



**Acesso Aberto  
Angola**

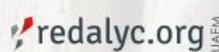
# **Internationalization of publication and collaboration of Angolan scientific journals**

Work derived from the collaborative project among Redalyc UAEM, AmeliCA, MESCTI and U. Óscar Ribas funded by UNESCO for the development of an Open Access strategy in Angola

**Project managers**

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This piece is the result of work carried out in 2021 as part of a collaborative project between UNESCO and the Redalyc Scientific Information System. The project had the collaboration of the Government of Angola through the Ministério do Ensino Superior, Ciência, Tecnologia e Inovação (MESCTI), the Universidad Autónoma del Estado de México (Mexico), AmeliCA and the Universidade Óscar Ribas (Angola), and its objective was to carry out a comprehensive diagnosis of scientific communication in Angola, a critical roadmap for the development of Open Access in the country and a series of technological developments in favor of non-commercial open scientific communication. The project resulted in a set of 38 works that are made public with the aim of contributing and influencing a technological, legal and knowledge infrastructure of non-commercial Open Access in Angola.

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## I. Introduction

The report shown below aims to present an analysis of the internationalization of Angola, specifically, based on the scientific communication that takes place in Angolan scientific journals.

This analysis starts from the consideration of internationalization as the diversity of stakeholders that participate in the generation and communication of scientific knowledge that is published in journals. From this perspective, the internationalization of the Angolan scientific journals was analyzed from three elements:

1. The recognition of journals as relevant scientific communication bodies by the scientific communities of other countries and regions: this aspect was observed through the identification of scientific production from countries other than Angola and the establishment of their relative weight with respect to the total of the scientific production published in Angolan journals.
2. The diversification of foreign scientific communities that participate in Angolan scientific journals as of publication: this aspect was observed by identifying the countries that have published in Angolan journals.
3. The diversification of international scientific collaboration networks that have published contributions in Angolan scientific journals: this aspect was observed from the characterization of international co-authorship networks that have scientific production published in Angolan journals.

The main part of the work strategy of the "Acesso Aberto Angola" project was the characterization of the Angolan scientific journals from two angles: while the report corresponding to *Diagnosis of the editorial quality of Angolan scientific journals for their consolidation and strengthening* aimed to diagnose them from their editorial practices, the present analysis seeks to characterize them from their international positioning as channels of scientific communication in their respective disciplinary fields; identifying the foreign scientific communities that have published in them and the dynamics of publication and collaboration that they have established.

This approach to internationalization in scientific journals seeks to be an alternative perspective to the usual or prevailing approach in the field of scientific communication, where the internationalization of scientific journals is conceptualized based on their presence in mainstream databases and from its position in the rankings of journals built based on citation metrics such as the Impact Factor.

This way, the present diagnosis seeks to recognize the international communication activity sustained by the Angolan scientific journals and the scientific communities that have participated in it. Likewise, this diagnosis may constitute an input of information that could result in the strengthening and positioning of the scientific journals of Angola.

## II. Synthesis of Findings

1. The scientific journals of Angola show a balance between the scientific production of foreign and national authorship, which reflects their position both internationally and nationally as organs of scientific communication. Significantly, Angolan journals have a publication flow from Latin America.
2. In its internal publication trends, the Angolan set of journals registers a balanced publication flow between the production of national scope and that of institutional scope.
3. The scientific journals of Angola register a relative balance between the scientific production of individual authorship (54%) and that which was published in co-authorship (46%). In the latter, it stands out that this responds mainly to national co-authorship, which represents 34.8%, while the scientific production resulting from international co-authorship represents 11.1%.
4. In the internal scientific collaboration, it is identified that this responds mainly to collaboration of institutional scope (29.8%) and secondly to collaboration of national scope (5.1%). From this it stands out that Angolan scientific journals are primarily oriented as scientific communication forums of Angolan scientific collaboration networks.
5. In the external scientific collaboration, this one is mainly identified between Latin American authors and those from other regions (5.1%) and, in second place, between Latin American authors from different countries (4.5%). For its part, the scientific production generated under a co-authorship scheme between authors assigned to non-Latin American countries has a relative weight of 1.5%.
6. The scientific journals of Angola show an internationalization from the perspective of publication: a significant flow of publications from abroad, mainly Latin America. From the perspective of scientific collaboration, the journals have not consolidated a global presence that attracts publication by international collaboration networks, but rather they are mainly communication forums for Angolan scientific networks.

## III. Methodological Considerations

### Identification of the Angolan scientific journals

The identification of Angolan scientific journals followed two tracks. In the first place, joint efforts with the Óscar Ribas University were made for the identification of the journals, obtaining information of 23 journals. A second way to track down Angolan journals was to search in various journal platforms, in articulation; for example, with the analysis carried out in papers *Visibility and impact of Angola in commercial circuits of scientific communication* and *Visibility and impact of Angola in Open Access scientific communication circuits*. In addition to the above, the *Revista Angolana de Ciências da Saúde* independently began its application process in Redalyc, which made it possible to have its information given the evaluation that this process implies, although

for purposes other than the diagnoses. It was in this way that the identification of the journals led to the tracking of 24 scientific journals from Angola (see table 1).

TYPE	LIST OF JOURNALS
<b>TOTAL IDENTIFIED JOURNALS</b>	-REVISTA SOL NASCENTE
	-SAPIENTIAE
	-KULONGESA
	-RAC: REVISTA ANGOLANA DE CIÊNCIAS
	-ANGOLAN MINERAL, OIL AND GAS JOURNAL
	-IPSIS VERBIS
	-TUNDAVALA: REVISTA ANGOLANA DE CIÊNCIAS
	-REVISTA ANGOLANA DE GEOCIÊNCIAS
	-REVISTA CIENTÍFICA DA CLÍNICA SAGRADA ESPERANÇA
	-REVISTA CIENTÍFICA DO ISCED-HUÍLA
	-REVISTA ANGOLANA DE EXTENSÃO UNIVERSITÁRIA
	-MULEMBA: REVISTA ANGOLANA DE CIÊNCIAS SOCIAIS
	-REVISTA ANGOLANA DE SOCIOLOGÍA
	-AGROMEIO
	-CADERNOS METROPOLITANOS
	-REVISTA MÉDICA DE ANGOLA
	-LUCERE
	-REVISTA ÓRBITA PEDAGÓGICA
	-REVISTA ANGOLANA DE CIÊNCIAS E TECNOLOGÍAS DE INFORMAÇÃO E COMUNICAÇÃO
	-REVISTA ANGOLANA DE LEGISLAÇÃO E JURISPRUDÊNCIA
	-REVISTA ANGOLANA DE CIÊNCIA POLÍTICA
	-REVISTA HONORIS
	-REVISTA MULTIDISCIPLINAR EM CIÊNCIAS SOCIAIS E HUMANAS
	-REVISTA ANGOLANA DE CIÊNCIAS DA SAÚDE

