

Colombia

Index Score **47,62**

Ranking **6**

51.874.024 / Population
 6.104,13 USD / GDP per capita
 0,32 / % allocated to R&D
 0,752 / Human Development Index (HDI)



Infraestructure Average	55,45	Data Availability AverageV	51,73	Talent Development Average	46,65
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Enabling Factors Average **51,28**

Research Average	60,05	Innovation and Development Average	14,00	Adoption Average	31,06
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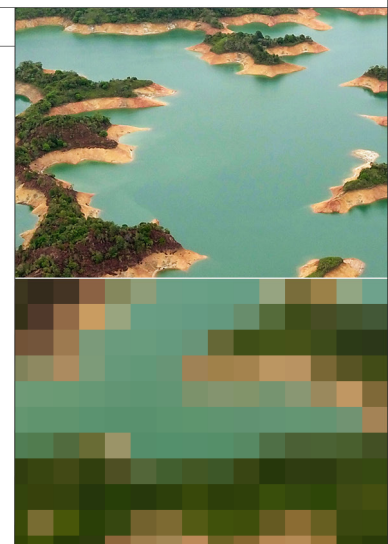
Research, Development and Adoption Average **74,46**

International Vinculation Average	75,00	Vision and Institutionalility Average	44,64	Regulation Average	100,00
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Governance Average **73,21**

OVERALL SITUATION

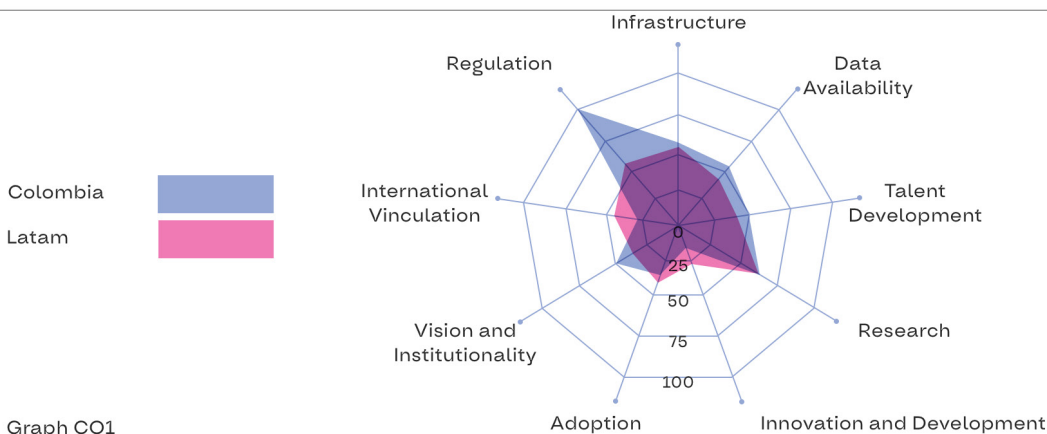
Colombia shows maturity in several aspects of its AI ecosystem, as can be seen in the areas of infrastructure, professional training and regulation. However, it also faces challenges in areas such as research, R&D, adoption and vision and institutionality. It is possible to leverage existing internal strengths and international participation to address the challenges and further boost AI development in the country by focusing on strengthening advanced human capital formation, promoting high-impact research, fostering AI adoption in companies, and increasing government spending on R&D earmarked for this technology. The migration of talent is not a significant phenomenon in the country, as is transdisciplinarity in AI, and Spain and the USA stand out as countries of destination and scientific exchange.



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Graph CO1

GENERAL FINDINGS

In terms of infrastructure, Colombia has achieved a commercial implementation of 5G technology. However, it is slightly below the regional average in internet access and average download speed. In the computing indicator, there are gaps in the number of data centers to boost development and take advantage of the potential of the cloud that has already been implemented, with a value close to the regional average. In terms of access to devices, it is above the average for the region. However, the percentage of households with computers is slightly below, which represents a challenge to overcome, mainly in rural areas. In the data barometer it obtains good results, exceeding the regional average in all indicators, especially in capabilities, being the highest score in the entire region, indicating good data availability and a solid environment for the development of AI.

