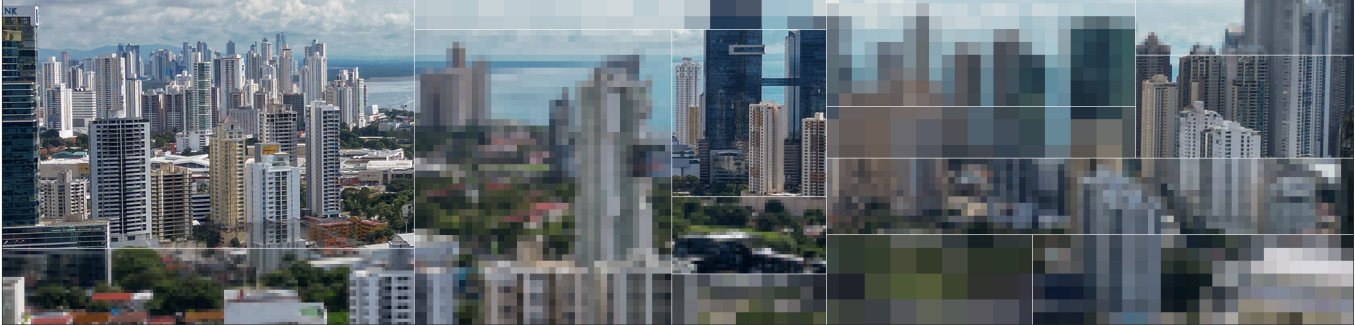


Panama

Index Score **24,66**

Ranking **9**

4.408.581 / Population
 14.617,60 USD / GDP per capita
 0,15 / % allocated to R&D
 0,805 / Human Development Index (HDI)



Infraestructure Average	47,44	Data Availability Average	31,00	Talent Development Average	16,12
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Enabling Factors Average **31,52**

Research Average	40,20	Innovation and Development Average	23,60	Adoption Average	38,59
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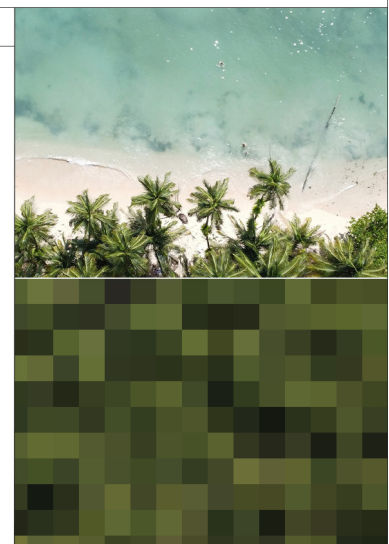
Research, Development and Adoption Average **34,13**

International Vinculation Average	0,00	Vision and Institutionalility Average	0,00	Regulation Average	25,00
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Governance Average **8,33**

OVERALL SITUATION

Panama is in a favorable position to promote the development of AI; it has the conditions to take advantage of its relatively high scientific productivity in AI and transmit this strength to other areas of the ecosystem. However, it presents challenges in different ILIA indicators, particularly in infrastructure, talent development and Innovation and Development. The governance dimension can be strengthened through the formulation of a national AI strategy with the participation and influence of all stakeholders. The migration of talent is higher than for the rest of the region and there is no diversification of scientific exchange destinations, with the USA and Spain standing out as relevant destinations and origins of scientific exchange.

