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► **To cite this version:**

Hélène Prost, Joachim Schöpfel. The Contribution of the Global South to Open Access. Ulrich Herb; Joachim Schöpfel. Open Divide. Critical Studies on Open Access, Litwin Books, pp.99-115, 2018, 978-1-63400-029-1. hal-04683750

HAL Id: hal-04683750

<https://hal.univ-lille.fr/hal-04683750v1>

Submitted on 2 Sep 2024

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The Contribution of the Global South to Open Access

Hélène Prost and Joachim Schöpfel

What is the actual contribution of the Global South to the open access movement? Do open repositories and academic journals in open access change the situation of unequal scientific production? The question is quite simple but the answer isn't, and this for three reasons. Monitoring open access is still a problem, and despite useful and efficient directories and discovery tools, nobody can provide reliable information on the content in open access. Also, because of their bias in favour of great research countries like the United States, UK, Germany or France, emerging countries and the Global South in general are less visible and underrepresented in these tools. Finally, the very term of Global South is fuzzy; what exactly is the Global South? The following chapter tries to provide some empirical elements for a better understanding of the situation.

A map of global inequality

The map of global knowledge production is a map of global inequality (Figure 1). The production and exchange of scientific papers is dominated by some major research-intensive countries, nearly all located in the Northern hemisphere. Is this map destiny? Laura Czerniewicz who analysed the underlying, inequitable global power dynamics is convinced that this situation must be confronted and can be challenged. She also suggests that “the open access movement needs to broaden its focus from access to knowledge to full participation in knowledge creation and in scholarly communication”²⁷.

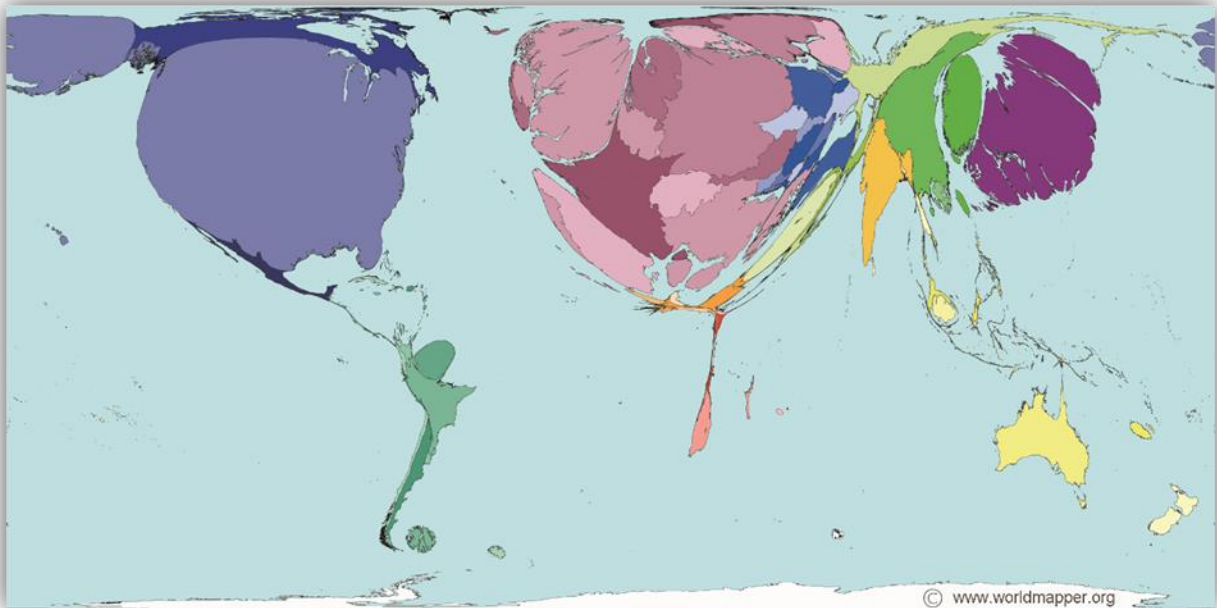


Figure 1. Scientific papers published in 2001²⁸

What is the actual contribution of the Global South to the open access movement? Do open repositories and academic journals in open access change the situation of unequal scientific production?

The question is quite simple but the answer isn't, and this for three reasons. Monitoring open access is still a problem, and despite useful and efficient directories and discovery tools, nobody can provide reliable information on the number of articles in open repositories or open access journals, and even less in other categories of scientific literature such as grey literature. Also, because of their bias in favour of great research countries like the United States, UK, Germany or France, emerging countries and the Global South in general are less visible and underrepresented in these tools. Finally, the very

term of Global South is fuzzy; what exactly is the Global South? Where are the frontiers with the North? Our selection of 101 countries (Figure 2) is based on economic data from the World Trade Organization and the World Bank Group (1), and we exploited the country information provided by the Elsevier's scientometric database (Scopus), the Directory of Open Access Repositories (OpenDOAR), the Directory of Open Access Journals (DOAJ), the Bielefeld Academic Search Engine (BASE), and the Registry for Research Data Repositories (re3data) run by DataCite. All data were gathered in March 2017.

