



Faire avancer les savoirs

Open Science Beyond Open Access: For and with communities

A step towards the decolonization of knowledge



Prepared for the Canadian Commission for UNESCO
By Leslie Chan, Budd Hall, Florence Piron, Rajesh Tandon and Lorna Williams
Ottawa, July 2020

For further reading, see:

An introduction to UNESCO’s Updated Recommendation on Science and Scientific Researchers
<https://en.ccunesco.ca//media/Files/Unesco/Resources/2018/11/IntroductionToUNESCOUpdatedRecommendationOnScienceAndScientificResearchers.pdf> (2018)

Is Science a Human Right? Implementing the Principle of Participatory, Equitable, and Universally Accessible Science
<https://en.ccunesco.ca//media/Files/Unesco/Resources/2019/10/IsScienceAHumanRight.pdf> (2019)

The Status of Science. The UNESCO Recommendation on Science and Scientific Researchers: Issues, Challenges and Opportunities
<https://en.ccunesco.ca//media/Files/Unesco/OurThemes/EncouragingInnovation/IdeaLab/ReflectionPaperMicheleStanton-Jean.pdf> (2019)

Toward a UNESCO Recommendation on Open Science: Canadian Perspectives <https://en.ccunesco.ca/-/media/Files/Unesco/Resources/2020/04/UNESCORecommendationOpenScienceCanadianPerspectives.pdf> (2020)

To quote this article:

CHAN, Leslie, HALL, Budd, PIRON, Florence, TANDON, Rajesh, and WILLIAMS, Lorna, “Open Science Beyond Open Access: For and with communities. A step towards the decolonization of knowledge”, the Canadian Commission for UNESCO’s IdeaLab, Ottawa, Canada, July 2020

This work is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0/> or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Canadian Commission for UNESCO.

Table of Contents

Acknowledgements.....	iv
About the Authors	iv
Summary	1
Introduction	1
1. Open Science and the pandemic	2
2. Openness to publications and data	4
3. Openness to society.....	6
4. Openness to excluded knowledges.....	8
5. Key considerations for UNESCO, other institutions, and decision makers	11
Conclusion.....	13
References	14

Acknowledgements

We would like to thank the Canadian Commission for UNESCO for supporting our approach to Open Science and the decolonization of knowledge. In particular we would like to thank Eleanor Haine-Bennett who has contributed both to the process and the content of this brief and to Sebastien Goupil, Secretary-General of the Canadian Commission for UNESCO, for his support and contributions. Special thanks go to Baptiste Godrie for his review of our final drafts. Importantly each of us owes a deep debt of gratitude to the communities within which we have been born, lived and worked. We are grateful to the Indigenous and non-Indigenous women, men and young people of communities in British Columbia and Québec in Canada, Haiti, West Africa, Brazil and other countries in Latin America, and many parts of urban and rural India. Knowledge is everywhere.

About the Authors

Leslie Chan is Associate Professor and Head of the Knowledge Equity Lab at the University of Toronto Scarborough

Budd Hall is Professor Emeritus of Community Development, University of Victoria

Florence Piron is Full Professor in the Communication and Information Department at Université Laval and founder of a [science shop](#) and an [open-access publishing house](#)

Rajesh Tandon is Founder-President of Participatory Research in Asia

Wanósts'a7 Lorna Williams is Lil'watúl and Professor Emerita of Indigenous Knowledge and Learning, University of Victoria

We were brought together by Rajesh Tandon and Budd Hall, who are also Co-Chairs of the [UNESCO Chair in Community-Based Research and Social Responsibility in Higher Education](#). Collectively, we bring diverse perspectives and experiences to the challenges of Open Science.

Each being ought to have the strength to be tolerant of the beauty of cognitive diversity.

Leroy Little Bear¹

Summary

- While many countries and scholars understand “Open Science” to mean the same as “open access” to publications and data, we argue that it can and should go further.
- Analyzing all the possibilities of “openness” during the COVID-19 pandemic, we explain how science could also open itself to society to be more relevant—particularly to civil society organizations and social movements.
- We suggest greater openness to knowledges and systems of thought that come from Indigenous Peoples, minorities, and cultures from the Global South. These knowledges are often ignored or excluded from Eurocentric science even though they could enrich scientific conversations across boundaries.
- Finally, we propose considerations for each form of openness to bring about a fair, decolonial Open Science—for and with communities, and beyond open access.

Introduction

UNESCO is launching international consultations aimed at developing a [Recommendation on Open Science](#) for adoption by member states in 2021. Its Recommendation will include a common definition, a shared set of values and proposals for action.

At the invitation of the Canadian Commission for UNESCO, this paper aims to contribute to the consultation process by answering questions such as:

- Why and how should science be “open”? For and with whom?
- Is it simply a matter of making scientific articles and data fully available to researchers around the world at the time of publication, so they do not miss important results that could contribute to or accelerate their work?
- Could this openness also enable citizens around the world to contribute to science with their capacities and expertise, such as through citizen science or participatory action research projects?
- Does science that is truly open include a plurality of ways of knowing, including those of Indigenous cultures, Global South cultures, and other excluded, marginalized groups in the Global North?

The paper has four sections: “Open Science and the pandemic” introduces and explores different forms of openness during a crisis where science suddenly seems essential to the well-being of all. The next three sections explain the main dimensions of three forms of scientific openness: openness to

publications and data, openness to society, and openness to excluded knowledges² and epistemologies³. We conclude with policy considerations.

1. Open Science and the pandemic

Writing this paper at the time of the COVID-19 pandemic, we have been struck by the place science has taken in this highly specific context, but also by the multiple forms of scientific openness that have appeared.

On the one hand, the research community is racing to produce a vaccine that some governments are suggesting is the only way we can return to “normal” life. Laboratories clearly need prompt, unconditional access to relevant and quality publications and data. As a result, some publishers have “opened” their paywalled journals to make certain articles freely available⁴; databases have been created that are completely open access, such as the [Open COVID Pledge](#); and other journals or platforms that were already open access are speeding up their peer-review processes⁵ by prioritizing access to data. This “opening” enables or assumes co-operation between laboratories rather than competition. Some laboratories are even sharing material⁶, hardware and specimens⁷.

On the other hand, while scientists have previously complained that governments do not listen to them, they are now in the spotlight and in the media, answering questions from the general public, guiding governments toward decisions and trying to predict the future⁸. But it is not clear whether science’s new role in public debate marks a new form of openness, is sustainable, or will extend to other global challenges, such as the climate crisis.