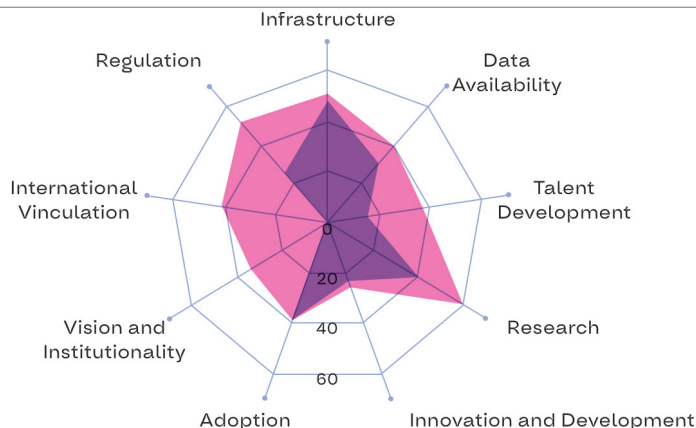


Panama

Index Score **24,66**

Ranking **9**

Panama
Latam



Graph PA1

GENERAL FINDINGS

Panama has great potential for progress in the area of connectivity. Currently, its internet usage and download speed indicators are below the Latin American average, and it has not yet implemented 5G technology nor does it have supercomputers, which contrasts with the relatively high presence of data centers, which opens up opportunities to boost artificial intelligence and the use of data. In terms of devices, Panama shows a high level of mobile device subscriptions and the percentage of households with a computer is close to the average value in the region. In relation to the Data Barometer, the country is lagging behind in comparison with Latin America, especially in the use and impact of data, this being the lowest sub-indicator in the entire region.

In terms of talent development Panama faces challenges. While it incorporates ICT training at the school curriculum level, it does not have open AI courses that are public. In addition, it lacks specific undergraduate programs in regional QS-ranked universities and there is an absence of master's and doctoral programs in computing or AI. On the other hand, it shows a level of penetration of technological skills for the workforce marginally above the average for the region.

In the field of research, Panama stands out as the country with the highest scientific productivity in AI in the last 5 years, but its academic community is relatively small. It is suggested to promote the creation of AI research centers to strengthen networks and talent development. In terms of R&D, Panama shows an excellent performance in Open Source productivity, and gaps to improve in quality of contributions to open source and number of patents. On the other hand, it ranks above the average for the region in terms of investor perception of government initiatives to promote investment in AI.

In the governance dimension, Panama has opportunities for growth. Although it lacks a national AI strategy in place, it has an outstanding scientific community, which opens the door for all stakeholders to develop a national AI strategy with support for the common good, involvement of society and multistakeholder methodology, with an institution or set of institutions in charge of its implementation. At the international level, it is not scored. It is important to improve these indicators because they offer the possibility of learning from international experiences. In terms of regulation, Panama is below the Latin American average in all sub-indicators, only with the Data Protection Law passed in 2021.

Panama

Index Score **24,66**

Ranking **9**

TALENT DRAIN:

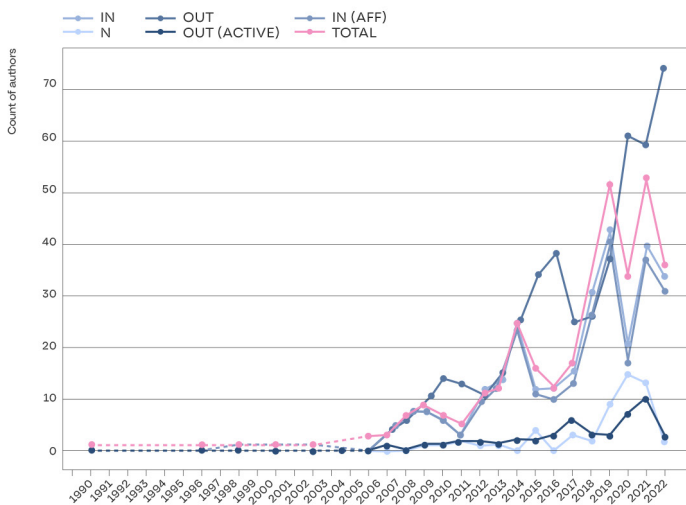
For all the graphs in the section it is important to consider that the high variability in the between 1990 and 2010 is due to the fact that the academic community was still small, so the mobility of few authors strongly impacts the proportion. In any case, it can be observed that the brain drain is proportionally greater in Panama than in the rest of the region.

We observe that the number of authors was almost zero until 2005, only exceeding 30 authors in 2018 (total). And as for Latin America, both in 2020 and 2022, we see a negative impact on all the elements measured in the graph, probably from the pandemic.