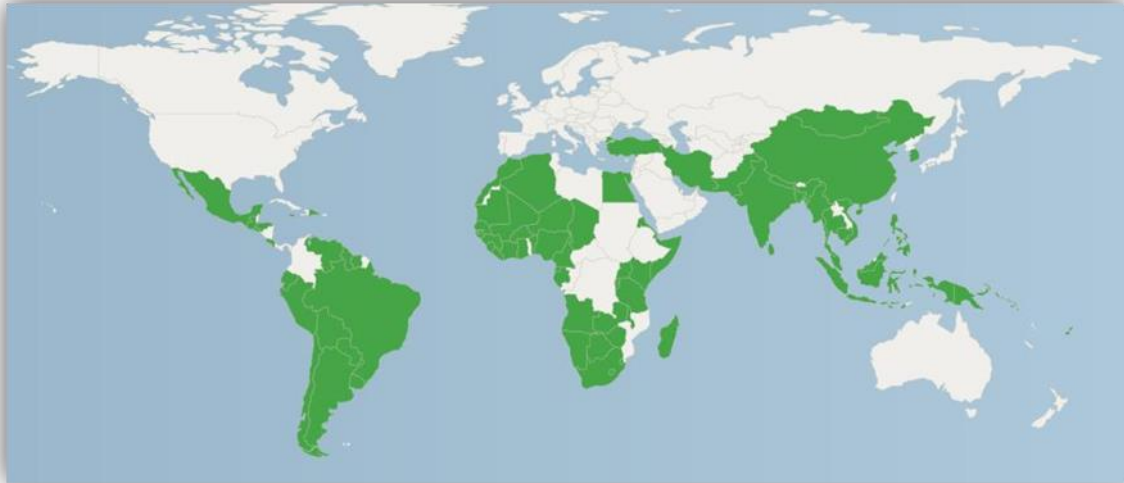


Figure 2. The Global South countries in our study (N=101)

Because of the data sources (WTO and World Bank Group), a couple of smaller and some major countries were missing in the original list of 99 countries, above all/especially Algeria and Iran. Both were added to our sample.

Global and open production

In March 2017, the Bielefeld Academic Search Engine (BASE) indexed more than 107m documents from 5,300 providers. 43m items are freely available on Internet, that is, indexed as open access. Only 2.6m or 6% of these open access items are provided from the Global South countries, from three countries in particular namely Brazil, India and Indonesia, which together represent nearly 60% of the Global South items in open access (Figure 3). On the other hand, 55 Global South countries are not indexed in BASE and their open access publications remain virtually inexistent and invisible.

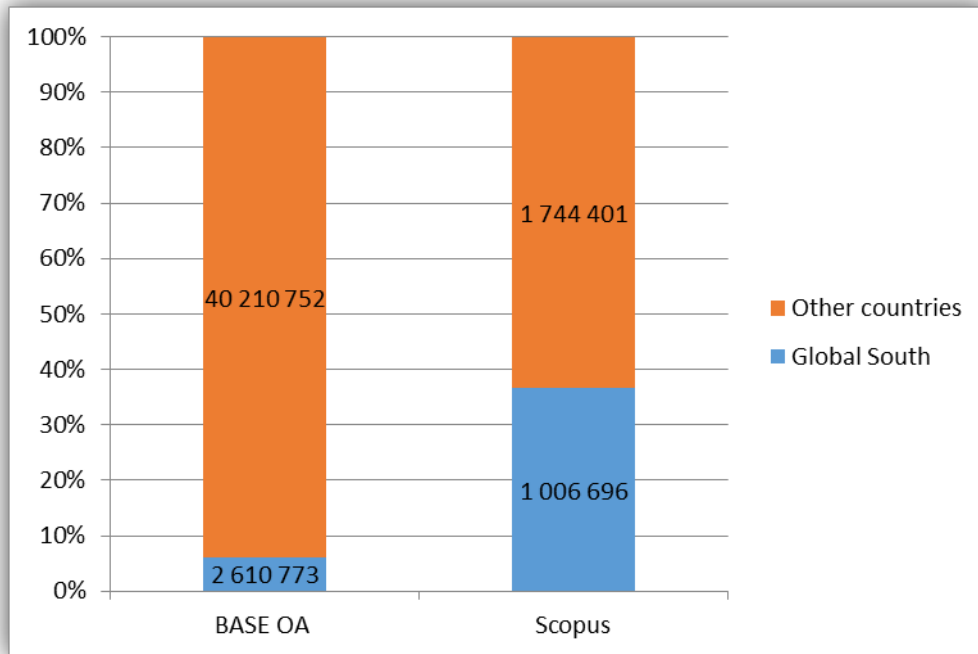


Figure 3. Global South academic output in BASE (open access, cumulative) and Scopus (2016)

