Epistemic Injustice in Science.
A conceptual and bibliometric exploration through a study of African academic literature

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Note to the reader

The articles included in this compendium have not been modified, apart from adjustments to table and figure numbering and formatting. The full text of each article is preserved exactly as in the original source. As a result, the reader may notice certain inconsistencies across the dissertation—whether in terminology (e.g., references to journal indexing systems [JIS], indexing platforms, data sources, or academic databases) or in writing style (e.g., some articles use the first-person singular, others the first-person plural, and others a more impersonal tone). This choice was intentional, as the aim is to reproduce the published versions of the articles rather than present revised or altered ones.

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Publications

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ABSTRACT

Efforts to make science more diverse, inclusive, and socially responsive have intensified across scholarly and policy arenas. Yet the infrastructures that govern how knowledge is produced, disseminated, and evaluated continue to privilege a narrow subset of the global research system, shaping whose voices are heard and whose work attains legitimacy. Commercial indexes, high-impact journals, and citation-based indicators act as gatekeepers that unevenly distribute visibility, authority, and epistemic resources.

Against this backdrop, this dissertation examines how structural asymmetries in scholarly knowledge production can be understood through the lens of epistemic injustice, and how bibliometric methods and research infrastructures both reproduce and can help mitigate these injustices. Conceptually, it proposes an open taxonomy of epistemic injustices in science that traces how harms arise across different stages of the research process and reflects on the limits of individual-level interventions. Empirically, it uses bibliometric methods to analyze two interconnected dimensions: (i) dissemination-stage injustices linked to the gatekeeping role of mainstream indexes, and (ii) uptake-stage injustices reflected in citation and recognition patterns. It also considers the partial remedial potential of open and regional bibliographic infrastructures. Africa serves as the principal empirical setting for examining how global hierarchies of visibility, authority, and circulation are configured and contested.

The findings show that epistemic injustices in science are structurally embedded rather than incidental. Biases in representation, recognition, and access are produced and reinforced through the infrastructures and evaluative practices that regulate how knowledge moves through the scientific system. This perspective underscores the need to understand databases and citation practices not as neutral intermediaries but as active sites where epistemic authority is constructed and contested.

The dissertation carries implications for bibliometric practice, research evaluation, and scholarly communication. It highlights the epistemic and political nature of database selection and data provenance, advocating for methodological pluralism and greater conceptual reflexivity in scientometrics. For evaluation, it cautions against exclusive reliance on commercial databases—especially when assessing underrepresented regions—and argues for context-sensitive, multifaceted approaches aligned with epistemic justice principles. For scholarly communication, it emphasizes the importance of supporting regional publishing ecosystems and recognizing diverse quality models, formats, and linguistic practices as essential to building a more inclusive and globally representative scientific system.

RESUMEN

En las últimas décadas, han aumentado las iniciativas orientadas a construir un sistema científico más diverso e inclusivo. Sin embargo, las infraestructuras que organizan la producción, difusión y evaluación del conocimiento —bases de datos comerciales, revistas de alto impacto e indicadores centrados en citas— continúan privilegiando a un segmento muy reducido del sistema global. Estos dispositivos actúan como filtros de visibilidad y reconocimiento, determinando qué voces son escuchadas, qué trabajos se consideran legítimos y qué comunidades adquieren autoridad epistémica.

Ante este escenario, esta tesis examina cómo las asimetrías estructurales en la producción de conocimiento pueden entenderse a través del marco de la injusticia epistémica, y cómo las metodologías bibliométricas y las infraestructuras de datos pueden tanto reproducir como contribuir a corregir dichas injusticias. En el plano conceptual, se propone una taxonomía abierta de injusticias epistémicas en la ciencia, que muestra cómo estas emergen en distintas fases del proceso investigador y reflexiona sobre los límites de las intervenciones centradas únicamente en el individuo. En el plano empírico, la tesis analiza dos dimensiones interrelacionadas: (i) las injusticias en la fase de difusión, donde los principales índices académicos actúan como guardianes de la visibilidad global; y (ii) las injusticias en la fase de recepción, donde los patrones de citación influyen en qué trabajos son utilizados, valorados y circulados. Asimismo, se examina el potencial de infraestructuras bibliográficas abiertas y regionales como posibles mecanismos de reparación. África constituye el escenario empírico central para estudiar cómo se configuran y disputan las jerarquías globales de producción y circulación del conocimiento.

Los resultados muestran que la injusticia epistémica en la ciencia no es un fenómeno accidental ni episódico, sino una consecuencia estructural de los sistemas que definen la legitimidad, confieren autoridad y regulan el acceso a los recursos epistémicos. Las desigualdades en representación, reconocimiento y acceso están incrustadas en dichas infraestructuras y sus prácticas evaluativas, acumulándose a lo largo de las distintas etapas del proceso científico. Este enfoque invita a comprender las bases de datos y las prácticas de citación no como intermediarios neutrales, sino como espacios activos donde la autoridad epistémica se construye y se disputa.

Finalmente, la tesis plantea implicaciones relevantes para la evaluación de la investigación, la práctica bibliométrica y la comunicación académica. En bibliometría, subraya la importancia de la procedencia de los datos y la necesidad de adoptar una postura reflexiva en la selección de bases de datos, entendida esta como una decisión simultáneamente epistémica y política. En evaluación, advierte sobre los riesgos de basarse exclusivamente en bases de datos comerciales para valorar la actividad científica en regiones infrarrepresentadas, y aboga por prácticas contextualizadas, multifacéticas y sensibles a las inequidades estructurales. En el ámbito de la comunicación científica, la investigación destaca el valor de los ecosistemas editoriales regionales y la necesidad de apoyar infraestructuras que amplifiquen voces locales. Reconocer la legitimidad de modelos de calidad, formatos

y prácticas lingüísticas diversas es esencial para avanzar hacia un sistema científico más global, plural e inclusivo.

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CHAPTER ONE
INTRODUCTION

Over the past decades, debates on how to make science more diverse, inclusive, and socially responsive have intensified across multiple fields. Calls to ‘decolonize’ knowledge, to open up research evaluation, and to acknowledge the plurality of scientific practices have become increasingly visible in scholarly arenas (Crawford et al., 2021; Jeater, 2018; Mitova, 2020). Yet despite this growing attention, the infrastructures through which scientific knowledge is produced, communicated, and assessed continue to privilege a narrow segment of the global research. Commercial bibliographic databases, high-impact journals, and citation-based indicators still function as central gatekeepers of visibility and recognition. As a result, some scientific communities gain disproportionate influence over what counts as legitimate knowledge, while others remain structurally marginalized system (Beigel, 2014; Collyer, 2018; Vessuri et al., 2014). These infrastructures shape whose voices are heard, which outputs are considered in evaluation, and which communities acquire the authority to define what constitutes valid knowledge.

This dissertation is situated at the intersection of these debates. It begins from the observation that the infrastructures used to assess scientific activity—particularly bibliographic databases and the indicators derived from them—carry profound epistemological and political consequences. When these infrastructures privilege particular languages, regions, publication formats, or disciplinary practices, they reinforce structural asymmetries that render entire communities less visible or less credible. In this sense, the politics of scholarly communication are inseparable from the politics of epistemic justice. Systems designed to measure science inevitably shape who is recognized as a knower, whose work becomes citable, and which intellectual traditions are preserved or erased.

The thesis examines how entrenched asymmetries throughout the scholarly knowledge production process can be understood through the lens of epistemic injustice and investigates how bibliometric methods and data infrastructures can both reproduce and help remediate such injustices. The conceptual vocabulary of epistemic injustice offers a distinctive way to identify and analyze these inequalities, making it possible to articulate how structural prejudices shape not only the content of scientific knowledge but also the conditions under which it is produced and evaluated. Yet, despite its relevance, epistemic injustice remains underexplored within scientometric research. Bringing epistemic injustice theory into conversation with bibliometrics allows familiar phenomena—such as coverage bias or data incompleteness—to be interpreted as manifestations of deeper, historically embedded mechanisms through which some knowledge becomes central and other knowledge becomes peripheral.

