Global Innovation Index 2021

PARAGUAY

88th Paraguay ranks 88th among the 132 economies featured in the GII 2021.

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 2021 is between ranks 86 and 92.

Rankings for Paraguay (2019–2021)

	GII	Innovation inputs	Innovation outputs
2021	88	90	87
2020	97	98	92
2019	95	95	94

- Paraguay performs better in innovation outputs than innovation inputs in 2021.
- This year Paraguay ranks 90th in innovation inputs, higher than both 2020 and 2019.
- As for innovation outputs, Paraguay ranks 87th. This position is higher than both 2020 and 2019.

28th Paraguay ranks 28th among the 34 upper middle-income group economies.

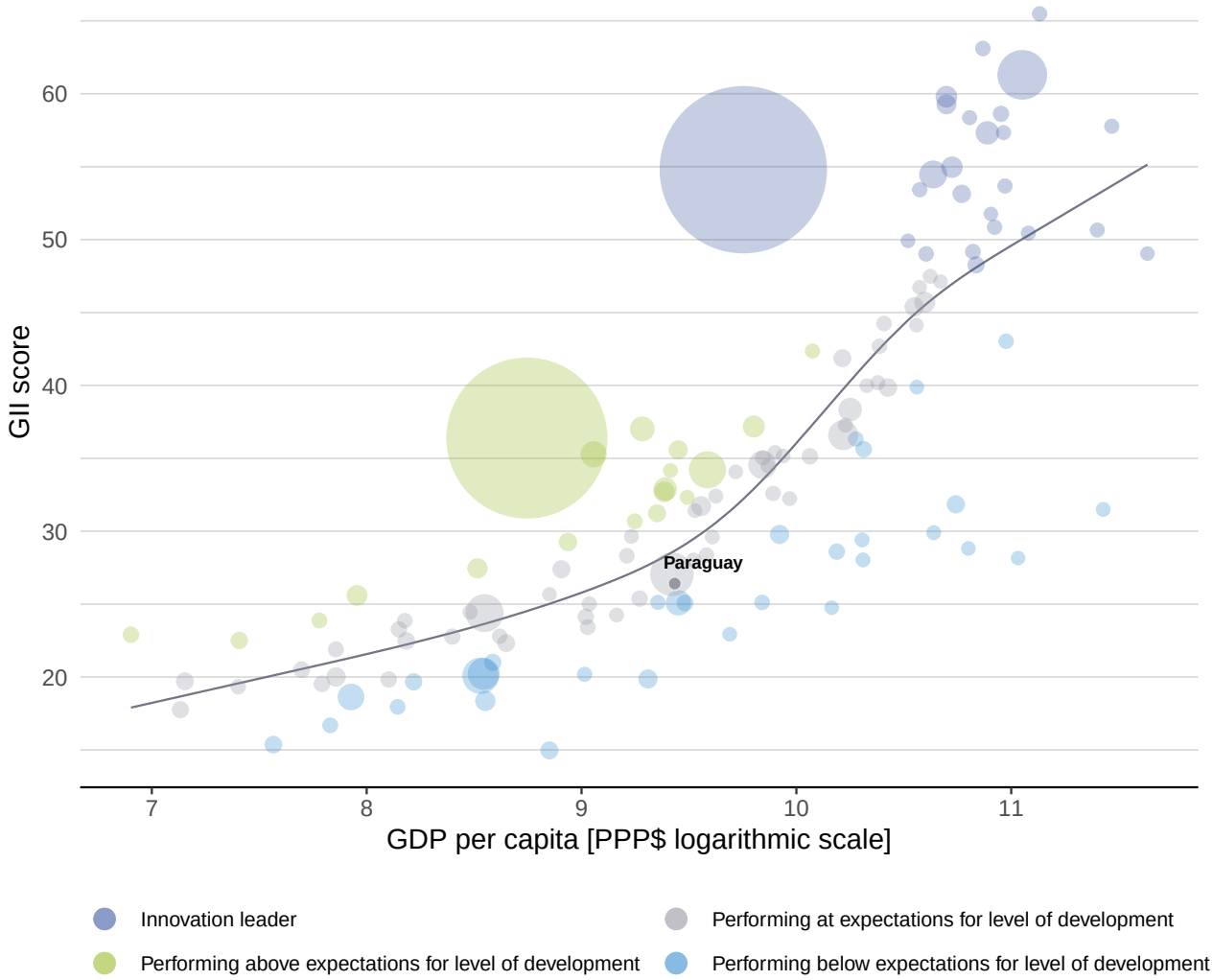
11th Paraguay ranks 11th among the 18 economies in Latin America and the Caribbean.