Table 1 Identified Angolan scientific journals

A second moment in the approach to the Angolan scientific journals was the distinction of those that had the technical feasibility of being diagnosed. To do this, a review of the website of the 24 identified scientific journals was carried out to determine if they had adequate interoperability conditions that would allow the gaining of their metadata for the elaboration of their respective bibliometric profiles. In this way, those journals that had an OAI protocol (Open Archive Initiative-Protocol for Metadata Harvesting) were identified, or those hosted on web platforms that allowed the harvesting of their data such as OJS (Open Journal Systems), Sistema de Información Científica Redalyc (Redalyc System of Scientific Information) or DOAJ (Directory of Open Access Journals). From the above it was derived that the resulting study universe was 9 Angolan scientific journals.

Table 2 shows the 9 scientific journals that make up the universe of study and the identification data (ISSN and publishing institution) of each one. Likewise, its website, the source of the

obtained metadata of its production and the scientific discipline to which they adhere -which was assigned according to the disciplinary categorization proposed by Redalyc<sup>1</sup> are detailed.

ISSN	NAME	INSTITUTION	WEB ADDRESS	DISCIPLINE	SOURCE
2708-2989	ANGOLAN MINERAL, OIL AND GAS JOURNAL "AMOGJ"	INSTITUTO SUPERIOR POLITÉCNICO DE TECNOLOGIAS E CIÊNCIAS (ISPTEC) E UNIVERSIDADE CATÓLICA DE ANGOLA	<a href="https://www.amogj.com/index.php/home">https://www.amogj.com/index.php/home</a>	NATURAL SCIENCES	OJS
2664-259X	RAC: REVISTA ANGOLANA DE CIÊNCIAS	ASSOCIAÇÃO MULTIDISCIPLINAR DE INVESTIGAÇÃO CIENTÍFICA	<a href="http://publicacoes.scientia.co.ao/ojs2/index.php/rac">http://publicacoes.scientia.co.ao/ojs2/index.php/rac</a>	MULTIDISCIPLINAR Y	DOAJ
2789-2832	REVISTA ANGOLANA DE CIÊNCIAS DA SAÚDE	EQUIPO MULTIDISCIPLINARIO DE PROFESIONALES DE LA SALUD, DOCENTES E INVESTIGADORES NACIONALES (ANGOLA)	<a href="https://www.racsaude.com/index.php/racsaude">https://www.racsaude.com/index.php/racsaude</a>	HEALTH	OJS
2707-5400	REVISTA ANGOLANA DE EXTENSÃO UNIVERSITÁRIA	ESCOLA SUPERIOR PEDAGÓGICA DO BENGO	<a href="https://portalpensador.com/index.php/RAEU-BENGO">https://portalpensador.com/index.php/RAEU-BENGO</a>	EDUCATION	OJS
2789-3138	REVISTA ANGOLANA DE GEOCIÊNCIAS	CENTRO DE INVESTIGAÇÃO DE CIÊNCIAS GEOLÓGICAS APLICADA, DA UNIVERSIDADE AGOSTINHO NETO	<a href="http://www.cicguan.co.ao/revista/index.php/RAG">http://www.cicguan.co.ao/revista/index.php/RAG</a>	GEOSCIENCES	OJS
2709-8931	REVISTA CIENTÍFICA DO ISCED-HUÍLA	INSTITUTO SUPERIOR DE CIÊNCIAS DE EDUCAÇÃO DA HUÍLA	<a href="https://portalpensador.com/index.php/RCIH">https://portalpensador.com/index.php/RCIH</a>	EDUCATION	OJS
2409-0131	REVISTA ÓRBITA PEDAGÓGICA	INSTITUTO SUPERIOR DE CIÊNCIAS DE EDUCAÇÃO DO HUAMBO	<a href="http://revista.isced-hbo.ed.ao/rop/index.php/ROP">http://revista.isced-hbo.ed.ao/rop/index.php/ROP</a>	EDUCATION	DOAJ
2304-0688	REVISTA SOL NASCENTE	CENTRO DE INVESTIGAÇÃO SOL NASCENTE: INSTITUTO SUPERIOR POLITÉCNICO SOL NASCENTE DO HUAMBO	<a href="https://www.ispsn.org/revista-sol-nascente">https://www.ispsn.org/revista-sol-nascente</a>	MULTIDISCIPLINAR Y (SOCIAL SCIENCES)	OJS
2183-5063, 2184-061X	SAPIENTIAE	UNIVERSIDADE ÓSCAR RIBAS	<a href="http://publicacoes.uor.ed.ao/index.php/sapientiae">http://publicacoes.uor.ed.ao/index.php/sapientiae</a>	MULTIDISCIPLINAR Y (SOCIAL SCIENCES)	REDALYC

Table 2 Angolan scientific journals that constitute the universe of study

## Information retrieval from the Angolan scientific journals

In the retrieval of the information of each journal, OJS was required for six of them and DOAJ for other two (see table 2). In both cases, an automatic process was carried out to infer institutional and country affiliation information from the scientific production. In this regard, it stands out that, in both platforms, a significant part of the scientific production could not be linked to at least one

<sup>1</sup> Redalyc proposes a categorization of 3 areas of knowledge and 37 scientific disciplines, based on which it catalogs the scientific journals that index and generate bibliometric information on the scientific production published in them. See <https://www.redalyc.org/>

form of institution or country to establish its origin. For this reason, it was not possible to use 100% of the scientific production of these journals, so the indicators presented refer to only a part of said scientific production published in each one of them. For its part, Redalyc was needed in the case of the remaining journal (see table 2), since it has indexing in such a system and, consequently, its production has mostly standardized information. In all cases, the information consultation was carried out during the month of September 2021.