In terms of talent development, Colombia has implemented AI literacy and has ICT and open courses in AI in the formal curriculum, which is positive. In the area of professional training in AI, it presents a mixed situation. It has a low level of computer science graduates compared to the Latin American average, but has undergraduate programs in universities of regionally recognized quality. In addition, it excels in disruptive technology skills in the workforce.

In terms of advanced human capital, it has a high level of Master's programs in Computer Science, which is reflected in a number of graduates well above the Latin American average. However, this number contrasts with the low number of PhD graduates in the same discipline. Promoting the training of PhDs in Computer Science or AI and equating them with Master's graduates, appears as an urgent effort to strengthen this element in Colombia.

In the field of research, it shows an outstanding performance in terms of publications, active researchers and presence of AI research centers, exceeding the regional average in these indicators. However, the impact of AI research measured in citations is a challenge to address, as it is below the regional average. In terms of Development, Colombia faces significant challenges. The number of registered patents is low and both productivity and quality of open source code are below the Latin American average.

In the area of innovation, Colombia presents an opportunity for relative improvement in terms of the number of inward investments, as it is below the Latin American average when normalized by population. The country faces challenges in terms of targeting government spending on R&D in Artificial Intelligence, which is the lowest of the countries reporting data in Latin America, despite the fact that there is a high perception of government promotion of emerging technologies.

In terms of vision and institutionalinity, Colombia has an AI strategy that is no longer current, which represents a challenge. The opportunity for updating can be seized by promoting the participation of various stakeholders, including citizens, academia, industry and civil society. At the international level, it stands out for its participation in international committees and subscription to multilateral documents that regulate AI. All this can be leveraged to strengthen and update its own AI strategy.

In terms of regulation, Colombia exhibits its maturity by having specific AI regulations and updated regulations in areas such as cybersecurity and data protection. There are also AI regulatory experimentation initiatives, which is positive. These regulations provide a solid framework for the development and responsible application of AI in the country.

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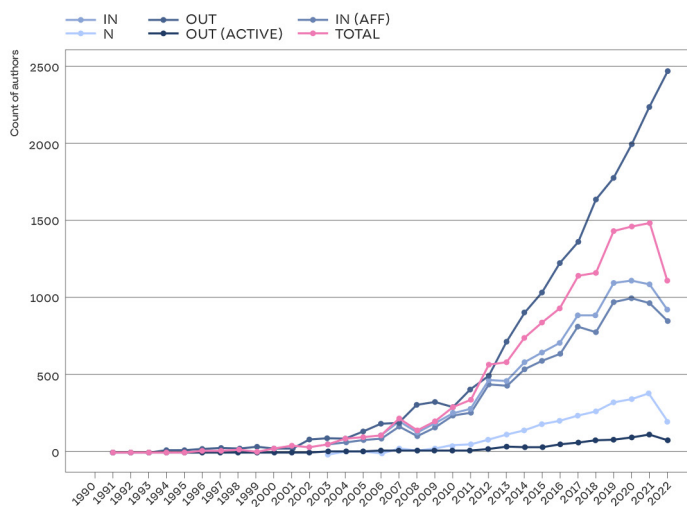
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TALENT DRAIN:

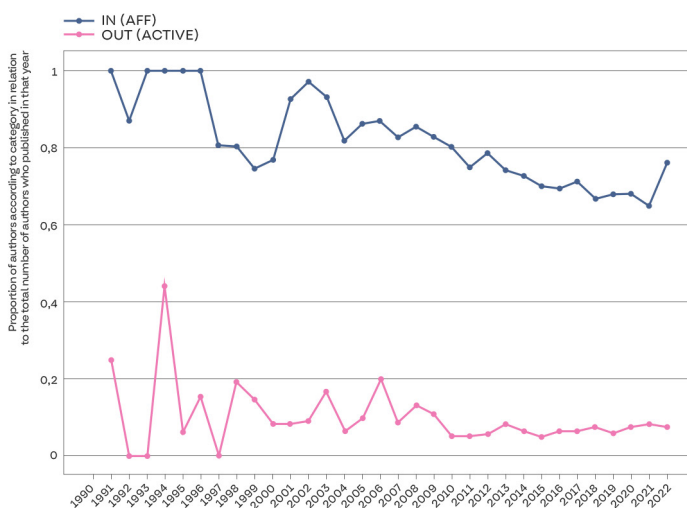
Graph CO2 shows us that the number of male and female authors was very low until 2003, but has grown steadily until 2019, especially since 2008. In this context, a marginal but constant increase can be seen for the talent drain indicator (out-active) up to 2021, but less than for the rest of the elements of analysis. As for Latin America, in 2022, we see a negative impact probably due to the pandemic for authors in AI (total).