Compared to the Scopus database, this percentage seems far too low. One third (1m) of the 2016 scientific output referenced by Scopus comes from the Global South, and this output is dominated by China, India and South Korea which represent 68% of the whole Global South while one third of the Global South countries are without any or with a very low output (<100). This discrepancy between 6% (BASE open access) and 37% (Scopus 2016) is due much to the nearly complete absence of Chinese open access papers in BASE. But it may also be that the European, North American or Japanese open access publications are better represented because of the rapid increase of Gold open access with article processing charges (APCs) in the Northern Hemisphere, which is so far without a counterpart in the Global South. When considering only the 2016 content of BASE, the share of the Global South increases to 10%, which appears to reflect a growing importance of their contribution to international science.

Open repositories

The BASE Figures provide information about the number of documents but do not tell anything about projects, initiatives, the gold or the green road. What do we know about the green road, that is, open repositories? In March 2017, the OpenDOAR database contains 3,335 repositories of which 63% are hosted by organisations in Europe and North America. Only 795 repositories (24%) are in the Global South, with a strong concentration in four countries - 40% of the repositories from the Global South are in Brazil, India, Indonesia and Turkey.

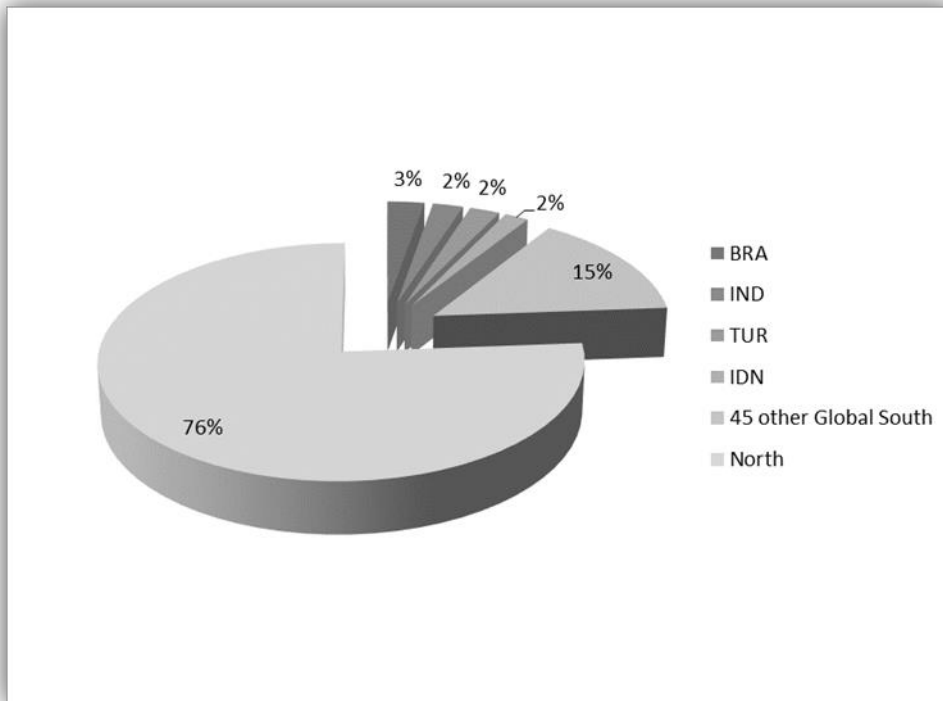


Figure 4. Open repositories in Global South countries

As for the other countries the major part of these repositories are institutional repositories, launched and maintained by universities and research organisations. Many of them are run with the MIT DSpace software, a smaller part with Greenstone, developed and distributed in cooperation with UNESCO and the Human Info NGO, with EPrints (University of Southampton) and, especially in South America, with the SciELO platform. As for the content, the share of grey literature, in particular theses and dissertations, seems higher than in Europe or North America where published journal articles prevail.

Another difference is the relative importance of languages other than English – Spanish and Portuguese in South America; Chinese, Turkish, Indonesian, Korean and Arabic in Asia and the Middle East; and French and Arabic in Africa. However, English remains by far the most important language in open repositories and the Lingua Franca of scientific research also in the Global South.

Open access journals

What do we know about the gold road, that is, open access journal publishing in the Global South? First of all, one third of the open access journals are edited in Global South countries. In Figures: in March 2017 the DOAJ directory registers 9,400 titles, and 3,685 are edited in one of the 101 countries of our list (39%). Again, a small number of countries dominate the market, that is, Brazil (10%), Iran (8%), Egypt (6%) and Indonesia (6%), followed by India and Turkey (each with 3%) (Figure 5). However, recent studies reveal that these Figures are probably too low and that especially Chinese institutions and publishers edit many more journals in open access than the DOAJ shows (7).