Of the nine journals analyzed, the metadata of 510 scientific articles published in 32 fascicles could be downloaded; in this regard, only 39.2% of the scientific production (200 articles) could be accessed. Henceforth, it is this universe of study that is referred to in the analysis. In turn, in the scientific production, 1,446 forms of author were identified and the ascription of 32.8% could be known. On the other hand, 340 forms of institution were identified and only 35% could be linked to a country for reasons of information availability. See table 3 where the information that could be downloaded is detailed at metadata level regarding journal, issue, articles, author forms and institutions of the set of 9 analyzed scientific journals.

DATA	TOTAL	# RETRIEVABLE	% RETRIEVABLE
<b>JOURNALS</b>	9	-	-
<b>FASCICLES</b>	32	-	-
<b>ARTICLES</b>	510	198	38.8%
<b>FORMS OF AUTHOR</b>	1,446	474	32.8%
<b>INSTITUTIONS</b>	340	119	35.0%

Table 3 General data and normalization of the universe of study for the analyzed set of 9 scientific journals

The foregoing takes a different perspective if the universe of useful or recoverable information is displayed at the journal level. See table 3, where the information that could be downloaded is detailed at metadata level regarding journal, issue, articles, forms of author and institutions of each of the analyzed scientific journals.

In this respect, it stands out that the journal *Sapientiae* is the one that shows the highest percentage of useful information: the data from 82.7% of the articles, 88.1% of the authors and 96.4% of the institutions could be inferred. The second journal with the highest percentages of available information is *Angolan Mineral, Oil and Gas Journal "AMOGJ"*, with 63.6% of the articles, 59.7% of the author forms and 34.6% of the institutions, which was obtained by OJS. It should also be noted the case of the *Revista Angolana De Ciências Da Saúde*, given that, although the metadata of a part of its scientific production could be accessed via OJS, the forms of author could not be associated with at least one institution and, in consequently, to a country; therefore, the indicators for this journal could not be generated.

JOURNAL	TOTAL			RETRIEVABLE %		
	#ARTS.	#AUTHOR FORMS	#INST.	%ARTS.	%AUTHOR FORMS	%INST.
<b>ANGOLAN MINERAL, OIL AND GAS JOURNAL</b>	11	211	26	63.6%	59.7%	34.6%

<b>RAC: REVISTA ANGOLANA DE CIÊNCIAS</b>	40	73	46	37.5%	27.4%	28.3%
<b>REVISTA ANGOLANA DE CIÊNCIAS DA SAÚDE</b>	7	36	11	0.0%	0.0%	0.0%
<b>REVISTA ANGOLANA DE EXTENSÃO UNIVERSITÁRIA</b>	34	176	37	8.8%	6.8%	8.1%
<b>REVISTA ANGOLANA DE GEOCIÊNCIAS</b>	22	272	34	31.8%	20.6%	11.8%
<b>REVISTA CIENTÍFICA DO ISCED-HUÍLA</b>	10	42	9	20.0%	14.3%	11.1%
<b>REVISTA ÓRBITA PEDAGÓGICA</b>	204	307	61	27.5%	28.0%	27.9%
<b>REVISTA SOL NASCENTE</b>	78	152	61	30.8%	7.9%	31.1%
<b>SAPIENTIAE</b>	104	177	55	82.7%	88.1%	96.4%
<b>TOTAL</b>	510	1,446	340	38.8%	32.8%	35.0%

*Table 4 General data and normalization of the universe of study for the analyzed set of 9 scientific journals*

## **Analysis Methodology: methodology for the evaluation of science in Diamond Open Access**

The internationalization of Angolan scientific journals was approached from the analysis of 3 aspects:

1. The recognition of journals as relevant scientific communication bodies by the scientific communities of other countries and regions: this aspect was observed through the identification of scientific production from countries other than Angola and the establishment of their relative weight with respect to the total of the scientific production published in Angolan journals.
2. The diversification of foreign scientific communities that participate in Angolan scientific journals as of publication: this aspect was observed by identifying the countries that have published in Angolan journals.
3. The diversification of international scientific collaboration networks that have published contributions in Angolan scientific journals: this aspect was observed from the characterization of international co-authorship networks that have scientific production published in Angolan journals.

The above constitute elements that were taken up from the Diamond Open Access Science Assessment Methodology (Aguado-López, Becerril-García, Macedo-García, Godínez-Larios & González-Morales, in press), which proposes a framework for the analysis of Scientific production published in Diamond Open Access scientific journals, although it can be applied to any set of bibliometric information with an adequate metadata structure and with a standardized catalog of entities that allows its association.

The methodology addressed is comprehensive and relational, so it can be applied to different entities: author, institution, journal, country, discipline, area and scientific article. In turn, the Methodology has two approaches: one regarding research performance (Who generates scientific knowledge? Under what dynamics do they do it?) And another regarding editorial performance (How is scientific knowledge communicated by journals? Under what dynamics is it published?). It is to the second approach perspective that the present analysis resorts to.

On the other hand, among the different indicators that the Diamond Methodology for the evaluation of science in Open Access proposes, two stand out, to which the present analysis make use of:

1. Publication: “this indicator refers to the dynamics of knowledge generation of the different analysis entities by identifying the scientific production they publish. The objective of this indicator is to account for the publication dynamics over time of the actors, as well as how the publication flows. For this, some components of the present indicator are considered, such as External Publication (which refers to publication in other countries) and Internal Publication (publication within each country). In turn, these components distinguish specific origins such as institutional publication or in different geographical regions” (Aguado-López, Becerril-García, Macedo-García, Godínez-Larios & González-Morales, In press).
2. Collaboration: “this indicator aims to identify the patterns of scientific collaboration that give rise to the generation of scientific knowledge, specifically, from co-authorship. In order to identify the types and scope of collaboration networks, this indicator considers components such as external collaboration (co-authorship between researchers from different countries) and internal collaboration (co-authorship between researchers assigned to the same country). Likewise, in order to arrive at a geographic specificity of the collaboration networks, these components distinguish specific scopes of the networks, such as institutional and national collaboration, one where different Latin American countries participate, one where Latin America interacts with other regions, and one where researchers from different non-Latin American countries engage” (Aguado-López, Becerril-García, Macedo-García, Godínez-Larios & González-Morales, in press).