Integrating this vocabulary into scientometrics offers a valuable lens for interpreting these dynamics. On the one hand, bibliometric methods play a central role in mapping and evaluating scientific production and therefore occupy a privileged position in the contemporary governance of research. Citation counts, journal-level impact indicators, and performance-based metrics inform decisions on funding, promotion, institutional rankings, and national science policies. On the other hand, the datasets that underpin these metrics—most notably WoS and Scopus—are structured by linguistic, geographical, and disciplinary biases that systematically underrepresent research from non-Western regions, non-English outlets, and many humanities and social science fields. As a result, bibliometric indicators risk obscuring or reinforcing the very injustices they might otherwise help to diagnose (Ma, 2022). Bringing epistemic injustice into dialogue with scientometrics therefore requires a careful and critical approach. Bibliometric methods can reveal patterns of exclusion and asymmetry, but they can also reproduce them—especially when relying exclusively on commercial databases whose structures reflect the inequities of the scholarly publishing ecosystem. At the same time, open infrastructures and regional initiatives are creating new possibilities for more inclusive representations of scientific activity, particularly in regions historically underrepresented in global indexes. Understanding the affordances and limitations of these infrastructures is essential for advancing more just forms of research evaluation and knowledge assessment.

This tension is especially visible in the case of African scholarly publishing. African research has long been marginalized within global knowledge circuits, not only due to material constraints on funding and infrastructure, but also because local journals and publication practices often fall outside the boundaries of mainstream indexes (Asubiaro & Onaolapo, 2023; Alonso-Álvarez, 2024; Tijssen et al., 2006). The invisibility of African research cannot be explained solely by data gaps or technical limitations. It is intertwined with longer histories of coloniality in science, the dominance of English as the language of academic legitimacy, and the authority of Western-centric publishing norms. Regional initiatives such as African Journals Online (AJOL), and more recently open infrastructures like OpenAlex, seek to broaden coverage and improve representation. Yet the extent to which these initiatives counteract epistemic injustices in publication and uptake remains an empirical question. Meanwhile, research on African science is often conducted using only WoS or Scopus data, which contributes to partial and skewed representations of the continent's scholarly landscape (e.g., Confraria & Mira Godinho, 2015; Malapane et al., 2022; Mutebi et al., 2022).

Against this backdrop, the dissertation pursues two broad lines of inquiry. First, it asks how epistemic injustices in science can be conceptualized and operationalized in ways that are compatible with bibliometric investigation, without reducing complex social phenomena to simplistic indicators. This requires developing a conceptual framework that connects different varieties of epistemic injustice—drawing on authors such as Fricker, Dotson, Medina, de Sousa Santos, and others—to multiple stages of the scientific process: production, communication, uptake, transfer, historicization, and analysis. Second, it examines how specific bibliographic infrastructures and data sources participate in the reproduction or mitigation of these injustices, with a particular focus on the African context as a revealing empirical site.

The thesis is therefore both conceptual and empirical. Conceptually, it proposes an open taxonomy of epistemic injustices in science that highlights how injustices emerge at different stages and through different mechanisms, and reflects on the limits and possibilities of addressing them through structural rather than purely individual interventions. Empirically, it uses bibliometric methods to analyze two interconnected dimensions of epistemic injustice: (i) injustices at the dissemination stage, where mainstream indexes act as gatekeepers of global visibility; and (ii) injustices at the uptake stage, where patterns of citation and recognition influence whose work is used, valued, and further circulated. Finally, it studies how open and regional bibliographic insfrastructures might serve as remedies, albeit partial, for epistemic injustice in science. Throughout the thesis, Africa serves as a focal empirical setting for examining how global hierarchies of knowledge production and circulation are structured and contested.

Ultimately, the purpose of this dissertation is not only to diagnose these injustices but also to reflect on the possibilities for transforming bibliometric practice. It asks to what extent metric infrastructures can be re-imagined as tools for epistemic justice rather than instruments that silently perpetuate inequality. If scientometric indicators and infrastructures participate in the production of epistemic hierarchies, they can also be reconfigured to challenge and mitigate them. Doing so requires conceptual clarity, methodological reflexivity, and attention to how epistemic injustices arise at different stages of the scientific process. It also demands careful consideration of what metrics can—and cannot—capture, as well as acknowledgement of the limitations of bibliometric data and the structural conditions that frame what is and is not visible.

The remainder of this chapter introduces the main objectives of the thesis, reflects on the authors positionality in relation to this project, and outlines its overall structure.

1.1 Objectives

The general objective of this dissertation is to explore how epistemic injustices in science can be studied through bibliometric methods and data infrastructures, and to examine the extent to which alternative, more inclusive bibliographic sources can contribute to mitigating such injustices, with a particular focus on African scholarly publishing.

From this overarching aim, several specific objectives are derived:

1. To articulate a theoretical and conceptual framework for epistemic injustice in science.

The thesis seeks to synthesize existing theories of epistemic injustice by distinguishing between different varieties and orders of injustice, while also reflecting on the tensions between individual and structural remedies. Building on these theoretical foundations, it applies the lens of epistemic injustice to the scientific process to identify the specific injustices that arise at different stages. To this end, the thesis proposes a taxonomy that categorizes epistemic injustices according to where and how they emerge across the scientific process. It maps varieties and orders of epistemic injustice onto key stages of scientific production, namely: communication, uptake, transfer, historicization, and analysis. The resulting taxonomy is conceived as a flexible and evolving tool, open to refinement through further empirical research and adaptable to diverse disciplinary and regional contexts.

2. To operationalize selected dimensions of epistemic injustice using bibliometric variables.

The dissertation identifies which types of epistemic injustice can be meaningfully approached through bibliometric analysis and which require alternative methods. Focusing empirically on injustices at the publication and uptake stages, it operationalizes concepts such as credibility and prejudice through variables related to journal inclusion in mainstream indexes, geographical location, language of publication, disciplinary area, author affiliations, and citation patterns. The aim is to show how bibliometric indicators can illuminate structural asymmetries without reducing them to mere quantitative proxies.

3. To examine epistemic injustice at the dissemination stage in African scholarly publishing.

The thesis analyses how African journals are represented across different data sources—specifically AJOL, Scopus, and Web of Science—considering both quality criteria and coverage. It investigates how inclusion and exclusion practices in major databases shape which African journals become visible in global knowledge circuits, and how alternative quality frameworks challenge the monopoly of mainstream indexes as arbiters of journal legitimacy.

4. To study epistemic injustice at the uptake stage through citation patterns of local and non-local African research.

The dissertation examines how different conceptualizations of 'local research' (based on indexing status, journal toponyms, article titles, and author affiliations) relate to patterns of citation and recognition. It assesses whether research grounded in local contexts receives differential attention—within Africa and internationally—and how credibility deficits and testimonial injustices manifest at the level of uptake.

5. To assess the potential of both comprehensive and regional bibliometric data sources to mitigate epistemic injustice.

The thesis evaluates the capacity of bibliometric data sources to serve as potential remedies for certain varieties of epistemic injustice, particularly those associated with restricted access to epistemic resources. It examines two data sources of different natures: OpenAlex—arguably the most comprehensive bibliometric data source—and African Journals Online, the largest indexing platform for African-based scholarly journals. The thesis analyzes their coverage and reflects on their capacity to enhance the visibility and recognition of African scholarship. In addition to assessing their scope, it addresses whether, and under what conditions, each data source can serve as a viable alternative for bibliometric studies and research assessment.

6. To construct and disseminate a reusable dataset of African journals and publications indexed in AJOL.

As a concrete contribution toward epistemic justice and epistemic decentralization, the dissertation compiles, cleans, and documents a relational database of AJOL-indexed journals and publications. This dataset is intended to support further research on African scholarly communication and to lower the barriers to working with regional sources beyond mainstream indexes, thereby contributing to greater source diversity and helping to counter asymmetries in bibliometric analyses.

7. To reflect on the positionality of bibliometric analysis within structures of epistemic injustice.

Recognizing that bibliometrics is not a neutral analytical lens, the thesis examines the role of metrics and data infrastructures in simultaneously illuminating and reproducing epistemic injustices. It reflects on the limitations of the chosen methods with the aim of advancing a more reflexive and responsible use of bibliometric tools.

1.2 Reflexivity and positionality

This work talks about science, but not as a neutral or homogeneous subject. It approaches science as a field of struggle; as a site where multiple, and sometimes conflicting, realities confront one another, an arena that is traversed by material, social, geographical, and also epistemic realities. These realities shape the positions that individuals and communities held within the scientific world system and contour their (our) hermeneutical capabilities. This is particularly relevant for the aims of this thesis for two reasons. First, no researcher can escape the power relations that shape their positionality, which necessarily influence what we study and how we study it; in other words, there is therefore no ‘zero point’ (Mignolo, 2009). This dissertation criticises universalist approaches toward scientific research at various moments. It argues that science is always situated within the contexts in which it is produced and shaped by particular histories, practices, material conditions, and epistemologies. All knowledge is, after all, local (Harding, 2003). Consequently, any attempt to evaluate research must be contextually grounded: quality is not a universal category. Second, the thesis highlights how social and cultural factors shape our understanding of the world and of others, including the epistemic limitations that prevent agents from fully perceiving realities in which they are not embedded. Although our sensibilities can be expanded through epistemic interaction with other agents and contexts (Medina, 2013), our hermeneutical resources remain partly bounded by our lived experiences—including those interactions themselves. Openness and sensitivity cannot be meaningfully exercised without acknowledging these hermeneutical limits.