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 at expectations for its level of development.

The positive relationship between innovation and development

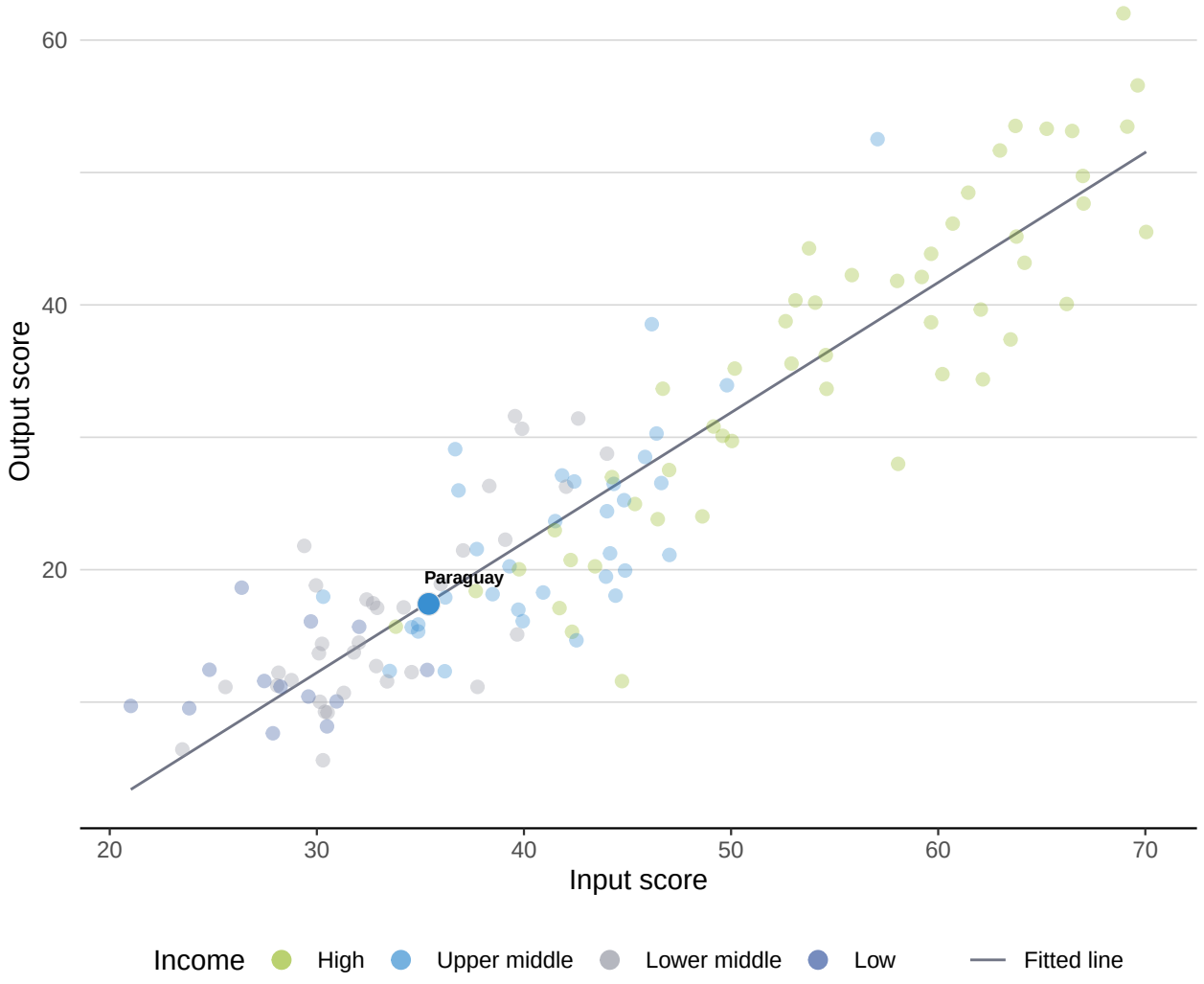


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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 less innovation outputs relative to its level of innovation investments.

Innovation input to output performance



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

The seven GII pillar scores for Paraguay

Upper middle-income group economies

Paraguay performs above the upper middle-income group average in Creative outputs.