Research and the pandemic

Governments and public granting agencies are calling for what could be termed “emergency research” in medicine, biology and the social sciences and humanities. For example, the [Canadian Institutes of Health Research](#) announced two critical research funding programs in April 2020. Does this form of research—far removed from the much longer timeframes of fundamental research—indicate a shift of publicly funded research toward societal needs and general well-being? The answer is unclear. It is also worth considering whether the change heralds a new form of social responsibility of universities and research centres that will lead them to science that is less frightened of society’s interference and more open to concern for the common good.

Part of the answer to such questions will be perceptible in the status of the vaccine that may one day be found: it will either be patented (and therefore not free), or open source under an “open” licence (transformed into a common good)⁹. Another question worth asking is: will research focus solely on managing the economic, educational and health issues in this crisis, or will it also look at the effects of COVID-19 on social inequalities¹⁰, particularly gender, race, age, handicap and ethnicity?

Examining science's place in society

The disruption of “normal” life caused by COVID-19 is transforming science’s place in society, even its standard practices. For example, researchers are launching partnerships with associations to advance their work and their research networks are offering multiple webinars to all internet users instead of in-person seminars for peers in “closed” research centres. As e-learning becomes the new norm, more use is being made of resources like massive open online classes, known as MOOCs. Citizen science movements are also taking on a more influential role¹¹, as demonstrated by [Just One Giant Lab](#), which brings scientists and non-scientists together “to develop innovations to adapt to the COVID-19 epidemic (detection tests, syringe pumps, etc.), all at a lower cost¹². Fablabs¹³ and other makerspaces are imagining new ways to produce masks¹⁴, syringes and prototype respirators¹⁵, while non-governmental organizations and scientists are bringing society into the fold by launching community-based, participatory research projects to fight inequalities¹⁶.

Critics of science and technology are also making themselves heard, most notably with regard to contact tracing applications and artificial intelligence. Meanwhile, suggestions emerging from Chinese traditional medicine, Ayurvedic medicine or African traditional medicine are neither being spoken about nor funded for clinical trials, and are sometimes quickly discredited¹⁷. This response purports to be based in science but could simply be a Western effort to silence other ways of knowing.

Challenging conventional research practices

This overview of the complex COVID-19 situation explores possible avenues for opening science. They include:

- Opening access to scientific publications
- Opening access to research data
- Scientists’ participation in public debates and governance
- Openness to public welfare issues and concerns (not just those of industry or governments)
- Openness to research partnerships with civil society associations and social movements
- Openness to hybrid knowledge, from citizen science to open makerspaces and laboratories
- Openness to Indigenous knowledge and ways of knowing
- Openness to knowledge from the Global South or marginalized communities in the Global North
- Openness to the idea that science is made up of complex debates rather than enduring certainties

All these forms of openness challenge the framework in which scientific research is carried out today—that is, the publication of results in pay-to-access journals that some cannot access; the reluctance to enter into equitable, non-financial partnerships to co-construct socially relevant research projects in the name of refusing to let society or politics “meddle;” and the exclusion of types of knowledge deemed unscientific, especially those originating from Indigenous Peoples or from projects involving people who are not professional scientists or who are from universities of the Global South. In the rest of this paper we examine ways to challenge these types of closures and inject openness.

2. Openness to publications and data

It is often said that open access to publications and data is a new science practice, associated with the digital age. Is this true?

Evolving science policies and practices

Surprisingly, many science practices are actually fairly recent, including the idea that journals should be owned by for-profit publishers rather than universities or learned societies. Between 1852 and 1908, academic journals were regulated by default by open licences¹⁸. This did not stop researchers from making and disseminating countless discoveries. Generally, academic journals were associated with disciplinary associations and published on a non-profit basis.

The idea that knowledge can become a commodity and create markets (for journals and patented innovations) is linked to the emergence of the knowledge-based economy in rich countries¹⁹. This orientation of science policy is part of the neoliberal ideology based on the promotion of competition²⁰, notably among universities, laboratories and scientists. More recently, some for-profit publishers have co-opted the idea of open access and conflated it with the pay-to-publish model of open access, which in fact covers only a small portion of the entire open-access universe²¹.

As a result one could argue that granting open access to scientific publications is less a daring innovation than a return to the conventional ethics of research²², which consider that science is a common good and that scientists must collaborate to advance knowledge, whatever their country or beliefs. But several surveys have shown that most researchers will prioritize a journal's reputation over accessibility when choosing where to publish - a reputation that is marked by commercial indices, such as the journal impact factor²³. More recently, digital technologies allow online and open-access journals to build their reputations through social networks rather than the journal impact Factor.

Understanding researchers' motivations

Researchers who advocate openness of publications and data may have varying motivations:

- Some see research as an immense scientific conversation and want full and immediate access to their colleagues' texts and data.
- Others appreciate open access for the chance to build a universal scientific legacy—a treasure trove of knowledge that would benefit humanity.
- Some believe the main purpose of open access is to democratize scientific knowledge.

Indeed, contrary to a widely shared preconception, many people outside of the scientific world can read, understand and use scholarly articles to improve their own knowledge base and working practices. Think about teachers, nurses, journalists, agronomists or social workers: all would benefit from continuous learning, but without a link to a university, they cannot access texts that might offer them opportunities to do so. In a true knowledge society²⁴, all knowledge is accessible to those who need it to advance and serve the common good.

Nowadays, an increasing number of public policies promote or require open access without forcing authors to pay to publish. In Latin America, most journals are operated by university departments. In South Africa, the Academy of Science of South Africa adopted the SciELO model of open access, pioneered by Brazil, for independent journal publishers to share publishing infrastructure²⁵. But pressures to publish in market-owned journals persist. The problem is that authors, funders and policymakers lack awareness of the diversity of models and initiatives that are available. This is why we think that UNESCO should support independent, community-based publishing initiatives, the [Latin American Council of Social Sciences](#) (CLACSO), the [Council for the Development of Social Science Research in Africa](#) (CODESRIA), the [African Books Collective](#), or the more recent [Grenier des savoirs](#) initiative. The [Radical Open Access Collective](#) is an interesting community of scholar-led, not-for-profit presses that publish open access books.

The risks of open access as a result of inequalities at the heart of science

We urge care in thinking about open access and most importantly not to reduce it to the pay-to-publish model promoted by for-profit publishers. That model has been designed through economic or market-based lenses that see it offering financial return on investment for funders, universities and libraries. This view normalizes the treatment of knowledge as a commodity, viewing the production and dissemination of science as a means of being economically competitive. This reasoning, typical of the knowledge-based economy, feeds into the growing trend of nationalism and regionalism, with European nations and the EU willing to make deals with multinational publishers to secure their presence in research outputs (e.g. [Projekt DEAL](#)).