For these reasons, it is necessary to acknowledge my own positionality so that this dissertation can be read within the context in which it was written. I am a PhD researcher at Universidad Carlos III de Madrid, a public Spanish university, and my academic training has taken place in both Spain and the United Kingdom. I am therefore embedded within Western values and ideals about research and science. My current location in Spain situates me in a country that, in research terms, has often been described as semiperipheral (Burgess, 2008; Cusell et al., 2024; Dagiene & Aibar, 2025). Spain is located in Europe and it is home to a major global language, has a resilient publication system, and it is well positioned in terms of the volume of academic production—ranking 11th in the Scimago Journal Ranking 2024. However, Spanish science remains largely driven by the standards and agendas set by the Anglo-American core, including the widespread adoption of English as the dominant publishing language. I have been fortunate to receive funding that has supported five years of doctoral work, including several research stays and attendance at academic conferences within and outside Europe. I approach this work with a deep interest in how inequalities and power relations shape our world and our position in it. At the same time, I acknowledge that my understanding and explanatory capacity are shaped by my positionality, particularly as this dissertation focuses on a context of which I am not a member. I undertook a research stay at CREST, Stellenbosch University, under the guidance of Prof. Nelius Boshoff, during which I had the opportunity to learn about aspects of the South African—and, to a lesser extent, the broader African—academic system from within. Although limited, this experience has been valuable for my understanding of the research presented in this thesis.

I do not believe that positionality should prevent us from studying contexts different from our own. However, I do believe that such work requires caution and reflexivity. In studying epistemic injustice and the position of African scholarship within the global academic system, I have tried to focus on the structures and practices through which inequalities are maintained, especially those arising from decisions made in the Global North. Thus, while the empirical analysis concerns African scholarship, my critical reflections are directed at the global power structures that sustain the marginalisation of certain African epistemic communities. Likewise, my approach to epistemic injustice is intentionally cautious, leaving room for others to extend, refine, or correct the ideas I present here. Whether I have succeeded in doing so is left to the reader's judgment.

1.3 Structure of the thesis

The dissertation is structured into eleven chapters, which together guide the reader from the conceptual foundations of the study toward the empirical analyses and final reflections. The first set of chapters builds the theoretical and contextual groundwork. Chapter Two situates the research within broader debates on the global organization of science, discussing how journals function as structural components of epistemic communities and how communication circuits reflect and reproduce inequalities. It traces the development of African scholarly publishing and engages with decolonial theory to examine how historical and geopolitical asymmetries shape present-day knowledge production.

Chapter Three deepens the theoretical discussion by presenting the concept of epistemic injustice and related ideas such as epistemic oppression, epistemicide, and hermeneutical marginalization. Drawing on authors such as Fricker, Dotson, Medina, and de Sousa Santos, it elaborates on the varieties and orders of epistemic injustice and explains why virtue-based approaches are insufficient without structural interventions. Building on this foundation, Chapter Four introduces a taxonomy of epistemic injustices specifically oriented to scientific practice. It organizes injustices across key stages of the scientific process—producing, communicating, transferring, historicizing, and analysing science—and highlights which dimensions are most amenable to empirical investigation through bibliometric methods.

Chapter Five outlines the research design. This chapter explains how epistemic injustices at the publication and uptake stages are operationalized through bibliometric variables, discusses the role of open and regional infrastructures such as AJOL and OpenAlex, and provides an overview of the data sources and methods used in the subsequent empirical analyses.

Chapters Six, Seven, Eight, and Nine compile the empirical studies conducted for this dissertation. Chapter Six examines the representation of African journals across AJOL, Scopus, and Web of Science, comparing their quality criteria and exploring how selective indexing practices contribute to credibility deficits. Chapter Seven investigates citation patterns of local and non-local African publications using data from AJOL and OpenAlex, analysing how different conceptualizations of locality relate to recognition within and beyond the continent. Chapter Eight evaluates the coverage and metadata accuracy of African publications in OpenAlex in comparison with commercial databases, highlighting both the benefits and limitations of open infrastructures. Chapter Nine presents the construction of a comprehensive dataset of AJOL journals and publications, reflecting on its potential as a contribution to the epistemic decentralization of science.

The final two chapters synthesize the findings and articulate the broader implications of the dissertation. Chapter Ten discusses how the empirical results relate to the theoretical and conceptual frameworks developed earlier, reflects on the use and potential risks of bibliometrics, and on how to approach epistemic justice in science. Finally, Chapter Eleven concludes the dissertation by summarizing its contributions, outlining avenues for future research, and reflecting on the possibilities and challenges of integrating epistemic justice perspectives into scientometrics.

CHAPTER TWO
BACKGROUND

This chapter provides the contextual and theoretical foundations of the thesis. It is structured into four sections. The first examines the role of academic journals within the broader process of scientific production, emphasizing their function as core institutional structures in the formation and consolidation of epistemic scientific communities. The second section introduces the conceptual framework of mainstream and peripheral knowledge-production circuits, addressing the barriers to entry that sustain these hierarchies and examining how such stratification informs the attribution of credibility and authority to certain scholarly communities while marginalizing others. The third section offers a concise overview of the historical evolution of the African scholarly publishing system and its current configuration. The final section discusses the power asymmetries embedded in academic publishing through the lenses of coloniality and decolonial theory, tracing the interconnections between knowledge decolonization and epistemic justice.

2.1 Journals as structural elements of scientific communities

Scientific communities can be seen as 'communities of practice' (Lave & Wenger, 1991), consisting of individuals who share common interests, challenges, or passion for a specific topic and who enhance their understanding and skills through continuous interaction (Wenger et al., 2002). These communities are defined by three interrelated elements: mutual engagement, a joint enterprise, and a shared repertoire (Wenger, 1999). They are not static; rather, they emerge and evolve through continuous participation and the negotiation of meaning among members. For Wenger, meaning emerges from the dynamic interplay between participation—the active engagement of individuals in shared practices—and reification—the creation of symbolic or material artifacts (e.g., texts, tools, concepts) that stabilize and objectify collective meaning. Zougris (2018) observes that this process parallels Bourdieu's (1977) theory of practice and habitus: individuals' participation in social fields both shapes and is shaped by the internalized dispositions that guide their perceptions and actions. While Wenger emphasizes interaction with others as an essential aspect of human experience, Bourdieu highlights participation as the mechanism through which an individual becomes a member of a community. Through engagement in shared practices and the symbolic mediation of the artifacts and meanings they collectively produce, members of scientific communities reproduce the social and cognitive structures that sustain their domains. Practices and fields are therefore inseparable: practice occurs within fields as the expression of agents' habitus interacting with the rules, norms, and distributions of capital that structure these fields.

From a Bourdieusian perspective, scientific fields can be understood as relatively autonomous social spaces where agents—researchers, editors, institutions—struggle over the accumulation and recognition of different forms of capital: symbolic, cultural, social, and economic (Bourdieu, 1975, 1988). These fields are characterized by internal hierarchies and rules of legitimacy that regulate what counts as valid knowledge and who has the authority to define it. For Bourdieu (2004), the institutionalization of a scientific field is marked by the emergence of formal structures—associations, conferences, and journals—, which strongly linked to the process of autonomization of a particular scientific field. Though this process of autonomization and institutionalization, the field constitutes itself, setting its control on entry and then constantly exercising control thought the very logic of its functioning though competence, scientific capital and the "belief on the game" (p.55). This process consolidates the means of knowledge production and confers legitimacy upon its members.

Within this theoretical framework, academic journals occupy a central role as both constructive and communicative infrastructures of scientific communities. They function not merely as repositories or channels for disseminating finalized knowledge, but as constitutive spaces in which collective epistemic practices are organized, negotiated, and reproduced. As Gläser and Aman (2017) argue, scientific communication must be conceived as part of the production process itself rather than a mere circulation of products. Journals, through their gatekeeping mechanisms—editorial boards, peer review processes, and thematic scopes—mediate between producers and users of knowledge, shaping the contours of what counts as legitimate contribution within a field. Through these mechanisms, journals sustain the collective production of knowledge and structure the very boundaries of scientific communities.