In a synthetic way, the analysis proposal of *Metodología para la evaluación de la ciencia en Acceso Abierto diamante*, in its approach perspectives, indicators and application entities, is represented graphically as shown in figure 1.

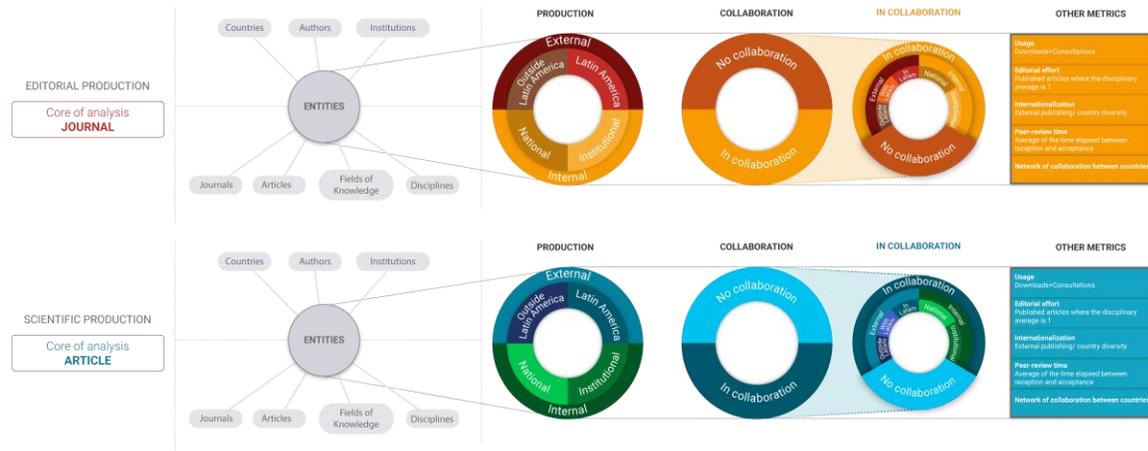


Figure 1 Methodology for the evaluation of science in Diamond Open Access. Source: Aguado-López, Becerril-García, Macedo-García, Godínez-Larios & González-Morales (in press)

Specifically, the diagnosis focuses on identifying the scientific collaboration and publication practices of Angolan scientific journals, emphasizing the international communities that have published in them and the scientific collaboration networks that have published scientific contributions in those as well. The analysis period is concentrated between 2014 and 2021, since it is the time in which the scientific journals maintained editorial activity, or from which the metadata could be recovered

## IV. Internationalization of the Angolan scientific journals

### Scientific publication trends

#### Publication trends of scientific journals as a whole

From the information that could be identified from the scientific journals of Angola, a relative balance between the scientific production from abroad and that from Angola stands out: 55.4% corresponds to External Production and 44.6% to Internal Production. In this, a significant flow of scientific articles from Latin America sticks out, a region that has contributed 44.6% of what is published in Angolan journals; while the articles of the rest of world regions represent 10.8%. On the other hand, in the Internal Production a balance between that coming from publishing institutions (23%) and that coming from other Angolan institutions (21.6%) catches the eye.

From another perspective, Angolan scientific journals show a balance between the scientific production of foreign authorship and of national authorship, which reflects their position both

internationally and nationally as organs of scientific communication. Significantly, Angolan journals have a publication flow from Latin America. In its internal publication trends, the Angola set of journals shows a balanced publication current between national and institutional production (see figure 2).

As graphically represented in figure 2, each of the scientific journals shows particular publication parameters. For example, it highlights that, in terms of External Production, there are journals where this represents 100% of the identified scientific production (in the case of *Angolan Mineral, Oil and Gas Journal "AMOGJ"* and *Revista Científica do ISCED-Huíla*) or has a predominant relative weight (this is the case of *Sapientiae* and *Revista Angolana de Extensão Universitária*).

On the other hand, trends of publication by journal are documented with an orientation to internal publication. For example, in the journals *Revista Órbita Pedagógica* (75.4%), *Revista Angolana de Ciências* (66.7%) and *Revista Angolana de Geociências* (62.5%), scientific articles by Angolan authors have the highest relative weight within the total of published scientific production that was identified. See figure 2, where the publication trends of Angolan scientific journals as a whole and individually are graphically represented.