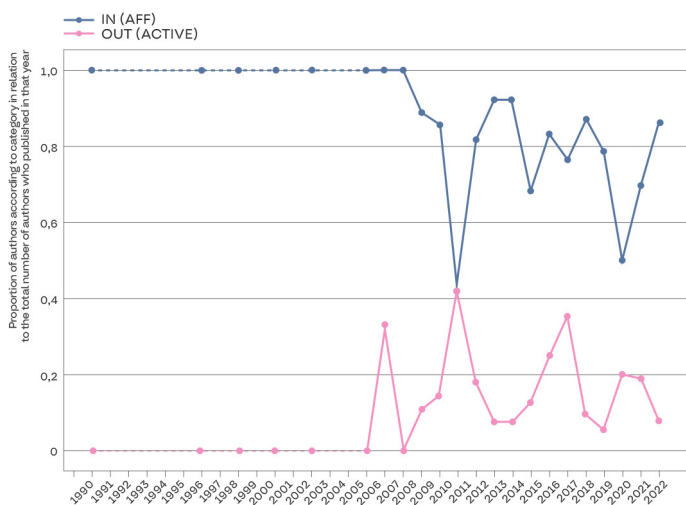
Authors who consistently publish in IA is a small group, although they have increased throughout the series, its highest year, 2019, only reaches more than 15 (N), which suggests the need for the country to strengthen its scientific community. In addition, those who published in other countries and are beginning to publish in Panama are progressively increasing (in-aff), especially since 2016, an increase that is also reflected in those publishing for the first time in IA (In).

Since 2006, the number of authors integrating AI concepts in their publications has been increasing (out), reaching 74, the highest number in the series (see Graph PA2).

Talent migration: Panama / Graph PA2



Talent migration: Panama / Graph PA3



The high variability of the series represented in graph PA3 is due to the fact that the academic community was still small, so the mobility of few authors strongly impacts the proportion. Graph PA3 shows that 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 slight tendency to decrease (in-aff). On the other hand, we see that the proportion of brain drain is higher for Panama than for the average for the region; however, it is not constant but there are years in which it has reached high levels, such as in 2011 (see Graph PA3).

Panama

Index Score **24,66**

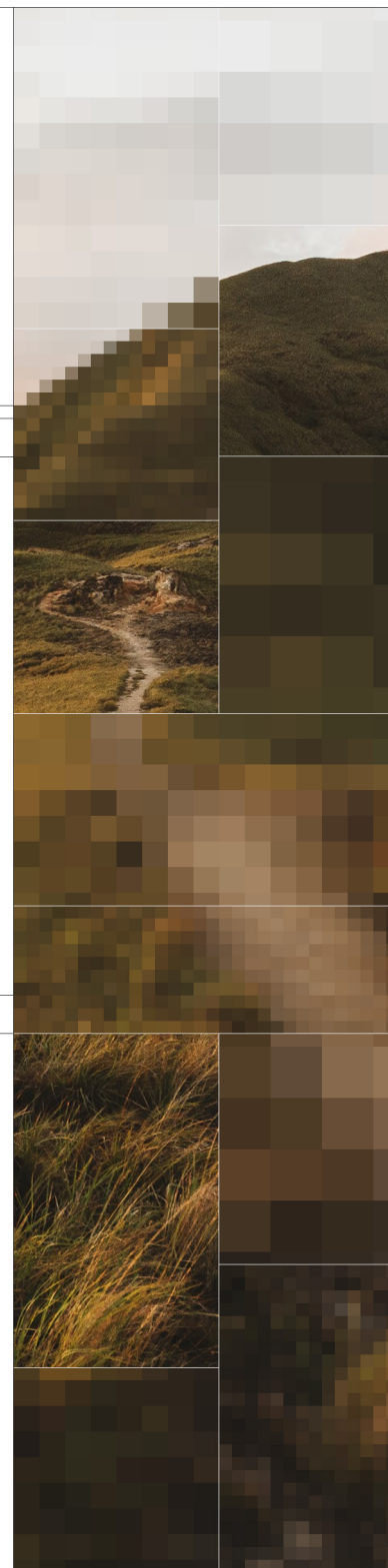
Ranking **9**

TALENT DRAIN:

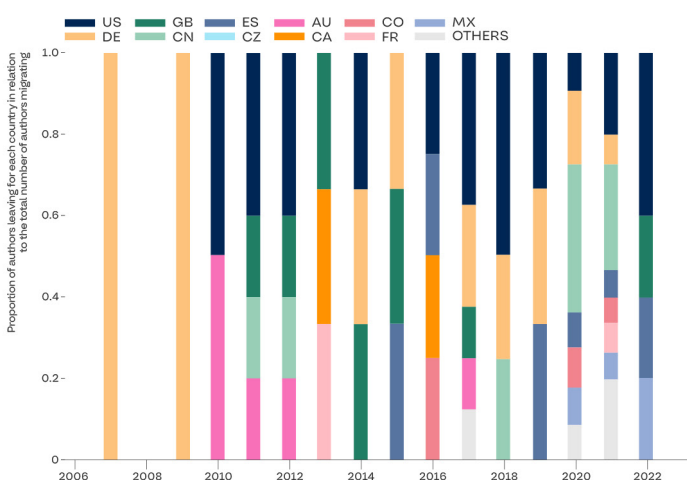
The data suggest that academic mobility is not a common phenomenon in Panama. Regarding the origin and destination of the authors, there is evidence of a relatively smaller number than in the rest of the region, the constant and progressive importance of the USA, also Spain and to a lesser extent other Latin American countries, probably due to language affinities for both those who arrive and those who leave. Other countries also appear with less relevance, such as Great Britain, Australia, Canada and Germany.

In Panama, the same phenomenon is observed in the return to the country of researchers who had migrated, i.e., the patterns of entry tend to be equivalent to those of migration, which indicates a tendency to migrate to specialize.

One of the most important differences between Panama and the rest of the region is that the phenomenon of diversification of destinations is not seen as in other countries in the region, possibly due to the low amount of scientific exchange of authors both within and outside the country (see Graph PA4).



Talent migration: Where are the authors that published in Panama going? / Graph PA4



Talent migration: Where does the authors that publish in Panama come from? / Graph PA5

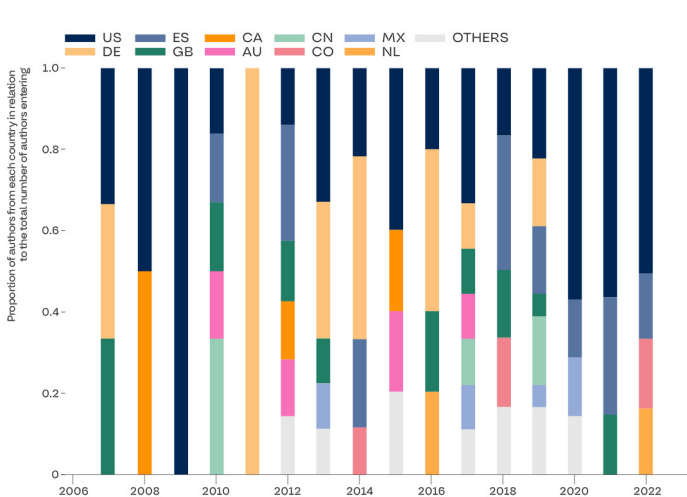


TABLE PA 1 Summary of scores and ranking in each sumdimension and indicators for Panama

Dimension	Subdimension	Indicators	Panama	LAC Average	Ranking
Enabling factors	Infrastructure	Conectivity	32,645	56,320	12
		Computing	40,414	33,725	5
		Devices	69,277	63,597	5
	Infrastructure average		47,445	51,214	9
	Data	Data barometer	31,003	39,800	9
	Data availability average		31,003	39,800	9
	Talent development	AI literacy	0,000	48,958	6
		AI professional formation	38,645	33,888	4
		Advanced human capital	9,722	28,053	12
	Talent development average		16,122	36,966	10
Enabling factors average		31,524	42,660	9	
Research, development and adoption	Research	Research	40,202	58,471	10
	Research average		40,202	58,471	10
	Innovation and development	Development	35,293	24,768	3
		Innovation	11,922	24,684	6
	Innovation and development average		23,607	24,726	5
	Adoption	Use of AI in companies	13,960	25,798	5
		Public promotion of AI	63,229	50,734	6
Adoption average		38,595	38,266	6	
Research, development and adoption average		34,135	40,488	8	
Governance	Vision and institutionality	AI Strategy	0,000	35,417	8
		Social involvement	0,000	21,875	5
		Institutionality	0,000	43,750	2
	Vision and institutio-nality average		0,000	33,681	8
	International vinculation average		0,000	45,833	4
Regulation average		25,000	54,167	4	
Governance average		8,333	44,560	9	
AI Index		24,664	42,615	9	