Historical studies of scientific periodicals reinforce this view. Dawson and Topham (2020) review the role of journals constructing and shaping scientific communities. They highlight the role of scientific journals in understanding "communities of scientific practice" (p. 8). In science, communities of practice function at a more abstract level, which do not require interpersonal interaction and are mainly sustained by periodicals. Periodicals thus enabled geographically dispersed scholars to coordinate their research, establish communication norms, and police community boundaries. The authors think of scientific journals as key sites in which power structures of science are developed and negotiated and, as thus, have the power to confer legitimacy and exercise control within their communities. However, the boundaries of scientific communities are not fixed, but variable and can be redefined by the incorporation of new agents. Even within a single journal, the scientific community that it forms is subjected to variations. In similar terms, Granados (2012) describes journals as 'nudos-espacios'—spaces that cultivate intellectual sociability, generate networks of cultural and scientific exchange, and act as the seedbed of intellectual communities composed of editors, authors, readers, and other actors. Along these lines and inspired by Bourdieu's habitus, Pita González (2016) characterizes journals as 'practical infrastructures' for sustaining intellectual networks. Building on these insights, Zuluaga Quintero (2020) argues that examining journals offers a lens through which to analyze the historical processes through which intellectual communities take shape.

The publication of an article in a particular journal is therefore both an act of participation in a community of practice and a means of accumulating symbolic capital within a field. From this perspective, academic fields and subfields can be seen as both Bourdieu's fields and scientific communities, structured around shared norms, epistemic standards, and symbolic hierarchies. Journals, in turn, serve as gateways through which individual researchers enter these communities and as platforms through which collective knowledge is negotiated and stabilized. By selecting, validating, and circulating contributions, journals not only communicate science, but they also constitute the communicative fabric through which scientific communities exist and evolve.

2.2 Cognitive authority within knowledge publishing circuits

A large body of scholarship documents an unequal world structure of scientific production and circulation that divides the system into a dominant 'mainstream' circuit and a set of peripheral circuits (Beigel, 2013a, 2014; Beigel & Salatino, 2015). These stratifications do more than sort outputs; they differentially distribute cognitive authority, or, in other words, the capacity to influence what others think (Wilson, 1983). Bourdieu's field theory provides a useful framework for understanding how authority is accumulated and defended. Scientific fields are spaces structured by unequal distributions of symbolic, cultural, social, and economic capital. As stated in the previous section, dominant agents manage 'conditions of entry', enforcing boundaries that protect field autonomy and regulate relations with external worlds (Bourdieu, 1988, 2004; Rodríguez Medina, 2013). According to Rodríguez Medina (2013), 'habitus'—internalized, generative dispositions—guides what actors perceive as legitimate problems, methods, and interlocutors, thereby reproducing hierarchies through seemingly neutral choices.

For Bourdieu, the scientific field, like any social domain, is a space of contestation where actors compete for influence. Within this setting, power takes the form of scientific authority, defined as the ability to establish what counts as legitimate science. Scientists, similar to other cultural producers, engage in disputes with their peers to have their own practices and definitions recognized as legitimate. These conflicts often manifest as competition over the ranking of both outputs and contributors, as well as over the standards or criteria used to assess them (Albert & Kleinman, 2011). They also concern the conditions under which one may be included in the field. Those who gain scientific authority are those who succeed in having their views on science, their methods, and their publication practices recognized by others as the legitimate standard. For Bourdieu (2004), 'scientific capital' is "the product of recognition by competitors" and "functions as "symbolic capital of recognition that is primarily [..] valid within the limits of the field" (p. 53). This symbolic power allows agents that hold it to define what counts as good science, including which journals are considered prestigious and which types of contributions are recognized as valuable.

Science and Technology Studies (STS) expand this picture by foregrounding communication, infrastructures, and heterogeneous networks as constitutive of scientific activity. Communication does not merely disseminate findings but organizes fields by including some actors as interlocutors and excluding others, thereby codifying tacit assumptions about how scientific work should be done (Clarke, 1991; Rodríguez Medina, 2013). From this perspective, journals, indexing systems, review protocols, and repositories are not passive channels but organizational devices that define identities, standards, and alliances. They are also epistemic infrastructures through which scientific communities articulate and reproduce their shared beliefs and practices. Boundary-object theory (Star & Griesemer, 1989) further explains how scientific works travel across worlds by maintaining their original meaning or changing minimally. Scholarly works can be conceived as 'standardized forms', a type of boundary object capable of carrying ideas from one site to another without significant transformation. Boundary objects are, according to Clarke and Star (2008), "things that exist at the junctures where varied social worlds meet in an arena of mutual concern" (p. 121). In scholarly work, boundary objects allow scientists and other actors to collaborate, interpreting and translating methods and results across domains (Star & Griesemer, 1989). However, when power asymmetries exist between different worlds, objects do not function as spaces of negotiation between equals but as 'subordinating objects', linking unequally endowed worlds without genuine negotiation (Rodríguez Medina, 2013). For Rodríguez Medina, this is exemplified by the imposition of foreign ideas, research agendas, theories, and methodologies upon local actors. Foreign ideas function as subordinating forces imposed on peripheral scientific fields through the international division of academic labor, which confines theoretical production to Western academic centers (Alatas, 2003; Baber, 2003; Rodríguez Medina, 2013). Following Connell (2007), center and periphery are used here to denote global dynamics of epistemic authority where some powerful actors influence subordinated sites of production. The West, Global North, or metropole thus refer not merely to geography but to structural positions of cognitive dominance within the world system of science. Mignolo's (2018) decolonial argument reinforces this view. In the modern/colonial world-system, metropolitan centers positioned themselves as loci of universal reason while relegating other knowledges to the status of culture or folklore, producing "silenced societies/knowledges" (p. 135) and transforming much of the Global South into objects of knowledge rather than sources of theory. Claims to neutrality are historically situated and geopolitically located yet naturalized as placeless. Within this context, alternative knowledge circuits—and alternative Journal Indexing Systems (JIS) in particular—can serve as spaces to contest the universality of dominant epistemologies.

The distinction between mainstream and peripheral circuits is therefore not only a matter of where knowledge circulates, but also of whose judgments are accepted as authoritative. In contemporary academia, journal indexing systems—most notably WoS and Scopus—function as institutionalized sources of cognitive authority because they are widely trusted to identify, rank, and evaluate scholarly communication (Chavarro, 2017). Their legitimacy is closely bound to Merton's (1973) principle of universalism: the expectation that judgments of quality rely on impersonal, globally valid criteria. The indicators they produce—impact factors, citation counts, quartiles—operate as institutionalized judgments of worth that are embedded in research evaluation, career progression, and funding allocation. Thus, mainstream circuits both reflect scientific hierarchies and construct them by demarcating the boundaries of credible scholarship and consolidating particular scientific communities around specific journals and evaluative standards. In this sense, it is noteworthy to emphasize that, epistemic harms and vices do not only harm individual knowers but also affect communities (Medina, 2013; Tanesini, 2022).

Yet the credibility of mainstream JIS depends on the perception that their procedures are unbiased. Evidence of systematic exclusion—by language, geography, topic, or institutional embeddedness—challenges their claim to universalism and, consequently, their cognitive authority (Chavarro, 2017). Importantly, journals themselves constitute the principal units of evaluation for entry into mainstream circuits: it is at the level of the journal—not the article—that inclusion or exclusion in major indexing systems is decided. As a result, the gatekeeping practices and coverage policies that determine which journals are indexed directly shape which scientific communities gain visibility within the global system of science. This tension helps explain the proliferation and persistence of alternative knowledge circuits—transnational and regional platforms such as SciELO, RedALyC, Latindex, and AJOL—as well as local outlets that make visible forms of scholarship marginalized by mainstream coverage policies (Beigel, 2014; Collyer, 2018; Vessuri et al., 2014). Peripheral circuits thus emerge as epistemic responses to a biased architecture of cognitive authority, offering alternative spaces that extend the traditional boundaries of academic visibility and inclusion.

Beigel (2006, 2013b, 2014) argues that academic hierarchies articulate with broader political–economic structures. The contemporary configuration—domination of technology, finance, resources, media, and military power—coincides with the consolidation of publishing oligopolies and metric governance, reinforcing a centre–periphery imaginary that naturalizes 'excellence' as Northern and 'local' as peripheral. The alignment between academic and social hierarchies is also at the core of Alatas's (2003) concept of academic dependency, which he conceptualizes along six dimensions that include both epistemic and material conditions. Two are especially relevant here: dependence on ideas and dependence on the media of ideas. Dependence on ideas refers to the persistent import of metatheory, theory, and research agendas from core centers, exemplified in Hountondji's

(1997) concept of 'extroversion', whereby scholars on the periphery look to Northern sources of authority for theoretical and methodological guidance, "modify[ing] the content and even the orientation of their work, choosing research topics and design models in accordance with external norms" (p. 8). Dependence on media appears as reliance on journals, books, and platforms owned or curated by Northern companies. The mainstream indexing systems and evaluative cultures that develop around these media codify supposedly 'universal' quality criteria that permeate from international outlets to local spheres, creating hierarchies and privileging issues and styles that travel well in mainstream circuits (Beigel, 2013b, 2014; Beigel & Salatino, 2015).