Debates and policy recommendations from Global North institutions on Open Science and open access usually deal with access to and dissemination of research outputs (still largely in journals and books). Promotion of these policies has tended to focus on the benefits, such as increased visibility and citations, paying little attention to the burden and the risks—particularly for knowledge-holding communities on the margins or scholars from the Global South.

These risks are real. For example, open access as seen in francophone sub-Saharan Africa²⁶ reveals issues that are very different from those in the Global North. In this part of the world, open access cannot be separated from issues like difficult access to computers, the internet and local research grants, and weak digital literacy: many students touch a computer for the first time when they enter university. In this context, open access tends to reinforce the hegemony of science done and published in the Global North at the expense of local knowledge, seldom in open access. This reduces intellectual diversity and contributes to the homogenization of science and creativity. Ultimately, it leads to what Vandana Shiva²⁷ calls the “monoculture of the mind”—where Eurocentric and patriarchal knowledge structures are reflected and reproduced. Postcolonial open access²⁸ can thus be a tool of subjugation rather than empowerment. It can further entrench the deep-seated inequalities encoded in science’s colonial and racial infrastructure²⁹.

One of these inequalities stems from the obsession of many universities in the Global South for rankings and impact factors, even if the latter are based on criteria set by powerful institutions in the Global

North which ignore their reality. Very few journals from the Global south are recognized as having enough value to be included in these rankings. Fortunately, impact factor and its clones are more and more contested in the Global North³⁰, for example through the [Declaration on Research Assessment](#) (DORA) and alternative models³¹. Organizations like the Directory of Open Access Journals reject rankings and aspire to index scientific and scholarly journals from all over the world according to their quality control system.

Policies and actions to implement open access have tended to strengthen the existing power structure and further marginalize small-scale, local and community-driven initiatives in the Global South. Therefore, we propose recommendations that criticize this flawed logic of open-access and instead challenge the deep-seated structural inequities it has created, while promoting open access as a tool for building the knowledge society.

3. Openness to society

The idea that science must be wary of society—especially of anything that seems political—dates back to the first learned societies. It was promoted by scholars to protect themselves from the arbitrariness of power, from threats and punishments against those who challenged religious dogma. It seemed to scientists of the time that only among equals (i.e., male peers) and protected from the whims of rulers and clergy could knowledge of the world advance. Scholarly communities thus closed themselves off from society for protection (or for creative space) in what is sometimes called an “ivory tower.” The result was the exclusion of anything that was not them or like them. It also led to the establishment of complex rituals to gain access to the ivory tower. The doctorate degree is one example. Academics’ use of jargon that outsiders find hard to understand is another isolation tool.

Shattering the ivory tower

However, the world has changed a lot. For instance, young researchers who wanted to do things differently began attacking “ivory tower syndrome” in the 1960s. They asked questions like: “How can we make science a ‘truly’ fair and egalitarian practice? How can scientific practice be made compatible with a concern for social justice?”³² The environmental disasters of the 1980s would heighten awareness of the potentially harmful effects of scientific research and technological innovations, and lead to the adoption of the precautionary principle in addition to the major ethical codes.

In the 1970s, led by scholar activists in the Global South, participatory research was put forward as a way to co-create knowledge for and with communities, especially marginalized ones, experiencing and documenting the challenges of their daily lives³³. However, this movement was largely ignored by mainstream academics. Around the same time in Europe, science shops³⁴ were invented. They invited civil society associations to propose research projects that students would carry out free of charge in the course of their training, particularly in environmental sciences³⁵. Several political actors began to demand public participation in the scientific and technological choices made by governments. This gave

rise to citizens' juries, consensus conferences³⁶ and other mechanisms aimed at building a “third sector of research” that is still running today³⁷.

In other words, science was opening itself to society.

But the advent of the knowledge-based economy and the public finance crisis of the 1980s took a toll on this emerging scientific citizenship³⁸. Dependent on governments or industry for funding, science became less concerned with social justice, equality and participation than with contributing to the prosperity of states and universities. Science was to become a source of income through patents and marketable innovations³⁹. Funding for social and human sciences gradually decreased⁴⁰ while industry-university partnerships multiplied, as evidenced by the renaming of campus buildings after funders.

Science and society today

The second decade of the 2000s has seen the traditions of participatory action research and critical research continue. Indigenous scholars, such as Linda Tuhiwai Smith⁴¹ with her seminal work on decolonizing research methodologies, have inspired a new generation of Indigenous and non-Indigenous scholars to work in engaged ways. Community-based and community-engaged research has become increasingly accepted in universities around the world, with many new structures to facilitate community-university research partnerships created⁴².

In Europe, the science shops' pioneering work has found substantial support from European Commission funding and advocacy for the [Science With and For Society](#) (SWAFS) and [Responsible Research and Innovation](#) (RRI). International structures, such as the [UNESCO Chair of Community-Based Research and Social Responsibility](#), the [Talloires Network](#) and the [Global University Network for Innovation](#), have been established.

There are still tensions, as some scholars are wary of showing social or political commitment that could make them look “radical” and perhaps harm their careers. The normative expectation that scientists should separate their values and identities from their work remains powerful⁴³. It can be a source of stress for young researchers who begin their careers believing in the power of science to change the world only to learn that what really counts is research funding, quantity of publications and impact factor.

Interestingly, digital technologies have created new forms of openness to society within technoscience, notably within the open-source software and hardware movements in computing (see [Open Source Initiative](#), for example). The implementation of fablabs⁴⁴, makerspaces⁴⁵ and other do-it-yourself laboratories that integrate non-scientists and citizen science (using non-scientific citizens to collect or capture massive data via applications) have produced great advances in [botany](#), biology, [astronomy](#), geography and even [mathematics](#)⁴⁶.

Science at a crossroads

We are at a critical juncture. It is unclear whether we are moving closer to the 1960s ideal of scientific citizenship - making digital technology a tool for the democratization of science and knowledge - or

whether science is truly part of knowledge economy and cognitive capitalism⁴⁷, seeking industrial partners and "exploiting" citizen volunteers as cheap labour. The openness of science here is complex and uncertain, as exemplified by the fablabs in Africa, funded by organizations in the Global North: can they respect local values and practices to contribute to local sustainable development⁴⁸?

The consultations around the creation of the UNESCO Open Science Recommendation offer an exciting chance to explore what we have learned so far from opening to society and will support future initiatives. We are calling for respectful and transparent collaboration between scientists and social actors as well as the co-creation of knowledge and social innovation that includes all world views.

4. Openness to excluded knowledges

In this section, we deal with two families of knowledge that are excluded from mainstream or conventional science in a systemic way:

- Indigenous knowledges, ways of knowing and epistemologies; and
- scholarly knowledge from marginalized groups of people in western English-speaking science, such as women, minorities, Indigenous scholars, non-Anglophone scholars, or scholars from the less-advantaged countries in the Global South.