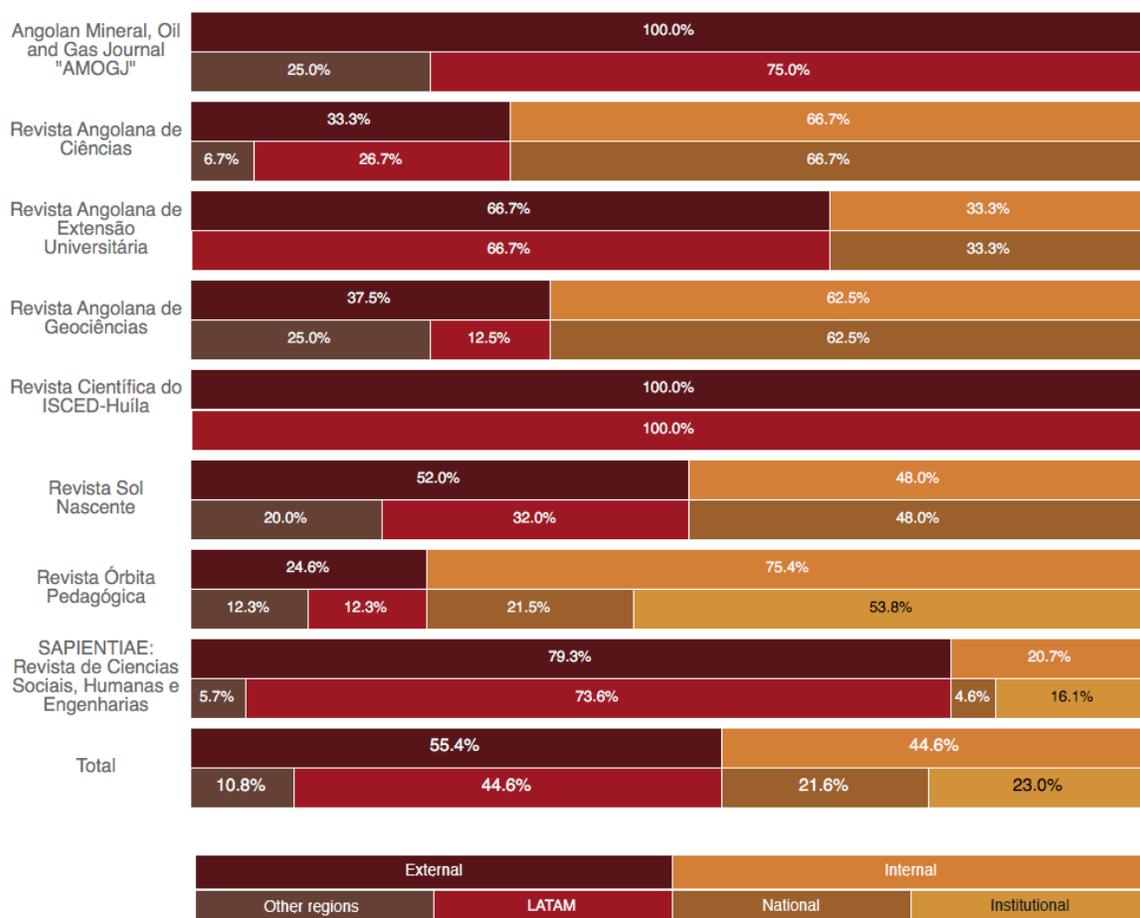


Figure 2 Scientific publication trends of Angolan scientific journals

The following sections provide an overview of the international publication trends of each of the Angolan scientific journals.

### **International publishing trends: Revista Sol Nascente**

52% of the scientific production published in the journal comes from abroad, while 20% comes from Europe, specifically, from Spain and Portugal. The years in which the publication of such countries is recorded in *Sol Nascente* are 2017, 2019, 2020 and 2021 (see figure 3).



Figure 3 International publishing trends, outside Latin America: Revista Sol Nascente

For its part, 32% of the scientific production published in *Sol Nascente* comes from Latin American countries. The totality of this identified scientific production comes from Brazil, from which a recognition of the journal by the academic communities of Brazil is concluded (see figure 4).



Figure 4 International publishing trends, Latin America: *Revista Sol Nascente*

### **International publishing trends: *Revista Angolana de Extensão Universitária***

In the identified information regarding the scientific production published in the *Revista Angolana de Extensão Universitária*, there is no presence of foreign scientific communities, except in the case of Cuba, the country from which 66.7% of the identified scientific production of this journal comes from and dates from 2019 and 2020 (see figure 5).



Figure 5 International publishing trends, Latin America: *Revista Angolana de Extensão Universitária*

### **International publishing trends: Angolan Mineral, Oil and Gas Journal "AMOGJ"**

100% of the scientific production identified in the *Angolan Mineral, Oil and Gas Journal* comes from other countries. In this, 25% is constituted by scientific articles of European authorship. As figure 6 is represented, this type of scientific production is signed by Portugal and the United Kingdom, and accounts for a recent publication trend, given that such scientific articles register 2020 and 2021 as years of publication.



*Figure 6 International publishing trends, outside Latin America: Angolan Mineral, Oil and Gas Journal "AMOGJ"*

It is in Latin America that the *Angolan Mineral, Oil and Gas Journal* has its main international academic community of authors: 75% of the scientific production published comes from Latin American countries, mainly from Brazil and, secondly, from Mexico. It is important to note that the scientific journal charges for APC, which highlights that the Brazilian, Mexican, Portuguese and English communities that have published in the journal have adhered to a gold-APC Open Access scheme to publish their results of research in the field of studying mineral and fossil resources (see figure 7).



Figure 7 International publishing trends, Latin America: Angolan Minera, Oil and Gas Journal "AMOGJ"

### **International publishing trends: Revista Científica do ISCED-Huíla**

100% of the scientific production identified in the *Revista Científica do ISCED-Huíla* corresponds to External Production of Latin American origin. As graphically represented in figure 8, External Production comes from Brazil. This publication flow and, in general, the significant publication current from Brazil to Angolan scientific journals can be explained from the linguistic link between both Lusophone countries, although it highlights the relevance of pertinent inquiries that allow characterizing this link of publication.



Figure 8 International publishing trends, Latin America: *Revista Científica do ISCED-Huíla*

### **International publishing trends: Revista Angolana de Geociências**

In the scientific production from abroad that has been published in the *Revista Angolana de Geociências*, 25% is by Spanish authorship (see figure 9).



Figure 9 International publishing trends, outside Latin America: *Revista Angolana de Geociências*

For its part, the flow of publication in the *Revista Angolana de Geociências* from Latin America represents 12.5% of the total production and comes from Brazil (see figure 10).



Figure 10 International publishing trends, Latin America: *Revista Angolana de Geociências*

## **International publishing trends: Revista Órbita Pedagógica**

The *Revista Órbita Pedagógica* has a publication profile mainly oriented towards internal publication, with 24.6% being scientific production coming from abroad. In this, it is documented that 12.3% comes from Europe, with a concentration from Portugal. This flow of publication expresses, in another case, the strong link between Portugal and Angola in terms of scientific publication (see figure 11).



Figure 11 International publishing trends, outside Latin America: *Revista Órbita Pedagógica*

Outside of Portugal, the *Revista Órbita Pedagógica* has built a significant position in Latin America, a region that has contributed 12.3% of the total published in the journal. This trend has the particularity of showing a diversification among the countries that have contributed the Latin American external scientific production identified in *Órbita Pedagógica*, since 4 countries of authorship are documented: Brazil, Ecuador, Cuba and Chile (see figure 12).