However, neither dependency nor peripherality implies passivity. Ethnographic and historical studies show that peripheral scientists critically appropriate, hybridize, and re-situate foreign ideas, bridging local and international academic spheres (Chavarro, 2017; Vessuri, 1997). In Bourdieu's terms, mainstream circuits acquire symbolic power—the power to impose meanings that are recognized as legitimate (Bourdieu, 1991). Since symbolic power exists only through recognition, the emergence and acceptance of alternative systems hold the potential to contest dominant structures. Mainstream and peripheral circuits are thus mechanisms through which cognitive authority is constructed, circulated, and disputed—and journals stand at their very core as both the objects and the arenas of these epistemic struggles.

2.3 Contextualizing academic publishing in Africa

The history of African scholarly publishing is deeply entangled with broader processes of decolonization, state formation, and dependency. With the exception of South Africa and Nigeria, university press publishing was not introduced in sub-Saharan Africa until the mid-1950s (Darko-Ampem, 2004). As a result, the decades immediately following independence were marked by remarkable intellectual vitality across universities in both anglophone and francophone Africa. The 1960s, in particular, were characterized by what Mills et al. (2023) describe as a period of "intellectual effervescence and publishing creativity" (p. 20). During this period, universities and newly established university presses became central nodes in the circulation of ideas. Scholarly journals proliferated, often with strong national identities and editorial boards composed primarily of local academics. This early phase was marked by optimism about the possibility of building self-sufficient systems of knowledge production. Scholars such as Altbach (1978) argued that the challenges of academic publishing were not "very costly nor overwhelmingly difficult" (p. 502). Similarly, Zeleza (1998) links the establishment of scholarly journals to "the dreams of nationalism and developmentalism" (as cited in Adebowale, 2001). Revisiting the transformation of African knowledge production during the 1960s, Allman (2013) notes that it challenged colonial categories by being "Africa-centred, Africa-based and globally engaged" (p. 183). By the mid-1970s, many African universities maintained their own journals and presses, and scholars as well as regional initiatives, such as the Arusha Seminar in Tanzania (1984), emphasized the importance of developing autonomous publishing capacity, particularly through university presses (Ebewo, 2010).

However, this promising landscape deteriorated rapidly during the following decade due to economic constraints and the associated crisis in higher education (Murray, 2008). Political instability, shrinking university budgets, and the imposition of International Monetary Fund structural adjustment programmes eroded the material foundations of African universities (Bgoya & Jay, 2013). Developing countries were subjected to World Bank policies that prioritised primary and secondary education at the expense of higher education, which was comparatively neglected (Murray, 2008). Insufficient funding, combined with colonial legacies and the rise of authoritarian states in many African countries, led universities into severe financial crisis. Laboratories and libraries deteriorated, and many leading academics emigrated, producing a substantial brain drain with significant consequences for research and scholarship (Mouton, 2008). In terms of scientific output, Africa's share of publications indexed in the ISI declined from 1 percent to 0.7 percent between 1987 and 1996 (Tijssen, 2007).

The contraction of African publishing infrastructures was accompanied by a growing sense of epistemic dependency. Altbach and Rathgeber (1980) noted a rising consciousness among Nigerian intellectuals of the "ideological control exercised over their work by expatriate publishers" (p. 31) and the pressure to conform to metropolitan viewpoints. The early sociology of publishing began to identify what would later be called the 'core–periphery' structure of global science. Peripheral academic systems were not simply less productive but were structurally dependent on Northern circuits for validation, visibility, and career advancement. By the 1980s and 1990s, journal indexing systems such as the Science Citation Index (SCI) and the Social Sciences Citation Index (SSCI) had become global arbiters of scientific credibility. These databases, managed by commercial publishers, set inclusion criteria—regularity of publication, citation by existing indexed journals, and digital archiving—that implicitly favored well-resourced regions in the North (Nwagwu, 2010). Applications from African journals, often characterised by irregular publication histories and limited digital infrastructures, were frequently rejected by international indexing systems (Mills et al., 2023). In response, universities across Africa increasingly began to require publication in so-called 'international' journals, a shift that undermined the reputation and viability of long-established national journals (Adomi & Mordi, 2003; Omobowale et al., 2014). At the same time, newly founded journals faced the so-called 'volume one, number one' syndrome, whereby financial constraints and organisational difficulties jeopardised their consolidation and long-term sustainability (Adebowale, 2001; Jaygbay, 1997). Concurrently, African journals, alongside journals from other Global South contexts, were systematically excluded from mainstream global circuits of knowledge. Compounding this exclusion, weak library and bibliographic infrastructures meant that many publications produced within African countries became inaccessible even to scholars based in the same national contexts (Lor & Britz, 2005).

This situation is reflected in an interview study by Alemna and colleagues (1999), in which most university staff reported very limited access to African-published journals and indicated that they relied primarily on personal networks rather than institutional library or bibliographic services.

Yet counter-movements also emerged. In 1973, the Council for the Development of Social Science Research in Africa (CODESRIA) was established in Senegal and later consolidated as a major regional publisher focused on the dissemination of the humanities and social sciences. In 1998, the International Network for the Availability of Scientific Publications (INASP) launched AJOL. Initially a donor-funded project, AJOL became an independent non-profit company listing fifty journals in 2005 and now hosts more than 900 titles from forty African countries. Around the same time, CODESRIA further consolidated its role as a major regional publisher, CODESRIA developed various programmes to promote local research and a culture of scholarly publishing in Africa (Bgoya & Jay, 2013). Founded by the South African government, SciELO South Africa was created in 2012—emulating the Brazilian site—to index high-quality, open-access African journals. Alongside these initiatives, new commercial publishers such as Hindawi—founded in Cairo in 1997 by Ahmed Hindawi and Nagwa Abdel-Mottaleb—were also established. Scholar voices also proposed the creation an African Citation Index (ACI) thar serve to structure and promote the use of African research (Nwagwu, 2006).

However, despite some improvements during the late 1990s, the early 2000s were not exempt from challenges for African academic publishing. These included persistent economic and technological constraints, limited access to electronic journals, political instability, and the continued invisibility of many publications, including some indexed in major Northern databases (Ondari-Okemwa, 2007). Moreover, the visibility and accessibility of African research outside Western bibliographic databases remained limited. The emergence of predatory publishing, a phenomenon that has disproportionately affected journals in the Global South, further undermined the credibility of African journals and exacerbated existing structural vulnerabilities (Nwagwu, 2016). AJOL plays a central role in addressing these challenges, having increased the visibility of its participant journals and contributed to higher submission rates reported by the journals themselves (Murray, 2008). Beyond serving as a bibliographic tool, AJOL provides a range of functionalities aimed at reducing publishing costs for journals, as well as offering training and mentorship for editors, a quality standards framework, and a tiered certification system that rewards editorial continuity. Since 2008, it has also functioned as a repository of full-text open-access journals, which has significantly increased the visibility of published articles (Murray, 2008). Using AJOL for bibliometric analyses therefore offers a more comprehensive picture of African scientific production. Already in the first years following AJOL's launch, Mouton (2010) showed that, when comparing sub-Saharan social sciences and humanities articles indexed in ISI and AJOL, the number of articles covered by AJOL was almost double that of ISI. This finding illustrates both the limitations of ISI and the potential of AJOL as a complementary data source. Nevertheless, AJOL's coverage remains uneven. Francophone and lusophone countries continue to be underrepresent Its limited search functionality and metadata standardization complicate large-scale analyses, yet it remains one of the largest compilations of African scholarly publications.

Parallel innovations in open bibliographic infrastructures—such as OpenAlex—have introduced new possibilities for inclusive mapping. Early evaluations suggest that OpenAlex's country-level coverage is more balanced than that of Scopus or WoS, but African journals remain comparatively under-represented (Chavarro & Alperin, 2024). This underrepresentation stems in part from OpenAlex's reliance on Crossref metadata and its prioritisation of publications with digital object identifiers (DOIs), which are still unevenly adopted across the continent. Moreover, its metadata for African outputs not included in the mainstream circuits remain very limited (Alonso-Álvarez & van Eck, 2025). Given that bibliometric indicators often depend on such metadata, gaps in coverage translate directly into invisibility in global science metrics (Confraria & Godinho, 2015; Sooryamoorthy, 2022). The cumulative effect is a skewed cartography of global science. Reliance on Scopus and WoS yields an incomplete and distorted picture in which much of African research—particularly that published in national or regional journals and in local languages—remains unseen.