We argue that science should become much more pluriversal⁴⁹ by opening itself to these families of knowledge that are ignored by so many scientists in the Global North.

Science as a product of history and culture

Feminist, Indigenous and decolonial studies, particularly in Latin America⁵⁰ and India⁵¹, as well as social studies of science⁵² and the deconstruction of the Western knowledge as set out in great books, have helped show the extent to which science was European and male, a product of the intersection of colonialism and capitalism. Examples of these books include Mudimbe's *The Invention of Africa*⁵³, Said's *Orientalism*⁵⁴, Fanon's *Black Skin, White Masks*⁵⁵, and *Decolonizing the Mind* by Ngũgĩ wa Thiong'o⁵⁶.

The recent publication in English of the *Jewel of Reflection on the Truth about Epistemology* by the 12th century scholar Gangesa Upadhyaya⁵⁷, said to be one of the most important philosophical works in Indian and Sanskrit scholarship, is just one example of the vast bodies of knowledge that have been excluded from contemporary understandings of science. For an example closer to our times, the work on action research with Indigenous communities by the great Columbian sociologist Orlando Fals Borda had never been translated into French until very recently⁵⁸. This is also the case for the classic decolonial work, *The Invention of Africa*⁵⁹. Conversely, many scholarly books from the Global South published in French, Spanish or Portuguese have never been translated into English.

Contrary to the myth of scientific neutrality, science—steeped in history and culture—has always carefully selected the knowledge to which it will grant the status of “scientific”. This knowledge has to prove that it meets certain normative and epistemological criteria. Depending on the era, these can

include the use of the experimental method, extensive doctoral training of its author, its ritualized presentation in meetings of learned societies, its publication in peer-reviewed journals, and more. Such filters obviously lead to exclusion.

Feminist social studies of science exposed the exclusion of women from this universe decades ago. Even today, during the COVID-19 crisis that closed universities, female academics had more trouble submitting papers and research proposals than did their male counterparts because of unequal divisions of household labour⁶⁰.

Some research indicates that Global South and Indigenous scientists have difficulty publishing in high-impact scientific journals, whose editorial boards are dominated by white males⁶¹. A full professor of physiology from Senegal told us that one of his articles was only accepted when he added a European author to the list of authors. Western science is increasingly unilingual English and hegemonic.

Beyond the nationality and language of the scientists and suspected systemic racism, exclusion also concerns epistemologies that come from outside the European tradition, especially Indigenous ways of knowing and political knowledges based on minority experiences of oppression⁶². Non-European or Indigenous epistemologies are so different from the framework that dominates Western science that the latter can neither see nor understand them and ends up ignoring and excluding them.

Western science vs. Indigenous ways of knowing: a fundamental divide

Leroy Little Bear, member of the Blood Tribe and an Indigenous constitutional scholar and philosopher, puts it this way: “One of the problems with colonialism is that it tries to maintain a singular social order by means of force or law suppressing the diversity of human world views”⁶³. For example, Indigenous ways of knowing generally reject the division of life into a series of disciplines—the basis of conventional science in most universities. Instead, these epistemologies propose a global vision of life focused on relations. In this sense, they are close to what Edgar Morin calls complex thinking⁶⁴. Can science open itself to these knowledges to enrich itself instead of excluding them?

According to Nakata⁶⁵,

an important aspect of Indigenous knowledge that is overlooked in some definitions is that Indigenous Peoples hold collective rights and interests in their knowledge. This, along with the oral nature, the diversity of Indigenous knowledge systems and the fact that management of this knowledge involves rules regarding secrecy and sacredness, means that the issues surrounding ownership and therefore protection are quite different from those inscribed in Western institutions. It therefore complicates things for our conception of openness. Western concepts of intellectual property have for some time been recognized as inadequate.

As Snively and Williams⁶⁶ note in their breakthrough book, *Knowing Home: Braiding Indigenous Science with Western Science*, “for Indigenous peoples, Indigenous Knowledge (Indigenous Science) is a gift. It cannot be simply bought and sold. Certain obligations are attached. The more something is shared, the greater becomes its value.”

Canada has developed a set of principles that apply to all research involving Indigenous communities. The [principles of ownership, control, access and possession \(OCAP\)](#) of data from Indigenous communities means those communities have control of ancient ways of knowing, but also of new knowledge that is being shared in contemporary research settings.

Conversely, scholars from the Global South are fighting the invisibility of their scientific work within dominant science in order to put it at the service of their country's development⁶⁷. Open access can become a powerful tool in that fight.

Urgency of openness to excluded knowledge

Why is it important for mainstream science to open itself to these excluded families of knowledge? It is not only a social justice fight, but an epistemological one to improve the quality of science. As sociology Professor Boaventura de Sousa Santos famously said, no social justice can happen without cognitive justice⁶⁸. Feminist studies have clearly shown that knowledge based on alternative viewpoints has an immense advantage: it can understand both the dominant and the subalternized⁶⁹ perspectives, whereas the dominant knowledge sees only itself. Including more ways of knowing and understanding our common world within the great scientific conversation would enrich and diversify its collective ideas and creativity for the common good.

The concept of cognitive justice argues for the opening of science to all knowledges and epistemologies in a fruitful and respectful dialogue that presupposes the opening of science to something other than itself, its habits and rituals. Conceived by the Indian anthropologist Shiv Visvanathan⁷⁰, this concept has been recently developed by students and researchers from the [Open Science in Haiti and Africa network \(SOHA\)](#) to include the other two dimensions of openness discussed in this paper: open access and openness to society. For them,

Cognitive justice refers to an epistemological, ethical and political ideal aimed at the blossoming and free circulation of socially relevant knowledge everywhere on the planet, and not only in the countries of the North (which have the resources to develop science and heritage policies that suit them), within a science practicing an inclusive universalism, open to all knowledge and all epistemologies, and not an abstract universalism based on Western standards that exclude what is different from themselves. This ideal is of course opposed to the cognitive injustices that Santos⁷¹ first defined by referring mainly to the knowledge destroyed or killed by the positivist scientific hegemony: the epistemicides⁷².

We need to acknowledge that the dominant knowledge practices and institutions have been structured and implemented in such a way as to simultaneously privilege certain epistemic situated values (such as universality, objectivity and truth) while being unjust or dismissive with regard to other, more relational and complex modes of knowledge⁷³.

We need to restore the knowledge that has been erased or silenced in the current system.