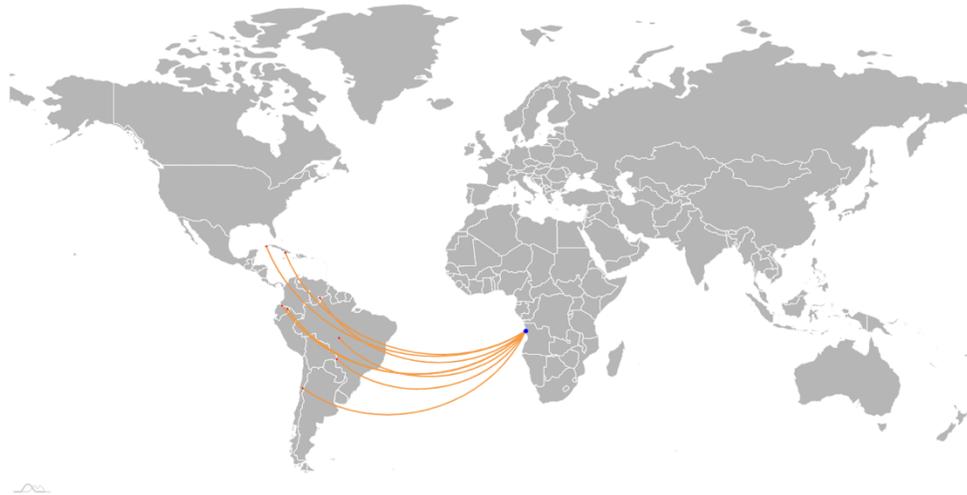


Figure 12 International publishing trends, Latin America: *Revista Órbita Pedagógica*

### **International publishing trends: *Revista Angolana de Ciências***

33.3% of the scientific production documented in the *Revista Angolana de Ciências* comes from abroad. Portugal registers a participation that represents only the 6.7%.



Figure 13 International publishing trends, outside Latin America: *Revista Angolana de Ciências*

The *Revista Angolana de Ciências* registers a more significant publication flow from Latin America, given that 26.7% of the production published in the journal comes from this region, specifically from Brazil and Venezuela (see figure 14). An aspect that stands out in the identification in the internationalization of each scientific journal, together with the linguistic links,

is the thematic link between Angola and the diversity of scientific communities that have published in each of the Angolan scientific journals. This aspect stands out for its need to be investigated in depth in future research, since it can offer perspective on the international strengthening and consolidation of the analyzed journals.



Figure 14 International publishing trends, Latin America: Revista Angolana de Ciências

### **International publishing trends: Sapientiae: Revista de Ciências Sociais, Humanas e Engenharias**

*Sapientiae* registers a publication profile oriented mainly overseas, with 79.3% of its scientific production participating researchers assigned to abroad. It should be noted that 5.7% of the total scientific articles published in the journal are authored by Australia, the United States and Portugal (see figure 15), a diversified origin compared to that registered by the rest of the analyzed Angolan scientific journals.



Figure 15 International publishing trends, outside Latin America: *Sapientiae*

For its part, most of the scientific production identified in *Sapientiae* (73.6%) corresponds to scientific articles of Latin American authorship. This publication flow shows the greatest diversification of countries that publish in an Angolan journal as documented in this analysis, given that scientific production from 8 countries is identified: Mexico, Venezuela, Ecuador, Cuba, Brazil, Colombia, Costa Rica and Argentina (see figure 16).



Figure 16 International publishing trends, Latin America: *Sapientiae*

One aspect that should be highlighted in the characterization of the international publication identified in *Sapientiae* is that it is the journal from which the most information was retrieved at the metadata level according to its collection. It follows that the internationalization that is documented of the journal in terms of scientific publication is explained, in part, by the availability

and retrievability of the journal's information, a characteristic that is fulfilled to a lesser extent in the other Angolan scientific journals that were analyzed.

## **Scientific collaboration trends**

### ***Collaboration trends of scientific journals as a whole***

From the information that could be identified from the scientific journals of Angola, it stands out from the group of journals that there is a relative balance between the scientific production of individual authorship (54%) and that which was published in co-authorship (46%). In the production of the latter, it stands out that it responds mainly to internal co-authorship, which represents 34.8%, while the scientific production resulting from international co-authorship represents 11.1%.

Specifically, in the Internal Collaboration it is identified that this responds mainly to collaboration of institutional scope (29.8%) and secondly to collaboration of national scope (5.1%). On the other hand, in external collaboration, the mainly identified joint efforts are those between Latin American authors and authors from other regions (5.1%) and, in second place, between Latin American authors from different countries (4.5%). For its part, the scientific production generated under a co-authorship scheme between authors assigned to non-Latin American countries has a relative weight of 1.5%.

On an individual level, Angolan scientific journals show particular tendencies regarding the presence of co-authored scientific production and the scientific production of individual authorship that they publish. Likewise, in the scope of scientific collaboration networks that have been captured from multiple authorship production. See figure 17, where the trends in scientific collaboration of Angolan scientific journals as a whole and individually are graphically represented.