2.4 Coloniality, knowledge decolonization and epistemic justice

As stated in the previous sections, the uneven geographies of publishing are not solely technical or economic; they carry profound epistemological implications. The ongoing effects of colonialism form part of what Ndlovu-Gatsheni (2013) calls 'coloniality', which refers to the "longstanding patterns of power that emerged from colonialism and continue to define culture, labour, intersubjective relations and knowledge production, long after the end of direct colonialism" (p. 16). This is expressed by Mitova (2020) as 'epistemic colonialism'. As she argues: "We live in an epistemically colonial world; that's no secret. Although the Global North physically left as colonial 'master' long ago, it still gets to tell the Global South what counts as genuine knowledge, rational thought, and real science" (p. 1).

But voices pointing towards the effects of colonality in science are not new. Scholars have largely argued that the global scientific order perpetuates colonial hierarchies of authority and legitimacy. Ake (1982) articulated this problem arguing that mainstream Western social science on Africa functioned as a "subtle and pernicious form of imperialism" (p. xiii), shaping how Africans perceived both their world and themselves. Western theories of political development, sociology, and economics, presented as universal, became tools for shaping the intellectual boundaries of the postcolonial world. Mudimbe's (1988) deepens this critique by showing how colonial epistemes structured what could be said and known about Africa. Europe not only represented Africa, but in doing so, invented it as an object of knowledge. Nyamnjoh (2004) extends these arguments to the present, portraying African higher education as captive to a Western epistemological export. He argues that even universities created after independence have conformed to foreign epistemologies. Curricula, pedagogies, and research agendas remain aligned with Western paradigms of science and competitiveness, rather than with African social realities. Europe not only represented Africa, but in doing so, invented it as an object of knowledge. Ndlovu-Gatsheni (2021) refers to this as the 'cognitive empire', which, building on wa Thiong'o, he describes as the "invasion of the mental universe of the colonized people" (p. 886). This marginalizes indigenous epistemologies, cosmologies, and value systems. In response to this situation, de Sousa Santos (2014/2016) proposes a new epistemological paradigm, the epistemologies of the South. He defines this as "a set of inquiries into the construction and validation of knowledge born in struggle, of ways of knowing developed by social groups as part of their resistance against the systematic injustices and oppressions caused by capitalism, colonialism, and patriarchy" (p. x). This aligns with Nyamnjoh's proposal to take African cosmologies, ontologies, and lived experiences seriously, and to build a more relevant scholarship that includes them (2019).

Academic literature has also emphasized the effects of epistemic marginalization on scholars. Hountondji (1990) argues that scientific activity in the Global South follows the same historical rules as elsewhere and is inseparably linked to economic life. As a result, it reproduces similarly "extroverted" economic patterns. According to Hountondji, African intellectual work is largely dependent on publishing infrastructures located outside the continent; consequently, the work of African scholars is more often published and better known in the Global North than in the South. This pattern leads to what he calls 'theoretical extroversion', a condition in which African scholarship is oriented outward, adapting its research topics, designs, and content to Northern norms while seeking validation from external centers of authority. As a result, African scholars are confined to the role of describing their own societies, while theoretical production remains concentrated in the North. Similarly, Zeleza (2002) characterizes this unequal relationship as an "international intellectual division of labor" (p. 21), in which African researchers primarily provide empirical material, while theory and interpretation are produced in Northern universities. Building on Ake's work, Arowosegbe (2016) compares Africa's intellectual dependency to its historical economic dependency: just as the continent was once confined to exporting raw materials, it has also been reduced to exporting raw data for theoretical processing elsewhere.

Bhargava (2013) directly links the epistemic dimension of coloniality to epistemic injustice. 'Epistemic injustice', according to Fricker (2007), is harm done to someone in their capacity as a knower (see Chapter 3 and 4 for a theoretical development of the concept, and an exploration of its varieties in science). However, applying a colonial lens, Bhargava adjusts Fricker's notion of epistemic injustice, arguing that it occurs when the categories through which people understand themselves are shaped by the categories of the colonizers. This occurs, for instance, when colonial frameworks prevent communities from recognising their own historical and cultural traditions. This approach is heavily influenced by Fanon's (1961/2004) notion of colonialism, in which "[colonialism] is not satisfied with snaring the people in its net or of draining the cononized brain of any form or substance. With a a kind of perverted logic, it turns its attention to the past of the colonized people and distorts it, disfigures it, and destroys it" (p. 149). Bhargava also asserts that the academy plays a central role in maintaining coloniality. Keet (2014) argues that epistemic injustice in the academy is legitimized through everyday acts of 'micro-othering', which are "invisible to the academy itself" (p. 24). The denial of the African knower and the rejection of African epistemologies in favor of Eurocentric dominant narratives has been framed under de Sousa Santos's concept of 'epistemicide' (2014/2016; the idea of epistemicide is further developed in Section 3.1.3), one of the most pernicious forms of epistemic injustice.

In order to counteract epistemic injustice, Ndlovu-Gatsheni (2018) calls for 'epistemic freedom'. To achieve it, he advocates for 'deprovincializing Africa' while 'provincializing Europe'. This process, akin to Ngũgĩ wa Thiong'o's (1993) concept of 'moving the center', involves shifting the intellectual center from the West to multiple global locations and cultures, as well as from dominant social strata to all social strata. Ndlovu-Gatsheni moves beyond the idea of a single form of knowledge, promoting a plural view of multiple knowledges. In terms of knowledge production, decolonization is essential. Chilisa (2012) understands knowledge production decolonization as "a process of conducting research in such a way that the worldviews of those who have suffered a long history of oppression and marginalization are given space to communicate from their frames of reference" (p. 14, as cited in Ndlovu-Gatsheni, 2018, p. 31). It is a process of 'researching back' to question the othering processes within academic disciplines. Similarly, Posholi (2020) defends 'epistemic decolonization' as a response to the hermeneutical injustice of Eurocentrism, which requires both thinking beyond the Eurocentric paradigm and developing critical perspectives on Eurocentrism itself.

However, calls to epistemic decolonization in science are prior and trascend those related to episitemic injustice. Epistemic decolonization was already proposed by Quijano (1992) as the first step toward a new intercultural communication that legitimates other rationalities and avoids the imposition of a single provincial rationality as universal. Scholars also stress the importance of publishing practices. Among them, Hountondji (2002) contends that African scholars need to shift their audience to prioritize Africans as their prime target. Jeater (2018) argues that African scholars must choose between publishing in international journals, thereby accepting the dominant Northern research culture, or challenging that hegemony by establishing parallel publishing houses outside the international rankings. Mitova (2020), buinding on Wiredu (2002), emphasizes the importance of languge and how Southern scientists need to define their identities and intellectual around concepts developed in the Global North.

Crawford, Ma-Bornu, and Landström (2021) stress the importance of African journals to decolonize knowledge production in Africa. Among other strategies, they emphasize the importance of building the capacity of African-based journals and encouraging both Southern and Northern scholars to publish in African journals. The authors also emphasize the importance of encouraging scholars from both the North and South to publish in African journals, enhancing their status and impact. However, although the authors argue that these measures are crucial to addressing knowledge asymmetries in Africa, they are insufficient to fully address epistemic injustice. In this context, they underscore the significance of Ndlovu-Gatsheni's (2018) 'rethinking thinking', and Tlostanova and Mignolo's (2012) 'learning to unlearn in order to re-learn'. Both approaches call for a radical re-examination of how knowledge is produced, reflecting on the power dynamics that sustain current narratives, and opening up to alternative epistemologies. For de Sousa Santos (2014/2016), this is central as "there is no global social justice without global cognitive justice" (p. viii). There is therefore an imperative need to develop strategies intended to counteract epistemic injustice. For Ndlovu-Gatsheni (2018), "epistemic justice is about the liberation of reason itself from coloniality" (p. 3). For scholarly knowledge, this means unlearning, re-examining, and rethinking current dominant epistemologies, methods, theories, and research, while confronting historical conceptions of what constitutes knowledge.