5. Key considerations for UNESCO, other institutions, and decision makers

Interestingly and sadly, these three dimensions of science openness—to publications and data, to society, and to excluded knowledges—are rarely considered together. In fact, they tend to be ignored by the proponents of one or the other.

For instance, many action-research or citizen-science scholars do not really check if their work is accessible to society, since many choose to publish in “prestigious” journals or costly books published by for-profit publishers that only people linked to a university can access. The same can be said for many decolonial thinkers, who published in paywalled journals, making it impossible for Indigenous People, non-academics or even researchers and students from the Global South to read their work.

Conversely, open access practitioners, most of whom are from the Global North, tend to ignore the plurality of knowledge or even the fact that some interesting and important knowledge could exist outside of mainstream science.

We strongly suggest that UNESCO’s future Recommendation on Open Science include all three dimensions. The 13 considerations below⁷⁴ would nurture such a move.

Consideration 1

Governments, universities and research funders should support strategies and systems for the co-creation and sharing of knowledge that are co-designed for and with the communities they serve—especially communities that have been historically marginalized or excluded from determining their own knowledge needs and provision. The goal is to regain knowledge autonomy and self-governance.

Consideration 2

To encourage fairer, more diverse open access practices worldwide, governments, research funders and UNESCO should financially and institutionally support a wide range of actors—including non-anglophone, small, local and endogenous publishing initiatives that can build local communication capacities, or university libraries that decide to become publishers—rather than giving precedence and fiscal advantage to international, for-profit, unilingual publishing industries.

Consideration 3

Universities and researchers should provide opportunities for all students and community members to understand the multiple dimensions of open access, including the perils of a homogenized science and the advantages of bibliodiversity and ecology of knowledges.

Consideration 4

Research funders and related bodies should provide targeted funding for translation and open-access sharing of scientific works from Indigenous knowledge holders and Global South researchers, especially

from non–English-speaking countries. This would support the creation of a truly plurilingual scientific commons.

Consideration 5

Research funders and related bodies should demand that publicly funded journals diversify their boards to include more women, Indigenous scholars and scholars from the Global South, and diversify their language practices by providing at least abstracts in many languages.

Consideration 6

Research funders and related bodies should provide targeted funding for research collaboration between communities and universities as exemplified by Canada’s many programs on partnership research.

Consideration 7

Higher education institutions should create courses and engaged learning spaces so all scholars-to-be can learn the principles of Open Science for and with communities, including community-based participatory action research, citizen-science approaches, and open-access–related issues. This would lead them to care about who can read their work.

Consideration 8

Universities should provide administrative infrastructure and resources to support community-university research partnerships that empower people of *all abilities* to make and use accessible, open-source technologies.

Consideration 9

All higher education institutions should teach works from the Global South and scientific approaches drawn from Indigenous ways of knowing. This would support the decolonization of knowledge.

Consideration 10

Higher education institutions should appoint scholars and knowledge-keepers from Indigenous or excluded groups, such as immigrants from the Global South.

Consideration 11

Higher education institutions should ask their professors to teach and cite scholars from Indigenous and other sidelined bodies of knowledge and to encourage students and researchers to quote works from women, the Global South and non-English works, using digital translation tools where available.

Consideration 12

UNESCO should help universities from the Global South offer better internet access and shared, community-governed digital infrastructure for their researchers and students.

Consideration 13

Higher education institutions and governments should abolish university rankings and evaluation based on criteria established by powerful institutions in the Global North and rethink the incentive and reward structure of research funding and evaluation so that it is more based on local relevance and participation.

Conclusion

Among other questions, the [online consultation on Open Science](#) conducted by UNESCO asked: “In your experience, are current Open Science practices beneficial for all the relevant stakeholders in your country? In your experience, are the current Open Science practices beneficial for the scientists and other relevant stakeholders in both developed and developing countries?”

We believe the answer to both of these questions is an emphatic “No.” But there is much that can be done about it.

In this paper, we offer a vision of Open Science that is just, fair and decolonial, but also realist and lucid. We have drawn attention to an understanding of science based on an inclusive universalism, open to Indigenous ways of knowing and all other theories, epistemologies and viewpoints.

We call for science to be a dialogue between knowledges rather than a knowledge that exists only insofar as it silences or eliminates other knowledges. We call for science that is based on values of co-operation, sharing, friendship, compassion, understanding and refusal to separate personal life and values from research. Science can support cognitive justice and situations where everyone contributes knowledge, regardless of their country, social class, gender and language. We call for science as a pluriversal and plurilingual open space—a science that is with and for communities and where knowledge is open and empowering.

References

¹ Little Bear, L. (2000). Jagged worldviews colliding. In M. Battiste (Ed.), *Reclaiming indigenous voice and vision* (pp. 77–85). UBC Press. Page 78.

² Our use of the plural form is significant, as is shown further down in the paper.

³ We distinguish between 1) Indigenous knowledges, ways of knowing or epistemologies and 2) scholarly knowledge coming from marginalized groups within hegemonic western English-speaking science. The latter group includes women, minorities, Indigenous scholars, non-Anglophone scholars or scholars from the less advantaged countries in the Global South. We consider both as excluded knowledges, albeit not in the same way.

⁴ Anonymous. (2020, March 13). [Elsevier](https://www.elsevier.com/about/press-releases/corporate/elsevier-gives-full-access-to-its-content-on-its-covid-19-information-center-for-pubmed-central-and-other-public-health-databases-to-accelerate-fight-against-coronavirus) gives full access to its content on its COVID-19 Information Center for PubMed Central and other public health databases to accelerate fight against coronavirus. Press release, Elsevier website.

<https://www.elsevier.com/about/press-releases/corporate/elsevier-gives-full-access-to-its-content-on-its-covid-19-information-center-for-pubmed-central-and-other-public-health-databases-to-accelerate-fight-against-coronavirus>; Carr, David. (2020, March 16). Publishers make coronavirus (COVID-19) content freely available and reusable. Press release, Wellcome website. <https://wellcome.ac.uk/press-release/publishers-make-coronavirus-covid-19-content-freely-available-and-reusable>

⁵ Redhead, C. (2020, April 27). *Scholarly publishers are working together to maximize efficiency during COVID-19 pandemic*. Open Access Scholarly Publishers Association. <https://oaspa.org/scholarly-publishers-working-together-during-covid-19-pandemic/>

⁶ Centers for Disease Control and Prevention. (2020). *Research use only 2019-Novel Coronavirus (2019-nCoV) Real-time RT-PCR primers and probes*. <https://www.cdc.gov/coronavirus/2019-ncov/lab/rt-pcr-panel-primer-probes.html>