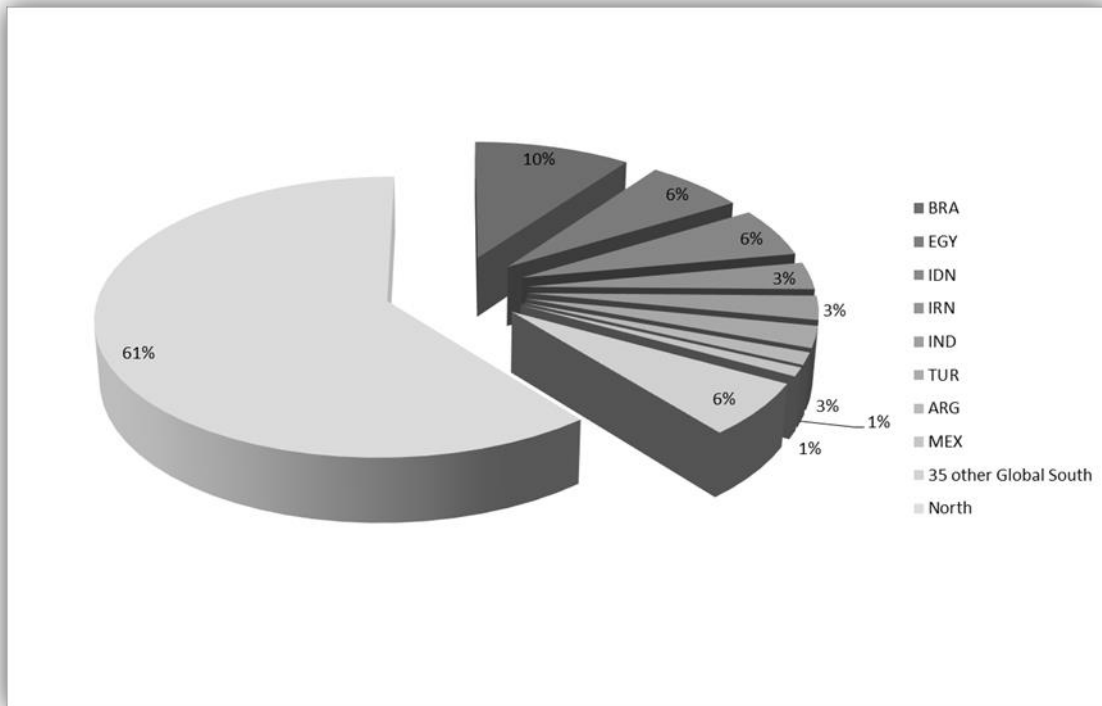


Figure 5. Open access journals in Global South countries

Another look reveals different situations – while in Brazil, Indonesia and Iran most of the journals are published by institutions or learned societies and do not apply APCs, in Egypt commercial open access publishing with APCs prevails (71%). In India and Turkey, most journals do not inform about their APC policy. The situation was quite different until 2016, when DOAJ removed 3,000 titles and applied a new and more selective policy. Many of the removed titles were edited by Indian publishers suspected of predatory publishing (2).

Data repositories

In the context of Open Science, data repositories are becoming increasingly important. Nearly all – 94% - of the data repositories listed in the re3data directory are open and can provide open access to research data. Can – because not all of the data in open repositories are freely available due to privacy concerns, intellectual property issues etc. Re3data is the most comprehensive directory of data repositories worldwide but because of its funding background it is (still) dominated by four countries, the US, Germany, the UK and Canada which represent 81% of the repositories and 71% of all registered institutions (5). For many other countries data are simply not available, especially in Africa, South America, the Middle East and South-East Asia.

So it may be even more surprising that among the 2,579 data repositories indexed by re3data we can find all the same 113 repositories from the Global South (4%); 109 of them are open. These repositories are hosted in 23 countries, led by China (32), India (30) and Mexico (11). Again, the small number can probably best be explained by the delayed uptake of the re3data initiative outside Western Europe and North America; however, lack of data infrastructures and security in many countries surely contribute to the situation.

Correlations

Our Figures show so far a contrasted landscape, with large disparities between the different variables (Figure 6).