CHAPTER THREE
EPISTEMIC INJUSTICE

The aim of this chapter is to elaborate a theoretical framework through which inequalities in science can be explored and understood. Since scientific endeavor is undeniably an epistemic and collective practice and given its epistemic authority as well as its political and social influence, I draw on the expanding field of epistemic injustice to frame the multiple ways in which social and political inequalities shape the production of scientific knowledge. This chapter reviews Fricker's initial account of epistemic injustice, subsequent variations, and proposed remedies, thereby providing the conceptual background for analyzing the specific case of epistemic injustice in science (Chapter 4).

Epistemic injustice, as defined by Fricker (2007) in her seminal book *Epistemic Injustice: Power and the Ethics of Knowing*, refers to a wrong inflicted upon someone in their capacity as a knower. She distinguishes between two forms of epistemic injustice, depending on their underlying cause: testimonial injustice and hermeneutical injustice. Testimonial injustice occurs when a person's credibility is unjustly undermined due to prejudice. Hermeneutical injustice, by contrast, arises when there is a lack of adequate hermeneutical resources—tools, concepts, or interpretive frameworks—to make sense of the experiences of marginalized groups. Both forms of injustice will be examined in more detail in Section 3.1.

Since the publication of Fricker's work, the literature on epistemic injustice has grown substantially, either extending her framework to new contexts or refining its conceptual boundaries. For example, some scholars have expanded the account to include not only cases of discriminatory practices —such as testimonial and hermeneutical ones— but also issues of access to epistemic resources such as education and information (Coady, 2017), or to develop broader understandings of what counts as a 'knower' (Grasswick, 2017). Moreover, the concept has been taken up in fields beyond epistemology and philosophy, leading to new applications and types of epistemic injustice. For instance, it has been employed in psychology and psychiatry to examine patient–doctor relations, and in AI studies to describe potential biases embedded in algorithmic systems.

This chapter provides an overview of key varieties of epistemic injustice and its remedies. As Dotson (2012) cautions, closed conceptual structures of what qualifies as epistemic injustice risk reproducing the very harms they seek to address. By imposing rigid taxonomies and restricting the concept's application to certain instances, one may obscure alternative accounts that emerge from different experiences or from the epistemic and hermeneutical resources of groups excluded from dominant frameworks. For this reason, the following section does not attempt to provide an exhaustive survey of the vast and evolving literature on epistemic injustice. Instead, it highlights a selection of examples that are especially relevant for the purposes of this study and that lay conceptual groundwork for analyzing epistemic injustice in science. These examples are organized through Dotson's 'scope of change' approach, which classifies injustices according to the depth of transformation required to remedy them (the approach is discussed in detail in Section 3.1). Building on this, Section 3.2 turns to debates on remedies, moving from Fricker's initial account centered on individual virtues to subsequent developments that underscore the limitations of this perspective, pointing to the risks of relying on the goodwill of privileged subjects and to the need for structural solutions.

3.1 Varieties of epistemic injustice

This manuscript draws on Dotson's (2012, 2014) degree-of-change lens to examine different forms of epistemic oppression that give rise to distinct forms of epistemic injustice. Dotson's framework offers a way of analyzing epistemic injustice that is not reducible to social and political factors alone, while also recognizing that epistemic injustices can exist independently of those systems. Moreover, it provides a conceptual space for identifying and addressing new or previously unrecognized forms of epistemic injustice across diverse social contexts.

Adapting a degree-of-change perspective from organizational studies, Dotson proposes a 'scope of change' framework that identifies three levels of epistemic exclusion—first-, second-, and third-order exclusions—each of which requires a corresponding degree of change to be adequately addressed. A first-order epistemic exclusion "results from the incompetent functioning of some aspect of shared resources with respect to some goal or value" (Dotson, 2014, p. 123). To address such exclusions, the system itself need not be fundamentally altered, nor do its values and beliefs require revision; rather, only certain inefficient elements of the system need adjustment. For example, in cases of testimonial injustice where credibility deficits are attributed to particular groups based on prejudice, the concept and value of credibility are not themselves in question. Instead, what must be reformed is the manner in which credibility is conferred (Dotson, 2012).

By contrast, second-order epistemic exclusions occur when "the epistemic resources in question function well for a significant portion of the social population" (Dotson, 2014, p. 128). Unlike first-order exclusions, addressing second-order exclusions requires critically interrogating and, where necessary, revising the epistemic resources of the system itself. A paradigmatic example can be found in cases of Fricker's hermeneutical injustice, in which the collective hermeneutical resources of a society must be expanded to ensure they are adequate for all members (Dotson, 2012).

Building further, third-order epistemic exclusions represent the most entrenched form, arising when there is "a compromise to epistemic agency [the ability to utilize persuasively shared epistemic resources within a given epistemic community in order to participate in knowledge production and, if required, the revision of those same resources] caused by inadequate dominant, shared epistemic resources" (Dotson, 2014, p. 129). Addressing such exclusions requires dominant groups to acknowledge the limitations of prevailing epistemological systems. However, because agents themselves operate within these very systems, interrogating their deficiencies is an inherently difficult task: the systems that must be transformed are the same ones that obscure the exclusions in question. Epistemic injustices stemming from third-order exclusions thus arise when privileged agents preserve structurally biased epistemic resources through an active ignorance that resists recognition of such biases (Dotson, 2012).

Overall, the three orders of epistemic exclusion illustrate a spectrum of increasing depth and complexity. While first-order exclusions can often be corrected through technical adjustments within an otherwise functional system, second-order exclusions demand revision of the epistemic resources that underpin collective understanding. Third-order exclusions, by contrast, expose the structural entrenchment of epistemic injustice, requiring a transformation of dominant epistemological systems themselves. This progression underscores how epistemic injustice is not a uniform phenomenon but one that ranges from relatively remediable failures to deeply entrenched forms of oppression that challenge the very conditions of knowledge production.

The following sections discuss specific forms of epistemic injustices that can be subsumed into first-, second-, and third-order injustices according to Dotson's account.

3.1.1 First-order epistemic injustices

Dotson (2012) identifies testimonial injustices as examples of first-order epistemic injustices. Following Fricker's definition, a 'testimonial epistemic injustice' occurs when "prejudice causes a hearer to give a deflated level of credibility to a speaker's word" (Fricker, 2007, p. 1). Fricker illustrates this with various examples. One of the most prominent comes from the screenplay *The Talented Mr Ripley*, in which Herbert Greenleaf, while investigating the disappearance of his son Dickie, dismisses the testimony of Dickie's fiancée, Margaret Sherwood, as mere 'female intuition'. Fricker uses this case to illustrate a kind of social power she terms 'identity power' (Fricker, 2007, p. 8), which depends on agents sharing certain conceptions of social identity—for example, what it means to be a woman or a man. In this case, Greenleaf, as a man, exercises identity power by drawing on shared conceptions of femininity—women imagined as insufficiently rational and excessively intuitive—to silence Margaret's suspicion, even if his dismissal was not intentional. Testimonial injustice is thus rooted in 'identity prejudice', which undermines the speaker's credibility.

Fricker also identifies a special form of testimonial injustice that occurs even before an epistemic exchange can take place, thereby preventing it altogether. She refers to these as 'pre-emptive epistemic injustices', which arise when "the hearer prejudice does it work in advance of an informational exchange", such that "it pre-empts any such exchange" (Fricker, 2007, p. 130). In this case, prejudice functions by excluding the speaker from participation in the conversation altogether, discrediting her in advance.

Subsequent scholarship has further developed and expanded Fricker's account of testimonial injustice. The following discussion highlights some of the most relevant contributions to broadening the concept. It should not, however, be taken as an exhaustive review, since it does not cover all the advances made in particular disciplines—such as medicine or psychology—where the field of epistemic injustice is rapidly evolving. Instead, the aim here is to consider general developments that refine our understanding of testimonial injustices and that will later help conceptualize the particular case of epistemic injustices in science. First, the manuscript reviews accounts of testimonial injustices that focus on the social relations between agents in epistemic interactions. It then considers injustices that concern the content of testimony rather than the speaker's identity, followed by testimonial injustices that arise from credibility excesses rather than deficits. Finally, it turns to other forms of first-order injustices not directly tied to testimony, such as participatory, distributive, and trust injustices, as well as injustices related to epistemic labor.

3.1.1.1 Expansions of Fricker's account of testimonial injustices

Wanderer (2012, 2017) expands Fricker's initial account of testimonial injustice—conceived as an isolated, unidirectional practice between two agents—to contexts in which, first, the testimony offered by a speaker requires an active response from the hearer, and second, epistemic exchanges occur within thick relations of intimacy between the agents. According to Wanderer, these two factors give rise to distinct forms of injustice.