⁷ Devlin, H. (2020, April 02). Small laboratories join coronavirus testing effort after 'precious time wasted'. *The Guardian*. <https://www.theguardian.com/world/2020/apr/02/small-laboratories-coronavirus-testing-time-wasted-dunkirk>

⁸ Callon, M. and Lascoumes, P. (2020, May 22). Penser l'après : Le Covid-19 pousse les scientifiques hors de leurs laboratoires. *The Conversation*. <https://theconversation.com/penser-lapres-le-covid-19-pousse-les-scientifiques-hors-de-leurs-laboratoires-137336>

⁹ Crouzet, T. (2020, April 04). *Covid-19 : Pour un vaccin libre de droits*. Thierry Crouzet's blog. <https://tcrouzet.com/2020/04/23/covid-19-pour-un-vaccin-en-bien-commun/>; Collectif. (2020). *Mémoire Covid-19 pour du libre et de l'open en conscience : enseignements et impulsions futures*. Inno3, Paris. <https://inno3.fr/actualite/memorandum-covid-19-pour-du-libre-et-de-lopen-en-conscience-enseignements-et-impulsions>

¹⁰ Bubola, E. & Fisher, M. (2020, March 15). As coronavirus deepens inequality, inequality worsens its spread. *The New York Times*. <https://www.nytimes.com/2020/03/15/world/europe/coronavirus-inequality.html>

¹¹ Dinneen, J. (2020, April 17). Covid-19 can't stop citizen science. *Undark*. <https://undark.org/2020/04/17/covid-19-citizen-science/>

¹² Meghraoua, L. (2020, April 22). *Covid-19 : la science participative, une troisième voie pour la recherche scientifique?* Usbek & Rica. <https://usbeketrica.com/article/covid-19-science-participative-troisieme-voie-recherche>

¹³ Lhoste, K. (2020, April 27). Les fablabs apportent des solutions concrètes et locales à la crise du Covid-19. *The Conversation*. <https://theconversation.com/les-fab-labs-apportent-des-solutions-concretes-et-locales-a-la-crise-du-covid-19-136277>

¹⁴ Makerspace. (2020). *Make a "No-Sew" Covid-19 mask*. <https://www.makerspaces.com/make-a-no-sew-covid-19-mask/>

-
- ¹⁵ Belga. (2020, March 25). *Coronavirus en Belgique : les Fablabs wallons développent des prototypes, dont un respirateur, pour lutter contre le Covid-19*. RTBF. https://www.rtf.be/info/dossier/epidemie-de-coronavirus/detail_coronavirus-en-belgique-les-fablabs-wallons-developpent-des-prototypes-dont-un-respirateur-pour-lutter-contre-le-covid-19?id=10467504
- ¹⁶ Garg S, Bhatnagar N, Gangadharan N. (2020, April 16). A Case for Participatory Disease Surveillance of the COVID-19 Pandemic in India. *JMIR Public Health Surveill.* 2020;6(2):e18795. <https://pubmed.ncbi.nlm.nih.gov/32287038/>
- ¹⁷ BBC News. (2020, April 22). *Coronavirus: Caution urged over Madagascar's 'herbal cure'*. <https://www.bbc.com/news/world-africa-52374250>; Hirsch, A. (2020, May 21). Why are Africa's coronavirus successes being overlooked? *The Guardian*. <https://www.theguardian.com/commentisfree/2020/may/21/africa-coronavirus-successes-innovation-europe-us?>
- ¹⁸ Langlais, P.-C. (2015, March 11). *Quand les articles scientifiques ont-ils cessé d'être des communs?* Sciences Communes. <https://scoms.hypotheses.org/409>
- ¹⁹ OECD. (2002). Strengthening the Knowledge-based Economy, *OECD Science, Technology and Industry Outlook 2002*, OECD Publishing, Paris. https://doi.org/10.1787/sti_outlook-2002-3-en
- ²⁰ Monbiot, G. (2016, April 15). Neoliberalism – the ideology at the root of all our problems. *The Guardian*. <https://www.theguardian.com/books/2016/apr/15/neoliberalism-ideology-problem-george-monbiot#comment-72416456>
- ²¹ See data on the blog *The Imaginary Journal of Poetic Economics* by Dr. Heather Morrison; The webinar “Cooperative Non-APC Publishing Models: Canada, Europe and Latin America” (Becerril-García et al. 2020) highlights the diversity of models currently available, including those that do not demand fees from authors or readers; Becerril-García, A., Friedman, J., Niemann, T., Stranack, K., Guédon, J.-C. & Kuchma, I. (2020, May 11). *Cooperative Non-APC Publishing Models: Canada, Europe and Latin America*. Zenodo. <https://zenodo.org/record/3821955#.Xsgwc5NKjBK>
- ²² Merton, R.K. (1942). The Normative Structure of Science. Reproduced on Panarchy.org. <https://www.panarchy.org/merton/science.html>
- ²³ Chan, L. (2010, March 15). *Prof. Mary Abukutsa-Onyango discusses the importance of Open Access for research from Kenya and other African countries* [Video]. Vimeo. <https://vimeo.com/10169351>; Piron, F. & Lasou, P. (2014). *Pratiques de publication, dépôt institutionnel et perception du libre accès : enquête auprès des chercheuses et chercheurs de l'Université Laval (Québec)* [Research Report, Université Laval]. Corpus UL. <http://hdl.handle.net/20.500.11794/14964>
- ²⁴ UNESCO. (2005). *Building Knowledge Societies*. <https://en.unesco.org/themes/building-knowledge-societies>
- ²⁵ Academy of Science of South Africa. (n.d.). *SciELO South Africa*. ASSAF. <https://assaf.org.za/index.php/programmes/scholarly-publishing-programme/open-access-scielo-south-africa>
- ²⁶ Piron, F., Diouf, A. B., Dibounje Madiba, M. S., Mboa Nkoudou, T. H., Aubierge Ouangré, Z., Tessy, D. R., Rhissa Achaffert, H., Pierre, A. & Lire, Z. (2017). Le libre accès vu d’Afrique francophone subsaharienne. *Revue française des sciences de l’information et de la communication*, (11). <http://journals.openedition.org/rfsic/3292>
- ²⁷ Shiva, V. (1993). *Monocultures of the Mind: Perspectives on Biodiversity and Biotechnology*. London: Zed Books.
- ²⁸ Piron, F. (2018). Postcolonial Open Access. In U. Herb & J. Schöpfel (Eds.), *Open divide: Critical studies on Open Access* (pp. 117–128). Litwin Books. <http://hdl.handle.net/20.500.11794/16178>
- ²⁹ Christen, K. A. (2012). Does Information Really Want to be Free? Indigenous Knowledge Systems and the Question of Openness. *International Journal of Communication*, 6(0), 24. <http://ijoc.org/index.php/ijoc/article/view/1618>; Chan, Leslie. (2018a). Open Access in the Global South: Perspectives from the Open and Collaborative Science in Development Network. Zenodo. <http://doi.org/10.5281/zenodo.1240505>; Chan, L. (2018b). Open Access, the Global South and the Politics of Knowledge Production and Circulation. *Open Library of Humanities*. <https://www.openlibhums.org/news/314/>
- ³⁰ Curry, S. (2012). Sick of Impact Factors. *Occamstypewriter blog*. <http://occamstypewriter.org>