The number of authors consistently publishing in AI has increased progressively since 2011 (N). In addition, the number of authors who published in other countries and started to publish in Colombia has increased progressively (in-aff), especially since 2011, an increase that is also reflected in the number of authors publishing for the first time in IA (In). On the other hand, since 2010 there has been a linear and very significant growth in the number of authors who integrate AI concepts in their publications (out), the trend in transdisciplinary scientific production is the same as that observed in the rest of the region (see Graph CO2).

Talent migration: Colombia / Graph CO2



Talent migration: Colombia / Graph CO3



The high variability in the first 10 years is due to the fact that the academic community was still small, so the mobility of few authors strongly impacts the proportion. The proportion of authors who had not published in the region and who do so in the year of analysis is very high and has a tendency to decrease over time (in-aff). This trend reflects a relative strengthening of the ecosystem, through a proportional increase in the number of authors who are trained and continue to publish in the country. On the other hand, we see that the proportion of talent drain is higher for Colombia than for the average for the region, especially prior to 2010, since when it has increased marginally (out-active) but remains relatively stable at around 10% (see Graph CO3).

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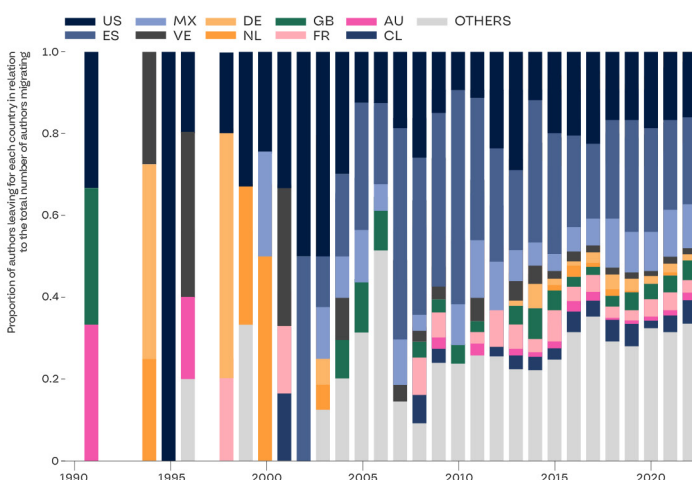
Ranking **6**

TALENT DRAIN:

Regarding the origin and destination of the authors, the importance of Spain is evident, probably due to the language affinities for both those who arrive and those who leave, even above the importance of the USA since 2005. It is important to note that the importance of both countries has been decreasing over time, a similar trajectory to that of other European countries. On the other hand, we see that the entry and exit of authors to and from China is less important than for the rest of the region. Another interesting aspect is that collaboration and destinations within Latin America are relevant for Colombia, both for those who arrive and those who leave; among them Mexico, Chile and Venezuela stand out.

The migration patterns described for arrivals are similar to those for departures, i.e., as at the regional level, most of the incoming authors come from countries to which the authors had previously left. Regarding the phenomenon of diversification of destinations, in Colombia it is becoming much more important over time, especially for those who arrive (see Graph CO4).