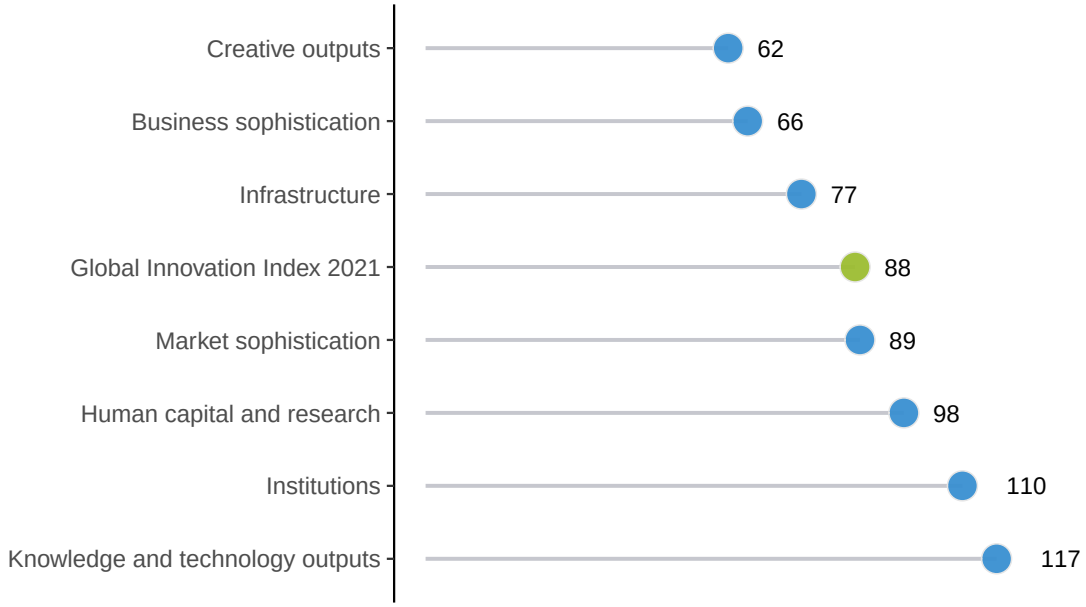
Latin America and the Caribbean

Paraguay performs above the regional average in two pillars, namely: Infrastructure; and, Creative outputs.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2021 AREAS

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

The seven GII pillar ranks for Paraguay



Note: The highest possible ranking in each pillar is one.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of Paraguay in the GII 2021.

Strengths and weaknesses for Paraguay

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
3.2	General infrastructure	61	2.3.3	Global corporate R&D investors, top 3, mn US$	41
3.2.1	Electricity output, GWh/mn pop.	29	5.1.4	GERD financed by business, %	98
3.2.3	Gross capital formation, % GDP	48	5.2.1	University-industry R&D collaboration	124
3.3.1	GDP/unit of energy use	46	5.2.5	Patent families/bn PPP$ GDP	100
4.1.3	Microfinance gross loans, % GDP	8	5.3.3	ICT services imports, % total trade	131
5.1.2	Firms offering formal training, %	21	6.1.4	Scientific and technical articles/bn PPP$ GDP	123
5.3	Knowledge absorption	39	6.3.4	ICT services exports, % total trade	126
5.3.2	High-tech imports, % total trade	6	7.1.2	Global brand value, top 5,000, % GDP	80
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	61	7.2.1	Cultural and creative services exports, % total trade	107
7.1	Intangible assets	36	7.3.4	Mobile app creation/bn PPP$ GDP	97
7.1.1	Trademarks by origin/bn PPP$ GDP	1			
7.1.3	Industrial designs by origin/bn PPP$ GDP	50			
7.2.4	Printing and other media, % manufacturing	34			

Paraguay

GII 2021 rank
88

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
87	90	Upper middle	LCN	7.1	90.7	12,503	97