³¹ Larivière, V. et al. (2016). A simple proposal for the publication of journal citation distributions. bioRxiv 062109. doi: <https://doi.org/10.1101/062109>

³² Quet, M. (2009). *Politiques du savoir. Une approche communicationnelle des rapports entre sciences, technologies et participation en France (1968–1983)* [Doctoral dissertation, Ecole des Hautes Etudes en Sciences Sociales (EHESS)]. HAL Archives-ouvertes. <https://core.ac.uk/download/pdf/52818734.pdf>; Quet recalls that “In December 1969, SESPA activists demonstrated in Boston at the annual meeting of the American Association for the Advancement of Science (AAAS), chanting ‘Science for the People’. They thus forged a formula that would make their fortune in the years that followed and mark the entry into the scientific sphere of a type of activism that was foreign to it.”

³³ Paulo Freire (1970) in Brazil, Orlando Fals Borda (2006) in Colombia, Rajesh Tandon (Hall & Tandon 2017) in India, Francisco Vio Grossi in Chile, and John Gaventa and Patricia McGuire in USA were associated with the 1978 creation of the International Participatory Research Network; Hall, B. L. (1975). Participatory research: an approach for change. *Convergence*, VIII(2), 24–32; Freire, P. (1970). *Pedagogy of the Oppressed* (Chapter 3: Thematic Investigation). Penguin Books; Hall, B. L. & Tandon, R. (2017). Participatory research: Where have we been, where are we going? – A dialogue. *Research for All*, 1(2), 365–374; Fals Borda, O. (2006). Participatory (Action) Research in Social Theory: Origins and Challenges. In P. Reason & H. Bradbury (Eds.), *Handbook of Action Research*. SAGE Publications.

³⁴ A science shop is a program that aims to put the knowledge and skills of students at the service of local community organizations and associations through concrete projects or research carried out as part of their training. See <https://www.livingknowledge.org/>, the world network of science shops.

³⁵ Hende, M., & Jørgensen, M. S. (2000). *The impact of science shops on university research and education*. Science Shop for Biology, Utrecht University. https://www.livingknowledge.org/fileadmin/Dateien-Living-Knowledge/Library/Project_reports/SCIPAS_report_nr.6_2001.pdf

³⁶ Nielsen, A.P., Lassen, J. & Sandøe, P. (2007). Democracy at its Best? The Consensus Conference in a Cross-national Perspective. *Journal of Agricultural and Environmental Ethics* 20, 13–35. <https://doi-org.acces.bibl.ulaval.ca/10.1007/s10806-006-9018-5>

³⁷ For example, by associations such as [Science for the people](#), [Sciences Citoyennes](#), [Alliance science and society \(ALLISS\)](#) in France, or [All India People’s Science Network](#) (Kannan 1990); Kannan, K. P. (1990). Secularism and people’s science movement in India. *Economic and Political Weekly*, 25(6), 311–313. <https://www.epw.in/journal/1990/6/roots-specials/secularism-and-people-s-science-movement-india.html>

³⁸ Piron, F. (2011). La citoyenneté scientifique contre l’économie marchande du savoir. Un enjeu d’éthique publique. *Éthique publique*, 12(1), 79–104. <http://journals.openedition.org/ethiquepublique/240>

³⁹ OECD. (2002). Strengthening the Knowledge-based Economy, *OECD Science, Technology and Industry Outlook 2002*, OECD Publishing, Paris. https://doi.org/10.1787/sti_outlook-2002-3-en;

⁴⁰ Nussbaum, M. C. (2011). *Not for profit: Why democracy needs the Humanities*. Princeton University Press.

⁴¹ Smith, L. T. (2012). *Decolonizing methodologies. Research and Indigenous Peoples*. Zed books.

⁴² Hall, B. L., Tandon, R. & Tremblay, C. (2015). *Strengthening community university research partnerships: Global perspectives*. University of Columbia. <http://hdl.handle.net/1828/6509>

⁴³ Piron, F. (2019). L’amoralité du positivisme institutionnel. L’épistémologie du lien comme résistance. In L. Brière, M. Lieutenant-Gosselin & F. Piron (Eds.), *Et si la recherche scientifique ne pouvait pas être neutre?* (pp. 135–168). Éditions science et bien commun. <https://scienceetbiencommun.pressbooks.pub/neutralite/chapter/piron/>

⁴⁴ Lhoste, K. (2020, April 27). Les fablabs apportent des solutions concrètes et locales à la crise du Covid-19. *The Conversation*. <https://theconversation.com/les-fab-labs-apportent-des-solutions-concretes-et-locales-a-la-crise-du-covid-19-136277>

