pop. 15–69	2009	2017	UNESCO Institute for Statistics
7.2.4	Printing and other media, % manufacturing	2010	2017	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 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.

Framework of the Global Innovation Index 2020



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.