		Score/ Value	Rank	
Institutions		**50.9**	**110**	◇
1.1	**Political environment**	**47.3**	**97**	◇
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	38.8	101	◇
1.2	**Regulatory environment**	**46.4**	**111**	◇
1.2.1	Regulatory quality*	38.2	85	
1.2.2	Rule of law*	32.1	98	
1.2.3	Cost of redundancy dismissal	29.4	117	
1.3	**Business environment**	**59.0**	**107**	
1.3.1	Ease of starting a business*	76.0	118	
1.3.2	Ease of resolving insolvency*	42.1	94	
Human capital and research		**19.8**	**98**	◇
2.1	**Education**	**33.8**	**108**	◇
2.1.1	Expenditure on education, % GDP	3.4	87	
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.9	84	
2.1.3	School life expectancy, years	12.2	90	◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.4	89	
2.2	**Tertiary education**	**23.8**	**[88]**	
2.2.1	Tertiary enrolment, % gross	34.6	80	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**1.8**	**97**	
2.3.1	Researchers, FTE/mn pop.	139.7	84	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	97	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	3.0	73	
Infrastructure		**38.9**	**77**	
3.1	**Information and communication technologies (ICTs)**	**59.2**	**85**	
3.1.1	ICT access*	45.0	99	◇
3.1.2	ICT use*	46.2	88	
3.1.3	Government's online service*	70.6	65	
3.1.4	E-participation*	75.0	57	
3.2	**General infrastructure**	**30.4**	**61**	●
3.2.1	Electricity output, GWh/mn pop.	7,013.9	29	● ◆
3.2.2	Logistics performance*	34.2	73	
3.2.3	Gross capital formation, % GDP	24.8	48	●
3.3	**Ecological sustainability**	**27.1**	**71**	
3.3.1	GDP/unit of energy use	12.4	46	●
3.3.2	Environmental performance*	46.4	67	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	92	
Market sophistication		**42.0**	**89**	
4.1	**Credit**	**38.5**	**75**	
4.1.1	Ease of getting credit*	40.0	113	◇
4.1.2	Domestic credit to private sector, % GDP	46.7	75	
4.1.3	Microfinance gross loans, % GDP	4.3	8	● ◆
4.2	**Investment**	**34.0**	**[53]**	
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 investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**53.6**	**111**	◇
4.3.1	Applied tariff rate, weighted avg., %	5.0	84	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	90.7	87	

		Score/ Value	Rank	
Business sophistication		**25.4**	**66**	
5.1	**Knowledge workers**	**27.7**	**80**	
5.1.1	Knowledge-intensive employment, %	18.6	83	
5.1.2	Firms offering formal training, %	46.4	21	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.4	98	○ ◇
5.1.5	Females employed w/advanced degrees, %	9.5	72	
5.2	**Innovation linkages**	**12.7**	**121**	◇
5.2.1	University-industry R&D collaboration†	24.5	124	○ ◇
5.2.2	State of cluster development and depth†	40.4	99	
5.2.3	GERD financed by abroad, % GDP	0.0	67	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	118	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**35.7**	**39**	●
5.3.1	Intellectual property payments, % total trade	0.1	98	
5.3.2	High-tech imports, % total trade	22.8	6	● ◆
5.3.3	ICT services imports, % total trade	0.0	131	○ ◇
5.3.4	FDI net inflows, % GDP	1.2	104	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**10.0**	**117**	◇
6.1	**Knowledge creation**	**3.0**	**[122]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	89	
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 and technical articles/bn PPP$ GDP	2.4	123	○ ◇
6.1.5	Citable documents H-index	4.0	114	
6.2	**Knowledge impact**	**19.4**	**108**	
6.2.1	Labor productivity growth, %	–0.7	77	
6.2.2	New businesses/th pop. 15–64	0.2	110	
6.2.3	Software spending, % GDP	0.0	105	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.5	61	●
6.2.5	High-tech manufacturing, %	15.0	76	
6.3	**Knowledge diffusion**	**7.6**	**103**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	31.1	88	
6.3.3	High-tech exports, % total trade	0.6	87	
6.3.4	ICT services exports, % total trade	0.1	126	○
Creative outputs		**24.8**	**62**	
7.1	**Intangible assets**	**41.7**	**36**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	119.2	1	● ◆
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	50	●
7.1.4	ICTs and organizational model creation†	41.8	110	◇
7.2	**Creative goods and services**	**6.4**	**[98]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	107	○
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.3	34	●
7.2.5	Creative goods exports, % total trade	0.1	111	
7.3	**Online creativity**	**9.5**	**96**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.7	85	
7.3.2	Country-code TLDs/th pop. 15–69	1.5	74	
7.3.3	Wikipedia edits/mn pop. 15–69	36.7	90	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	97	○

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 IV 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 for Paraguay