-
- ⁴⁵ A makerspace is “a member-operated shared space where people come together and collaborate while sharing tools, resources and knowledge. Members come from all different backgrounds and collectively bring vast amounts of knowledge and experience to the space. To keep Makerspace functioning, all members share a responsibility to keep the space safe, tidy, and welcoming. Makerspace members benefit from 24-hour access to a large assortment of equipment and tools” (from the Victoria Makerspace website at <https://makerspace.ca/>).
- ⁴⁶ Haklay, M. (2013). Citizen Science and Volunteered Geographic Information: Overview and Typology of Participation. In: Sui D., Elwood S., Goodchild M. (eds) *Crowdsourcing Geographic Knowledge*. Springer, Dordrecht. https://link.springer.com/chapter/10.1007/978-94-007-4587-2_7
- ⁴⁷ Moulier-Boutang, Y. (2012). *Cognitive capitalism*. Polity.
- ⁴⁸ Mboa Nkoudou, T. H. (2017). Benefits and the hidden face of the maker movement: Thoughts on its appropriation in African context | Os benefícios e a face oculta do movimento maker: Reflexões sobre sua apropriação no contexto africano. *Liinc em Revista*, 13(1), 72–88. <http://revista.ibict.br/liinc/article/view/3774>
- ⁴⁹ Escobar, A. (2020). *Pluriversal Politics: the real and the possible*. Durham: Duke University Press and (2018) *Sentir-penser la Terre. L'Écologie au-delà de l'Occident*. Le Seuil.
- ⁵⁰ Fals Borda, O. (2006). Participatory (Action) Research in Social Theory: Origins and Challenges. In P. Reason & H. Bradbury (Eds.), *Handbook of Action Research*. SAGE Publications.
- ⁵¹ Spivak, G. C. (1983). *Can the subaltern speak?*, 66–111. <https://disfasia.net/readings/spivak.pdf>
- ⁵² Harding, S. ed (2011). *The Postcolonial Science and Technology Studies Reader*. Duke University Press.
- ⁵³ Mudimbe, V. (1988). *The Invention of Africa*.
- ⁵⁴ Said, E. (1978). *Orientalism*. Pantheon Books.
- ⁵⁵ Fanon, F. 1952. *Peau noire, masques blancs*. Le Seuil.
- ⁵⁶ Thiong'o, N. W. (1986). *Decolonising the Mind: The Politics of Language in African Literature* (Studies in African Literature edition). Heinemann.
- ⁵⁷ Gangesa Upadhyaya. (2020). *Jewel of reflection on the truth about epistemology*. Bloomsbury.
- ⁵⁸ Fals Borda, Orlando. (2020). *Décoloniser les sciences sociales. Une anthologie bilingue de textes clés d'Orlando Fals Borda (1925-2008)*. Edited by Liliana Diaz and Baptiste Godrie. 2020. Éditions science et bien commun.
- ⁵⁹ Mudimbe, V. (1988). *The Invention of Africa*.
- ⁶⁰ Kitchener, C. (2020, April 24). Women academics seem to be submitting fewer papers during coronavirus. ‘Never seen anything like it,’ says one editor. *The Lily*. <https://www.thelily.com/women-academics-seem-to-be-submitting-fewer-papers-during-coronavirus-never-seen-anything-like-it-says-one-editor/>
- ⁶¹ Fredericks, B. (2011). ‘Universities are not the safe places we would like to think they are, but they are getting safer’: Indigenous women academics in higher education. *Journal of Australian Indigenous Issues*, 14(1), 41-53. <https://eprints.qut.edu.au/38492/>; Piron, F., et al. (2017). Le libre accès vu d’Afrique francophone subsaharienne. *Revue française des sciences de l’information et de la communication*, (11). <http://journals.openedition.org/rfsic/3292>
- ⁶² Santos, B. de Sousa (2014). *Épistémologies du Sud : Mouvements citoyens et polémique sur la science*. Desclée De Brouwer.
- ⁶³ Little Bear, L. (2000). Jagged worldviews colliding. In M. Battiste (Ed.), *Reclaiming indigenous voice and vision* (pp. 77–85). UBC Press. Page 77.

⁶⁴ Morin, E. (2008). *On complexity*. Hampton Press.

⁶⁵ Nakata, M. (2002). Indigenous Knowledge and the Cultural Interface: underlying issues at the intersection of knowledge and information systems. *IFLA Journal*, 28(5–6), 281–291. <https://journals-sagepub-com.acces.bibl.ulaval.ca/doi/abs/10.1177/034003520202800513>, page 283.

⁶⁶ Snively, G. & Williams, W. L. (2016). *Knowing home: Braiding Indigenous science with Western science, Book 1*. University of Victoria Press.

⁶⁷ Fonn, Sharon et al. 2018. Repositioning Africa in global knowledge production. *The Lancet*, Volume 392, Issue 10153, 1163–1166.

⁶⁸ de Sousa Santos, B. (2018). *The End of the Cognitive Empire: The Coming of Age of Epistemologies of the South*. Duke University Press.

⁶⁹ The term "subalternised" is inspired by the work of Antonio Gramsci and Gayatri Spivak, among others. It refers to a social group or knowledge that has been placed in a subordinate position in relation to the hegemonic power of another group.

⁷⁰ Visvanathan, Shiv. 1997. *A Carnival for Science: Essays on Science, Technology and Development*. Oxford University Press; Visvanathan, S. (1998). A Celebration of Difference: Science and Democracy in India. *Science* Vol. 280, Issue 5360, pp. 42–43. DOI: 10.1126/science.280.5360.42 <https://science.sciencemag.org/content/280/5360/42>; Visvanathan, Shiv. 2009. The search for cognitive justice. http://www.india-seminar.com/2009/597/597shiv_visvanathan.htm.

⁷¹ Santos, B. de Sousa (2014). *Epistemologies of the South: Justice against epistemicide*. Routledge. http://unescochair-cbrsr.org/pdf/resource/Epistemologies_of_the_South.pdf

⁷² Piron, F. (2018). Justice et injustice cognitives : de l'épistémologie à la matérialité des savoirs humains. In É. Tremblay & R. Dorcé (Eds), *Les Classiques des sciences sociales : 25 ans de partage des savoirs dans la francophonie* (pp. 259–273). Éditions science et bien commun. <https://scienceetbiencommun.pressbooks.pub/classiques25ans/chapter/justice-et-injustice-cognitives> (translated, p. 260)

⁷³ Grosfoguel, R. (2002). Colonial Difference, Geopolitics of Knowledge, and Global Coloniality in the Modern/Colonial Capitalist World-System. *Review (Fernand Braudel Center)*, 25(3), 203–224. <https://www.jstor.org/stable/40241548>; Grosfoguel, R. (2007). The Epistemic Decolonial Turn. *Cultural Studies*, 21(2–3), 211–223. <https://doi.org/10.1080/09502380601162514>; Christen, K. A. (2012). Does Information Really Want to be Free? Indigenous Knowledge Systems and the Question of Openness. *International Journal of Communication*, 6(0), 24. <http://ijoc.org/index.php/ijoc/article/view/1618>; Christen, K. (2015). Tribal Archives, Traditional Knowledge, and Local Contexts: Why the "s" Matters. *Journal of Western Archives*, 6(1). <https://digitalcommons.usu.edu/westernarchives/vol6/iss1/3>; Chan, L., Okune, A., Hillyer, R., Albornoz, D., & Posada, A. (Eds.). (2019). *Contextualizing Openness: Situating Open Science*. University of Ottawa Press. <https://press.uottawa.ca/contextualizing-openness.html>

⁷⁴ Some of these considerations are inspired by the work of the [Open and Collaborative Science in Development Network](#), which undertook a three-year study to better understand the promises and limitations of Open Science in the Global South. Collectively, the 12 research teams that comprised the network came to a set of shared principles and values. See Chan et. al. (2019); Chan, L., Okune, A., Hillyer, R., Albornoz, D., & Posada, A. (Eds.). (2019). *Contextualizing Openness: Situating Open Science*. University of Ottawa Press. <https://press.uottawa.ca/contextualizing-openness.html>