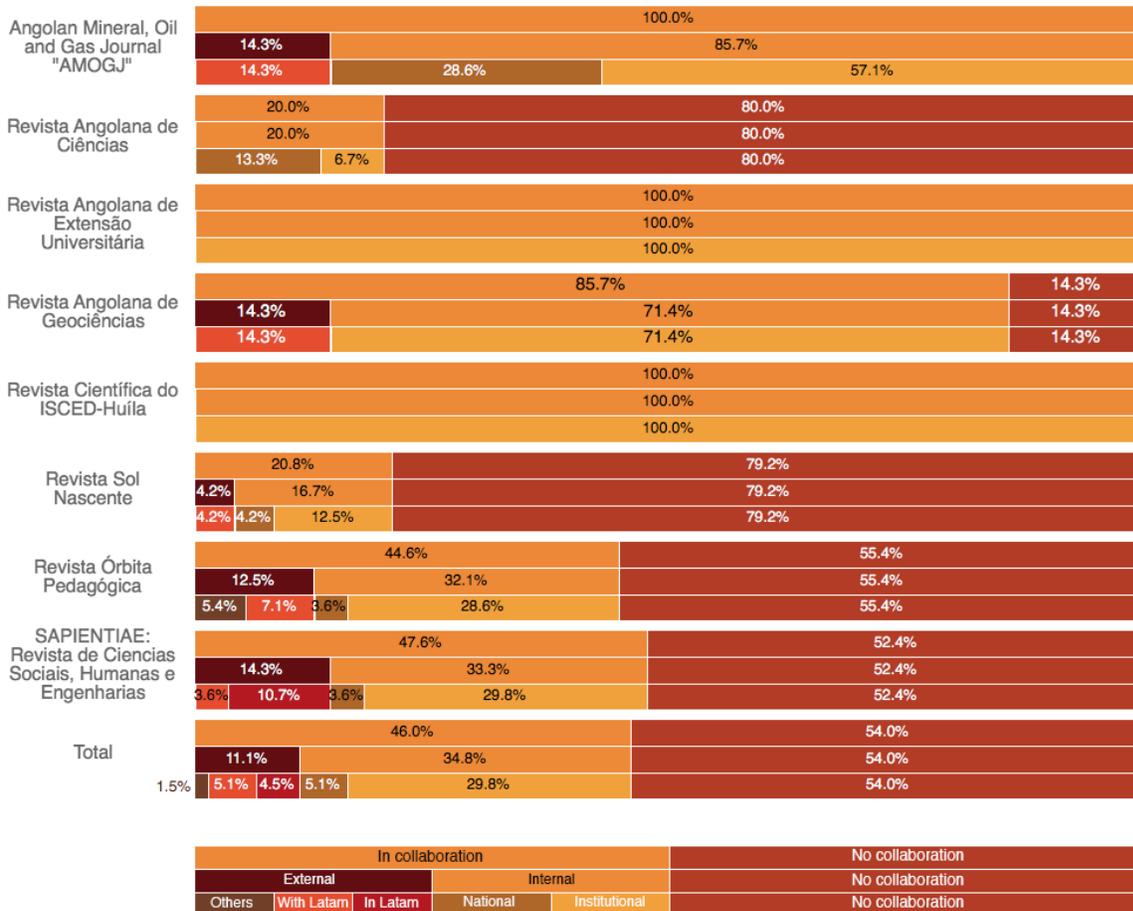


Figure 17 Scientific collaboration trends of Angolan scientific journals

The following sections offer a perspective on the international collaboration trends of each of the Angolan scientific journals.

### Trends in international scientific collaboration: Revista Sol Nascente

The scientific production published in the *Revista Sol Nascente* mainly accounts for individual work that is reflected in articles by a single authorship. For its part, scientific production resulting from scientific collaboration represents 20.8% and, specifically, scientific production resulting from international collaboration represents 4.2% of the total published in the journal. In the international collaboration networks that have published their findings in the *Revista Sol Nascente*, the interaction between academics from Brazil and Spain is recorded (see figure 18). This international interaction took place in 2017.

In the characterization of international scientific collaboration based on the journal, the flow that the generation of documented knowledge followed in this case stands out: an interaction at the research level between Europe (Spain) and Latin America (Brazil), which gave rise to a scientific product published in Africa (Angola). This perspective accounts for the diversity of approaches from which internationalization in the scientific field can be approached.

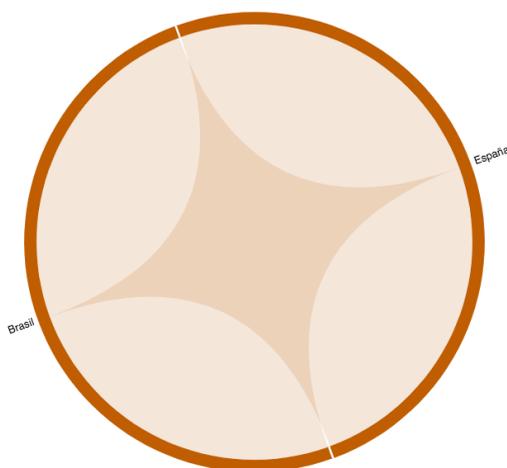


Figure 18 International collaboration trends, with Latin America: Revista Sol Nascente

### **Trends in international scientific collaboration: Revista Angolana de Extensão Universitária**

The *Revista Angolana de Extensão Universitária* does not record trends of international scientific collaboration in the scientific production that has been published in it.

### **Trends in international scientific collaboration: Angolan Mineral, Oil and Gas Journal "AMOGJ"**

The *Angolan Mineral, Oil and Gas Journal* records the peculiarity that the total of scientific articles published in it documented correspond to scientific production resulting from a co-authorship scheme. In this, 14.3% corresponds to international scientific collaboration, where the interaction between Mexico and Portugal is identified (see figure 19). This international interaction took place in 2021.

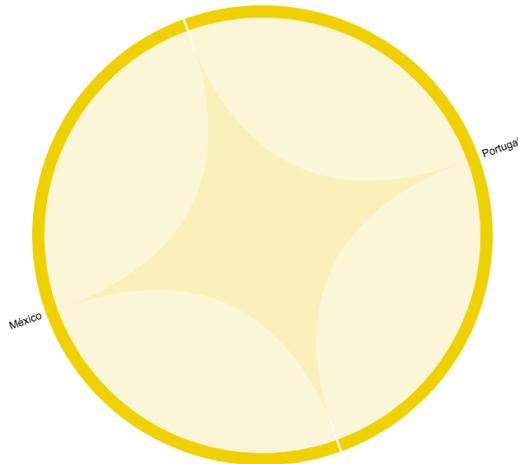


Figure 19 International collaboration trends, with Latin America: Angolan Mineral, Oil and Gas Journal "AMOGJ"

### **Trends in international scientific collaboration: Revista Científica do ISCED-Huíla**

The *Revista Científica do ISCED-Huíla* does not record trends of international scientific collaboration in the scientific production that has been published in it.

### **Trends in international scientific collaboration: Revista Angolana de Geociências**

The total scientific production derived from scientific collaboration published in the *Revista Angolana de Geociências* shows international co-authorship, specifically, between Brazil and Angola (see figure 20), which took place in 2020. It should be retaken, as it is represented in figure 17, that the *Revista Angolana de Geociências* constitutes mainly a forum for communication of scientific production derived from Angolan networks of scientific collaboration, whose production has a weight of 71.4% in the total published (and identified) in the journal.

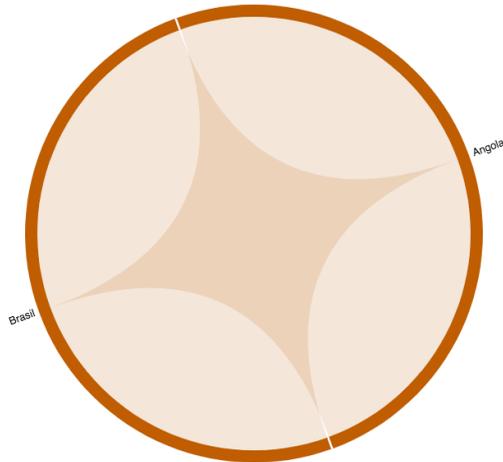


Figure 20 International collaboration trends, with Latin America: Revista Angolana de Geociências

### Trends in international scientific collaboration: Revista Órbita Pedagógica

In the published scientific production identified in the *Revista Órbita Pedagógica*, the articles resulting from international collaboration represent 12.5%. In this set of scientific production, the collaboration between Portugal and Angola gave rise to scientific production whose relative weight is 5.4% with respect to the total (see figure 21). This international interaction took place in 2015 and 2016.