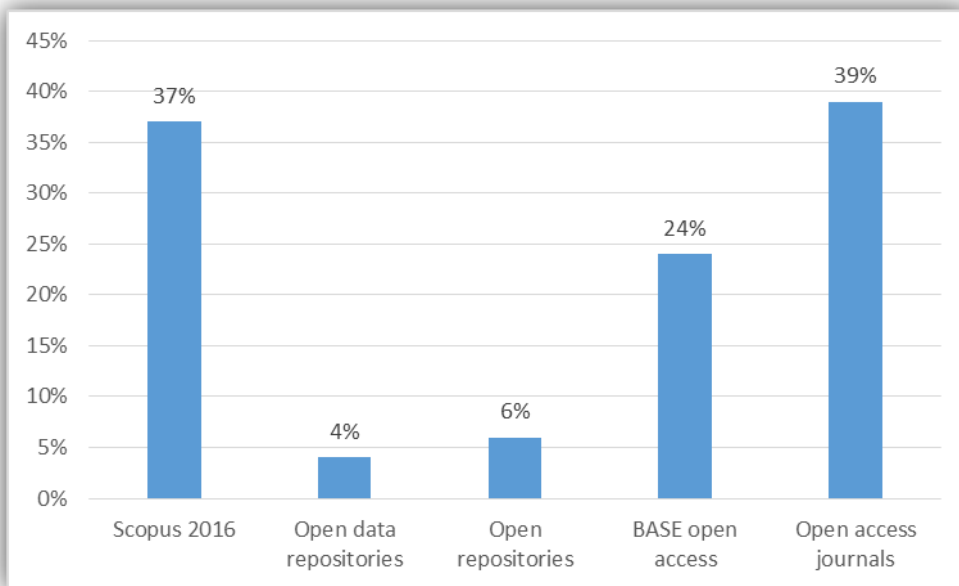


Figure 6. Synthesis of open access in the Global South (in %, N=101)

While these 101 countries count for 37% of the 2016 scientific publications indexed by the Scopus database, they represent only 6% of the open repositories, 24% of the open items retrieved by BASE and 39% of all open access journals. This may be surprising at first sight, as the prevalence of open access journals seems to challenge the idea that “gold is good for the rich and green for the rest”. But for newcomers, open access journals are an easy way to enter the academic information market, as they respond to the increasing demand for quick and easy dissemination of research results. For institutions and learned societies, on the other hand, the gold road provides a win-win option to increase impact and visibility and to guarantee the usual level of quality assurance via peer review. The number of repositories and open access journals are correlated (Figure 7) with Pearson’s $r=.70$. This correlation increases after elimination of “atypical” countries with high numbers of open access journals like Brazil, Egypt, Indonesia or India.

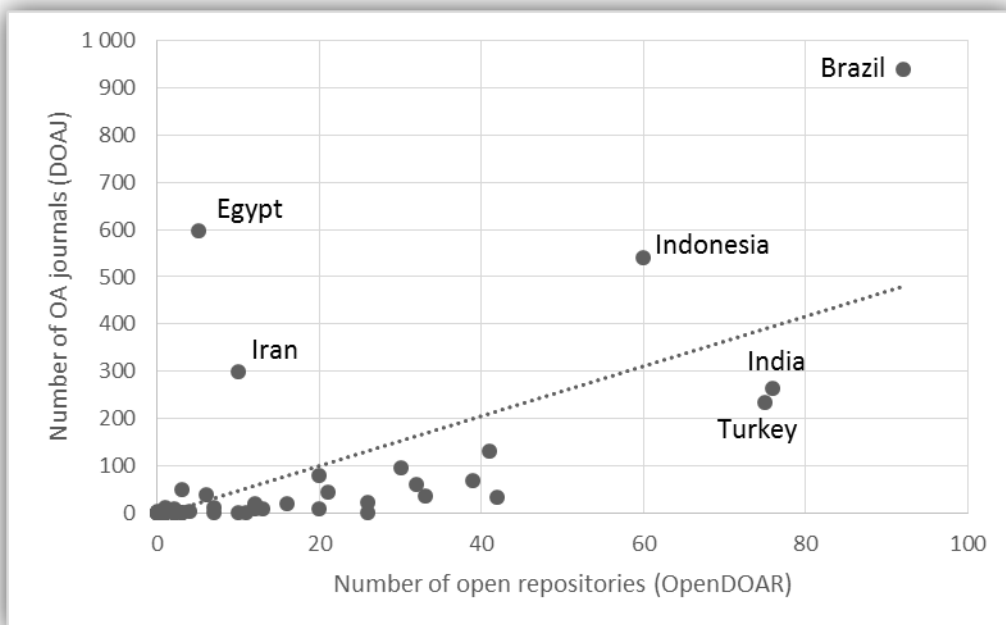


Figure 7. Correlation between open repositories and open access journals (N=101)

In other words: except for those mentioned above, most countries do not choose between green and gold strategies but develop both, at a relatively low level and often based on institutional initiatives, mostly university repositories and journals. Both variables, repositories and journals, are highly correlated with the open access content retrieved by BASE ($r > .80$) but there is no significant link with the scientific production indexed by Scopus ($r = .20-.40$) which appears, at least for the Global South countries, to reflect primarily traditional journal publishing. Perhaps more surprising is the high correlation between the Scopus output and the number of open data repositories ($r = .88$) which may indicate that countries with important and visible academic output invest more in data infrastructures and their visibility and impact.

Geographical areas

	1	2	3	4	5
Latin America & Caribbean	28	123523	1402789	294	1380
South Asia	5	157739	485635	104	349
East Asia & Pacific	22	609198	367174	175	724
Europe & Central Asia	1	43593	244277	75	235
Middle East & North Africa	6	87014	51582	31	917
Sub-Saharan Africa	39	41403	46296	116	80

Figure 8. Open access in different areas of the Global South (1. countries, 2. publications 2016, 3. documents in open access, 4. repositories, 5. journals)

The same variety of situations can be observed between the different areas of the Global South (Figure 8). Latin America & Caribbean is by far the most important open access area, with the greatest number of documents in open access (BASE), of repositories (OpenDOAR) and of journals (DOAJ) and with two leading countries, Argentina and above all, Brazil.