Code	Indicator name	Economy year	Model year	Source
2.1.4	PISA scales in reading, maths and science	n/a	2018	OECD Programme for International Student Assessment (PISA)
2.2.2	Graduates in science and engineering, %	n/a	2018	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.2.3	Tertiary inbound mobility, %	n/a	2018	UNESCO Institute for Statistics
4.2.2	Market capitalization, % GDP	n/a	2019	World Federation of Exchanges
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	2020	Refinitiv Eikon
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	2020	Refinitiv Eikon
4.3.2	Domestic industry diversification	n/a	2018	United Nations Industrial Development Organization
5.1.3	GERD performed by business, % GDP	n/a	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.3.5	Research talent, % in businesses	n/a	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	2020	World Intellectual Property Organization
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2019	World Intellectual Property Organization
6.3.1	Intellectual property receipts, % total trade	n/a	2019	World Trade Organization
7.2.2	National feature films/mn pop. 15–69	n/a	2017	UNESCO Institute for Statistics
7.2.3	Entertainment and media market/th pop. 15–69	n/a	2020	PwC

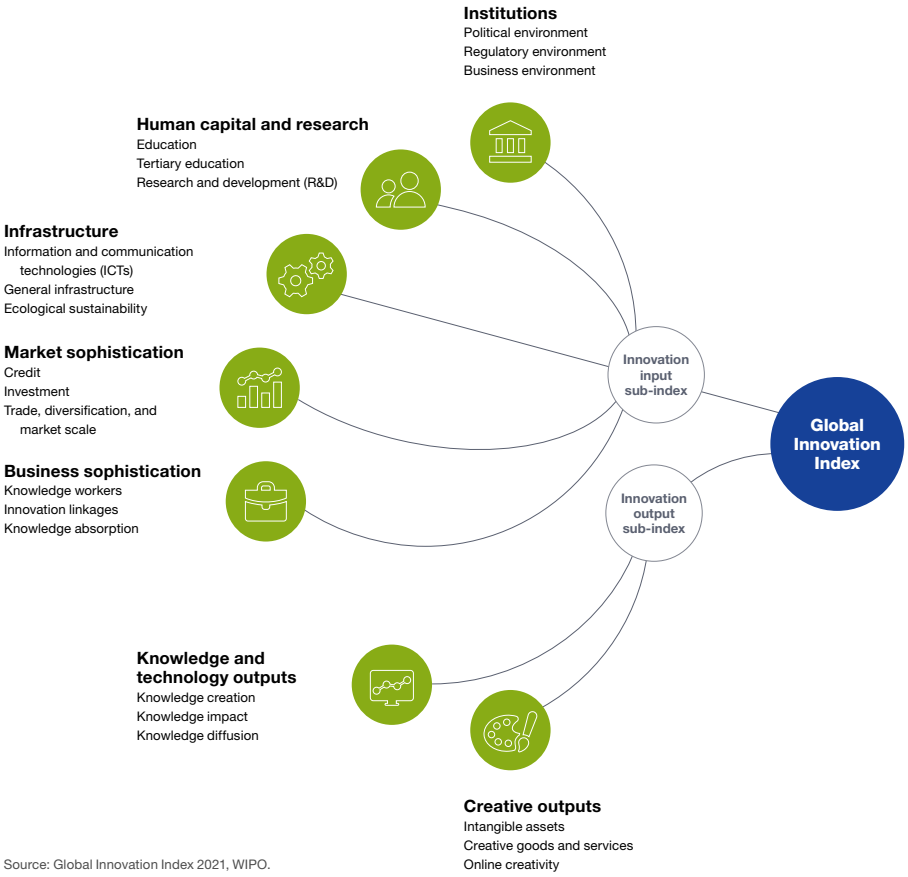
Outdated data for Paraguay

Code	Indicator name	Economy year	Model year	Source
2.1.1	Expenditure on education, % GDP	2016	2017	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	2016	2017	UNESCO Institute for Statistics
2.1.3	School life expectancy, years	2010	2018	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2012	2019	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2010	2018	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2018	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
2.3.2	Gross expenditure on R&D, % GDP	2018	2019	UNESCO Institute for Statistics; Eurostat; OECD - Main Science and Technology Indicators
5.1.2	Firms offering formal training, %	2017	2019	World Bank
5.1.5	Females employed w/advanced degrees, %	2017	2019	International Labour Organization
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	2018	2020	Refinitiv
6.1.1	Patents by origin/bn PPP$ GDP	2010	2019	World Intellectual Property Organization
6.2.5	High-tech manufacturing, %	2010	2018	United Nations Industrial Development Organization
7.1.3	Industrial designs by origin/bn PPP$ GDP	2018	2019	World Intellectual Property Organization
7.2.4	Printing and other media, % manufacturing	2010	2018	United Nations Industrial Development Organization

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is published by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations.

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.



Source: Global Innovation Index 2021, WIPO.

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.