Talent migration: Where are the authors that published in Colombia going? / Graph CO4



Talent migration: Where are the authors that published in Colombia going? / Graph CO5

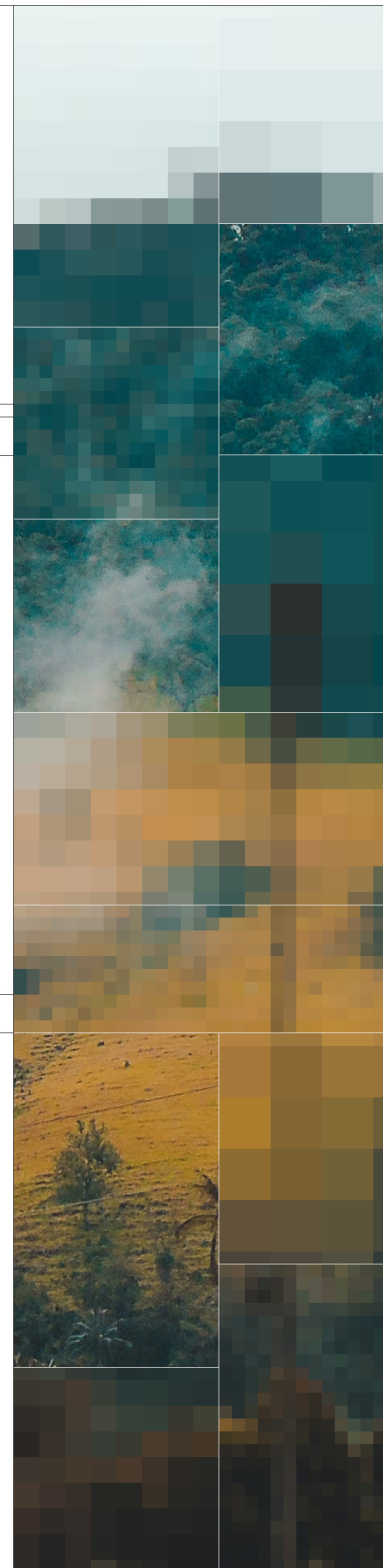
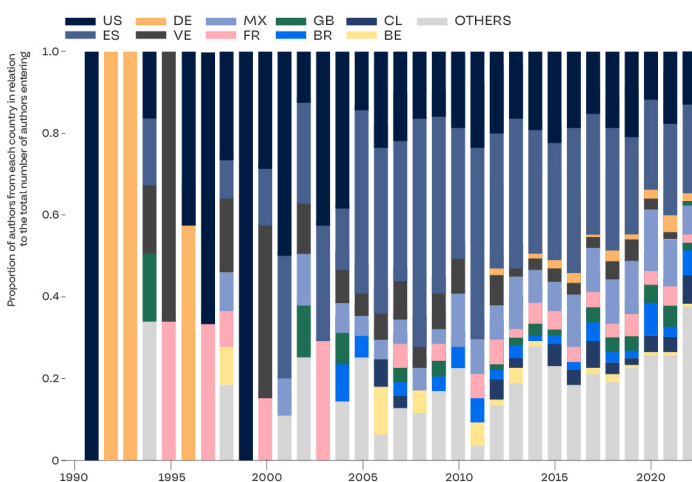


TABLE CO 1 Summary of scores and ranking in each sumdimension and indicators for Colombia

Dimension	Subdimension	Indicators	Colombia	LAC Average	Ranking
Enabling factors	Infrastructure	Conectivity	68,711	56,320	4
		Computing	30,550	33,725	7
		Devices	67,092	63,597	6
	Infrastructure average		55,451	51,214	5
	Data	Data barometer	51,737	39,800	2
	Data availability average		51,737	39,800	2
	Talent development	AI literacy	87,500	48,958	2
		AI professional formation	26,082	33,888	7
		Advanced human capital	26,392	28,053	3
	Talent development average		46,658	36,966	5
Enabling factors average		51,282	42,660	4	
Research, development and adoption	Research	Research	60,057	58,471	5
	Research average		60,057	58,471	5
	Innovation and development	Development	7,334	24,768	12
		Innovation	20,672	24,684	3
	Innovation and development average		14,003	24,726	9
	Adoption	Use of AI in companies	11,211	25,798	6
		Public promotion of AI	50,915	50,734	7
Adoption average		31,063	38,266	8	
Research, development and adoption average		35,041	40,488	7	
Governance	Vision and institutionality	AI Strategy	46,429	35,417	6
		Social involvement	0,000	21,875	5
		Institutionality	87,500	43,750	1
	Vision and institutio-nality average		44,643	33,681	6
	International vinculation average		75,000	45,833	2
	Regulation average		100,000	54,167	1
Governance average		73,210	44,560	4	
AI Index		53,180	42,615	5	