South Asia ranks second regarding the number of documents freely available via BASE, but only fourth in terms of repositories and journals. The main country in this area is India, with large repositories and relatively few referenced journals for the reason mentioned above (predatory publishing).

East Asia, first area of the Global South in terms of academic output, ranks third with regards to open access, with several hundreds of journals and 175 repositories. Surprisingly, the most important open access country today is neither China nor South Korea but Indonesia which counts 541 open access journals (mostly university presses) and 60 institutional repositories.

Figure 9 illustrates these differences and shows in particular the specific place of the other three areas: **Middle East & North Africa:** many journals but few open repositories and few documents in open access. The most important country is Egypt which hosts the Hindawi Publishing Corporation, a leader on the market of commercial open access journals, and some Elsevier titles. On rank two is Iran, with many journals but few repositories and very few open access documents referenced by BASE.

Sub-Saharan Africa: few journals and a small number of documents in open access, but a number of repositories above the average. There are some large countries with a growing investment and interest in open access, particularly the green road, like Kenya or Nigeria, but the most important country is South Africa which is also the privileged partner of the Brazil-based SciELO initiative for the development of open access journal publishing on the African continent³⁴.

Europe & Central Asia: in fact, only one country is considered as being part of the Global South, Turkey, with a significant and growing number of open access documents, journals (mostly published by universities) and repositories. Compared to other countries from the Global South, Turkey is

³⁴ See Raju, R., J. Raju, & I. Smith (2015). South Africa: The role of open access in promoting local content, increasing its usage and impact and protecting it. In (7), pp. 160-189.

somehow atypical, nearer to medium-sized European countries than to neighbouring countries like Iran, Egypt or India.

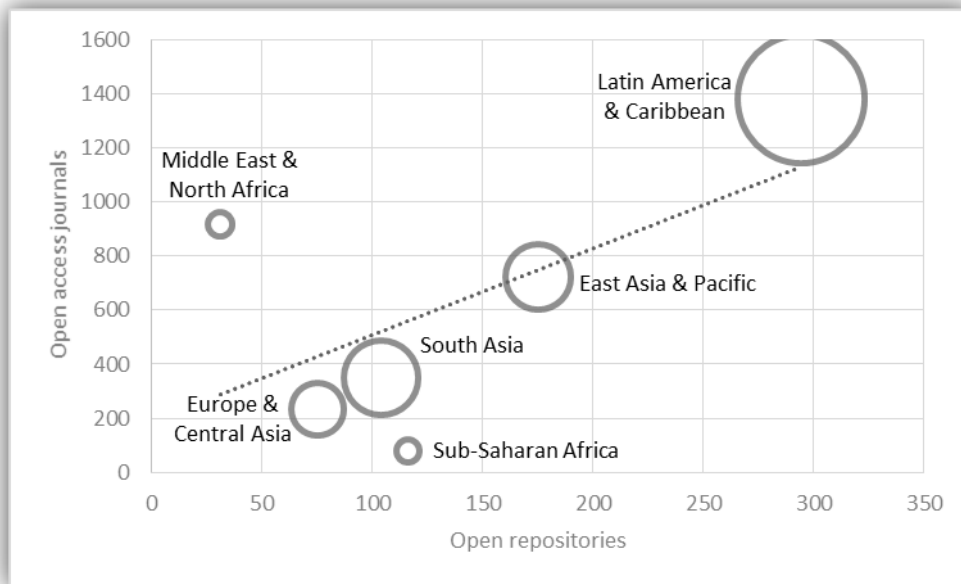


Figure 9. Open access in the areas of the Global South (size of bubble = documents in open access)

These average data are interesting; yet one must keep in mind that more than half of the Global South countries do not contribute in any way to the open access movement – no journal, no repository, and no document in BASE. At least, their contribution is neither visible nor indexed in the main international discovery tools and directories. The comparison with the Scopus database is startling: in fact, only one country (Niger) had no referenced document in 2016, and the median for all Global South countries is 281, which means that all these countries have some kind of academic output, but visible only on the level of individual authorship and the institutional affiliation.

Income level

Another way to evaluate the development of open access in the Global South is the income level. The World Bank Group distinguishes four different groups, based on the 2015 gross national income - low income (\$1,025 or less), lower middle income (\$1,026–4,035), upper middle income (\$4,036–12,475) and high income (\$12,476 or more) (Figure 10).