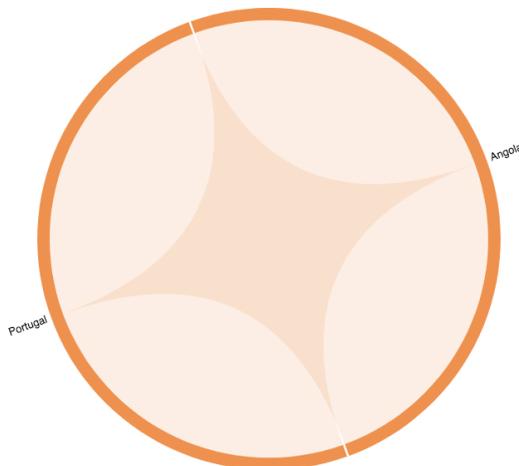


Figure 21 International collaboration trends, outside Latin America: Revista Órbita Pedagógica

On another side, the *Revista Órbita Pedagógica* has also served as a communication channel for scientific findings resulting from the collaboration between Angola and Latin American countries: Cuba, Chile and Brazil (see figure 22), whose resulting scientific production has a relative weight of 7.1% with respect to the total.

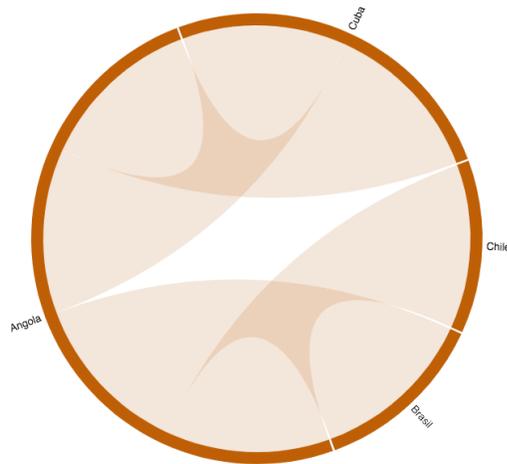


Figure 22 International collaboration trends, with Latin America: *Revista Órbita Pedagógica*

### **Trends in international scientific collaboration: *Revista Angolana de Ciências***

The *Revista Angolana de Ciências* does not record trends in international scientific collaboration in the scientific production that has been published in it.

### **Trends in international scientific collaboration: *Sapientiae: Revista de Ciências Sociais, Humanas e Engenharias***

*Sapientiae* records that scientific articles derived from international collaboration represent 14.3% of the total published in the journal. Two types of international scientific networks stand out, one of them is the interaction between Latin America, specifically Mexico and Brazil, with the United States and Australia (see figure 23), whose interaction gave rise to scientific production whose weight is 3.6% of the total published in the journal.

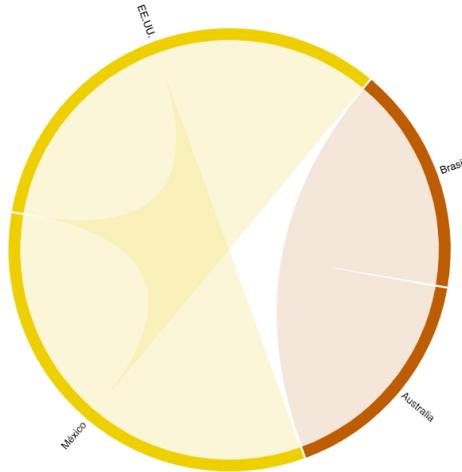


Figure 23 International collaboration trends, with Latin America: *Sapientiae*

A second type of scientific collaboration networks identified in *Sapientiae* is between Latin American countries: Mexico, Colombia, Ecuador, Brazil and Venezuela, whose interaction gave rise to scientific production whose weight is 10.7% of the total published in the journal.

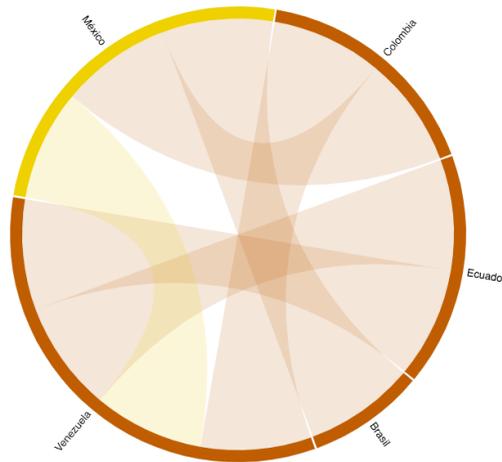


Figure 24 International collaboration trends, in Latin America: *Sapientiae*

## V. Recommendations

1. The internationalization documented in Angolan scientific journals from the perspective of international publication and international collaboration (and in general, the diversity of publication trends and scientific collaboration that was identified), shows the limitation of

having information with significant restrictions regarding its availability, recoverability and reuse, given that scientific journals and platforms do not have adequate metadata management that allows comprehensive and exhaustive bibliometric analysis to be carried out. It was highlighted that, among other factors, some journals register a diversity of trends and stakeholders in terms of publication and collaboration, since they are those from which more information could be retrieved from their collection. This way, it is suggested to establish strategies that allow the retrieval of information at the metadata level of Angolan scientific journals. One possible way to do so could be their inclusion in Redalyc and AmeliCA.

2. A formal and permanent effort to track and monitor Angolan scientific journals is suggested, first of all, to have an exhaustive knowledge of their profiles and of the stakeholders and communities that participate in them as of publication.
3. It is recommended to comprehensively promote the consolidation of Angolan scientific journals with regard to their editorial practices and with regard to their visibility, so that the internationalization practices that were documented enhance their global recognition as consolidated communication bodies in their respective fields of knowledge.

## References

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