	1	2	3	4	5
High income	9	90739	109261	54	119
Upper middle income	31	740916	1649205	468	2028
Lower middle income	34	222225	834884	245	1525
Low income	24	8589	4403	28	13

Figure 10. Open access in income groups of the Global South (1 countries, 2 publications 2016, 3 documents in open access, 4 repositories, 5 journals)

The main contribution to open access is not provided by the High income countries like South Korea or Chile but from the Upper middle income group, with large countries with an important research sector like Brazil, Argentina, Mexico, China, Turkey, Iran or South Africa. Their average share in open access output is two times higher than in the next group, the Lower middle income countries, with Egypt, India, Indonesia, Sri Lanka or Pakistan. But this average contribution should not mask the

fact that the median is quite low and that half of these countries have no or only one or two repositories or journals.

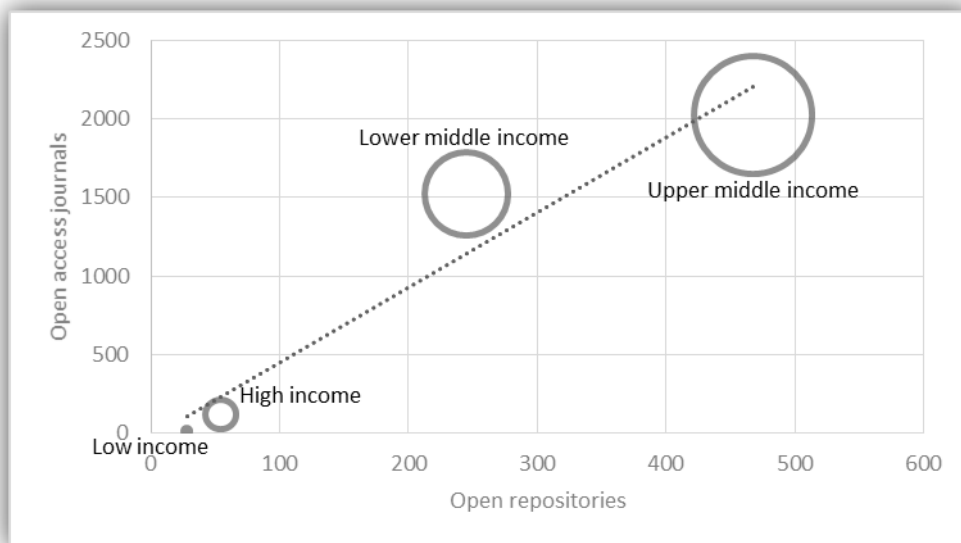


Figure 11. Open access in the income groups of the Global South (size of bubble = documents in open access)

No surprise for the last category – the Low income countries (mainly Sub-Saharan countries but also Nepal and Haiti) with a small or inexistent academic production are more or less absent from the open access landscape. Some exceptions like Tanzania, Senegal, Zimbabwe or Mali confirm the rule. Figure 11 illustrates the differences between these World Bank categories.

Profiles

Finally, the data of OpenDOAR, DOAJ and BASE allow the description of some particular profiles of those countries with some kind of contribution to the open access movement (N=41). We can distinguish two larger groups (Figure 12):

Q1 - A leading group with 16 countries which count for 79% repositories, 71% open access journals and 93% freely available documents (BASE). These countries have in common the fact that their repositories and journals are above the median of the Global South. In this category we find all large and significant open access countries such as Argentina, Brazil, China, India, Indonesia, Mexico, South Africa and Turkey, and also countries with less impact and visibility like Bangladesh, Chile, Ecuador, Malaysia, Peru, South Korea, Thailand and Venezuela.

Q3 – A second group with 15 countries where the open access movement exists but seems less developed or just at the beginning; together they represent less than 5% of the open access in the Global South. Here there are many countries from Latin America and the Caribbean, like Nicaragua or El Salvador.

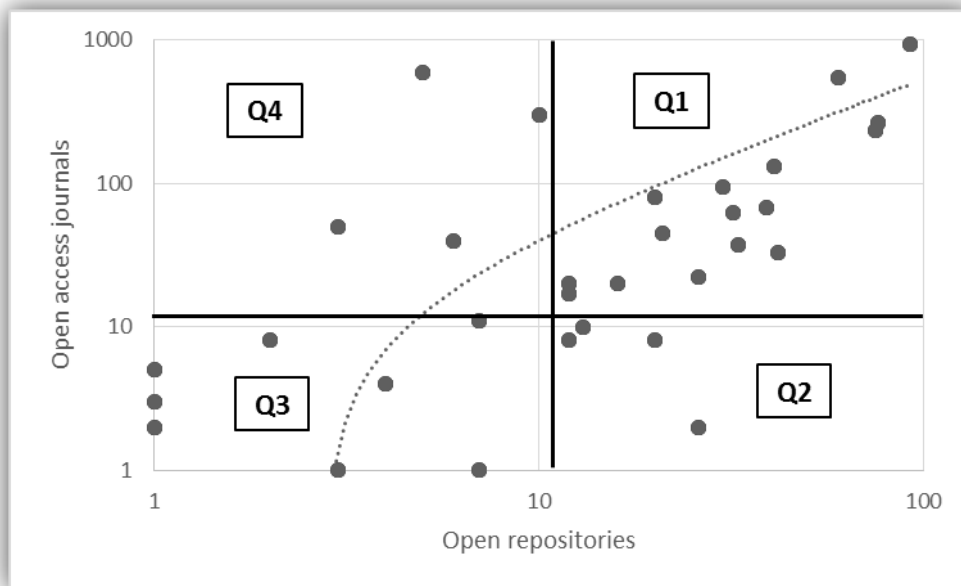


Figure 12. Open access journals and repositories in the Global South (only countries with open access contribution, N=41; with median; logarithmic scale)

Two other groups are less representative and composed of rather atypical countries.

Q2 – Four countries with more repositories and less journals. Together they represent 10% of all open repositories but less than 1% of all open access contributions. Algeria is part of this group, such as/as well as Sri Lanka.

Q4 – Five countries with more journals and less repositories. Their journals represent 27% of all open access journals in the Global South; yet the share of their freely available documents does not exceed 4%. Egypt belongs to this group along with Iran and on a much lower level, Pakistan, Costa Rica and the Philippines.

Among the World's poorest, heavily indebted and least developed countries³⁵ only four appear to develop some significant and visible open access activities, that is, Kenya and Nigeria with over 20 open repositories each and Pakistan and Bangladesh with together 77 open access journals.

23 countries are considered to be fragile or conflict affected; none of them contributes to open access, except for Zimbabwe with ten repositories indexed by the OpenDOAR. No small country (Botswana, Djibouti, Fiji, Jamaica, Tonga etc.) is visible or makes any impact.

Lessons learned

Which lessons can be learned from this overview? Let's summarize in three points.

Diversity: Global South is an umbrella term for many different situations, ranging from potential superpowers like Brazil, India or China to small or heavily indebted countries like Djibouti or Bangladesh. What most of these countries have in common, though, is the need for scientific information and the will to foster the impact and visibility of the domestic research results through open access. However, the way to open access can be very different, and we can identify at least four paradigms: successful public initiatives (SciELO in Brazil and other Latin American countries), favourable national policies (India), institutional projects (South Africa) and private entrepreneurship (Egypt). Even if Egypt and Brazil are both significant architects of the gold road to open access, the reason is completely different if not opposed – visionary private entrepreneurship in Egypt with one for-profit publishing house for an international author- and readership; and a mainly public-funded non-profit initiative for the local (regional) scientific community. Our figures, in particular those from Scopus and BASE, draw attention to another distinction that should be made, that is between open access publishing by individual authors affiliated to institutions in the Global South and open access initiatives and projects on the institutional and/or national level. This distinction explains for instance

³⁵ International Development Association (IDA), part of the World Bank; N=55 in our sample

why Scopus and BASE contain references to open access papers from nearly all countries worldwide, even from poor and heavily indebted countries, while those countries remain invisible and without any impact in open access directories.

Transition: Well developed and stable open access situations like Brazil or Egypt (insofar as “stability” makes sense in the context of open access....) are rare and unusual, whereas “transition” appears to better characterize most of the countries of the Global South – that is, transition from low impact, closed, domestic scientific information to open science. China is one significant example, with a rapid but so far (at least from “outside”) rather invisible development of an open access journal publishing market (4). Iran is another example for a country where nearly all journals are funded and published by universities while repositories are just at the beginning, without for instance any efficient dissemination in open access of PhD dissertations. But this may change in the near future because the Ministry of Science launched a national policy in favour of the preservation and dissemination of electronic theses and dissertations, which implies support for national or institutional open repositories. - Our paper was (is?) not about barriers to open access but it is evident that factors like infrastructures, costly publishing models; intellectual property, attitudes and awareness and language and literacy issues (see (3) for African countries) accelerate or slow down the development of open access. Also, the quality of open access resources remains a complex and controversial issue (6).

Resources: The successful development of an open access policy needs IT infrastructures²⁹ human resources and financial investment. From a political viewpoint, the open access movement may be considered as a kind of low-budget solution for scientific communication in poor regions and less developed countries; in particular the green road, that is, the development of open repositories. Yet, empirical evidence shows quite a different picture: all significant progress of open access, be they on the green or gold road or both, take place in newly industrialized countries (NICs), with strong political leadership, rapid growth of urban centres and population, a switch to industrial economies, foreign investment, open markets etc. Open access in this perspective, may not contribute to a new digital divide but is surely a part of it.

In other words (7), the reasons for success may be different from one country to another; but we can identify at least three key factors of success: strong public policy in favour of open access (including copyright law transparency), growing awareness among the research communities (including incentives and the redesign of the academic reward system), and investment – that is, private investment (with an emergent open access market) and above all, public funding for the dissemination of research results.

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Acknowledgments to Behrooz Rasuli from IRANDOC (Tehran) for helpful advice.