In her 2012 work, Wanderer distinguishes between acts of 'ignoring' and acts of 'rejecting' on the part of the hearer. The type of injustice—ignoring or rejecting—does not depend solely on the hearer's decision, but rather on the conditions under which the interaction takes place. He identifies particular forms of interaction in which the outcome is necessarily one of rejection rather than simple ignoring. Cases of rejection involve: (i) interpersonal reasons for accepting the speaker's testimony, where such reasons are intrinsic to the testimonial exchange and grounded in the relationship between speaker and hearer; (ii) a context of shared intimacy, as in face-to-face encounters; and (iii) a direct address from the speaker to the hearer that obliges recognition of the request—a feature Wanderer (2012) terms "second-person address" (p. 155). The second-person address is especially significant, since once the hearer has recognized it, it becomes impossible to simply ignore the speaker's testimony. Even silence, in such a context, counts not as neutrality but as a negative response. For Wanderer, testimonial injustices based on rejection therefore cause distinctive harms not present in cases of ignoring. The harms of ignoring typically accumulate across multiple instances, with their effects only becoming apparent over time. By contrast, the harms of rejection can be located in a single act, directed specifically at the speaker and arising immediately in the course of the interaction. For example, if a speaker addresses an audience but fails to convey sufficient credibility, the audience may collectively ignore her testimony without inflicting direct, immediate epistemic harm. However, if the same speaker conveys this information in a one-to-one epistemic exchange, explicitly seeking feedback, the hearer cannot simply ignore her without that silence being interpreted as rejection, thereby inflicting direct epistemic harm.

Further elaborating on the role of interpersonal relations in epistemic injustice, Wanderer (2017) introduces the notion of 'testimonial betrayal', which refers to the rejection of testimony within intimate relationships. Both of Wanderer's contributions—testimonial injustice through rejection and testimonial betrayal—emphasize that the agents of epistemic exchanges are situated, socially embedded individuals, rather than abstract figures whose testimonial transactions take place in a vacuum.

It is also worth noting the potential harm that testimonial instances of epistemic injustice may inflict upon hearers who could have benefited from the knowledge possessed by the speaker. Beyond the wrongdoing suffered by the speaker, Condon (2017) emphasizes that, in a case of testimonial epistemic injustice, the hearer incurs an epistemic loss by missing information that could have been advantageous to themselves or to others. A direct form of this harm is illustrated by Wanderer's (2012) lifeguard–swimmer example, in which a swimmer disregards a lifeguard's warning about shark sightings in the area due to racial prejudice. The story ends with a fatal shark attack. Considered as an isolated incident, the harm to the speaker may appear negligible, whereas the harm to the hearer is evident. However, when such instances of ignoring the lifeguard's testimony are viewed as systematic and recurrent, broader patterns of epistemic neglect and their social consequences become visible. Still, it also shows that testimonial injustice can produce effects—epistemic or otherwise—not only for the speaker but also for the hearer, or more broadly, for the privileged group to which the hearer belongs.

3.1.1.2 Deviations from Fricker's account of testimonial injustice

The next categories of injustices deviate from Fricker's notion of testimonial injustice in that they do not fully satisfy her conditions for being classified as testimonial epistemic injustices—i.e. (i) a hearer rejects or discounts a speaker's testimony (ii) owing to a credibility deficit (iii) that derives from a negative identity prejudice against the speaker — while nevertheless retaining their testimonial character. One such account is offered by Dembroff and Whitcomb (2022), who introduce the notion of 'content-focused epistemic injustice'. According to their definition, content-focused injustices occur when a hearer's prejudice is directed not against the speaker, but against the content of the communicative act. To illustrate this, they refer to the Reagan administration's refusal to fund research on HIV/AIDS. When a (male, white, heterosexual) official at the Centers for Disease Control advocated for increased funding before Congress—and when the majority of researchers supporting this claim were also white, heterosexual men—they nonetheless encountered resistance. The administration framed HIV/AIDS as a 'gay disease', and funding such research would have implied, in their view, tacit support for the gay community. In this case, the speakers were not themselves subject to identity prejudice; rather, the content of their testimony was linked to a marginalized group—the gay community—that was subject to such prejudice. Dembroff and Whitcomb classify this as a form of 'reactive content-focused injustice': the testimony is rejected because it concerns, or is associated with, a group toward which the hearer harbors prejudice. In addition to this reactive form, they also identify 'preemptive content-focused injustices', which parallel Fricker's (2007) account of preemptive testimonial injustices. These occur prior to any epistemic exchange, when prejudice prevents a hearer (or a third party) from acquiring knowledge associated with a marginalized group. For example, Russia's law criminalizing so-called 'gay propaganda' explicitly aims to prevent minors from learning about LGBTQ+ people and relationships. Importantly, these two forms of content-focused injustice are not mutually exclusive. Returning to the Reagan case, by refusing to fund HIV/AIDS research the administration both rejected testimony associated with the gay community (reactive injustice) and simultaneously prevented researchers and the public from gaining access to new knowledge about the condition (preemptive injustice).

Dembroff and Whitcomb defend these cases as instances of epistemic injustice rather than mere socio-political injustices resulting from testimony rejection. As they argue, "systemic rejection and preemption of knowledge about marginalised groups is a form of malignant misrecognition … that is itself a form of epistemic injustice" (Dembroff & Whitcomb, 2022, p. 11, emphasis in the original). Here, misrecognition refers to being "unfairly blocked off from being known about" (p.16). This position expands the connection between epistemic injustice and theories of recognition. Whereas recognition-based accounts (e.g. Fricker, 2018; Medina, 2018) typically understand epistemic injustice as harm caused by individuals not being recognized as knowers, Dembroff and Whitcomb focus instead on the systematic blocking of knowledge itself. In other words, the harm does not stem only from a failure to acknowledge the speaker's epistemic agency but also from preventing entire groups from being known about in the first place. Both approaches converge in highlighting the epistemic dimensions of recognition and misrecognition, but Dembroff and Whitcomb's contribution extends the scope of epistemic injustice to encompass the suppression of knowledge that concerns marginalized groups, even when the speakers themselves are not directly discredited.

In a different vein, Medina (2011) identifies an additional source of epistemic injustice that challenges Fricker's exclusive focus on credibility deficits, arguing that they can also be caused by credibility excesses. In her account, Fricker acknowledges that individuals who consistently receive credibility excesses may develop a form of "credibility arrogance" that hinders their capacity to acquire new knowledge (Fricker, 2007, p. 20). Yet she maintains that isolated instances of credibility excess are not sufficient to constitute testimonial injustice. Medina departs from this view by conceiving of epistemic injustices not as immediate or one-off occurrences but as "temporally and socially extended" (Medina, 2011, p. 17). In his account, the harms produced by credibility excesses may unfold over time and within broader social relations. Moreover, epistemic injustices are not limited to harms inflicted upon the speaker; they can also affect other participants in the exchange, particularly those who are displaced or silenced by the attribution of credibility excess to someone else. For instance, when a speaker receives undue credibility, the hearer may be inhibited from participating in the conversation, which can erode her self-trust and self-esteem.

This argument rests on the idea—one that diverges from Fricker's position—that credibility, like other epistemic goods, is fundamentally comparative. Credibility is never assigned in isolation; to credit one person as more reliable necessarily implies that others are being judged as less so. As Medina notes, "[b]eing judged credible implies being judged more credible than others" (Medina, 2011, p. 18). When credibility excesses are systematically attached to particular social groups, the comparative nature of credibility produces epistemically disadvantaged groups who thereby suffer credibility deficits. Medina illustrates this point by reinterpreting one of Fricker's central examples. Alongside the Sherwood–Greenleaf case, Fricker discusses Harper Lee's *To Kill a Mockingbird*, focusing on the trial of Tom Robinson, a Black man accused of raping Mayella Ewell, a poor white woman. Fricker interprets Robinson's conviction by an all-white jury as a case of testimonial injustice: his credibility is diminished because of prejudices tied to his racial identity. Medina expands this analysis by emphasizing the comparative dynamic of credibility distribution. In his view, Robinson not only suffers a credibility deficit but does so in comparison to the credibility excesses granted to other witnesses, such as Mayella Ewell. He describes this as a case of "misplaced trust" (Medina, 2011, p. 24), attributing it to a social imaginary that shapes testimonial relations and regulates the credibility of participants. This social imaginary not only governs which agents are deemed trustworthy but also constrains what kinds of propositions are intelligible. In Robinson's trial, the jury could not conceive of the possibility that a white woman might be sexually attracted to a Black man. Indeed, the scenario was unimaginable on multiple fronts: not only the transgression of racial boundaries, but also the notion that a woman could be the sexual initiator. Medina (2011) interprets this as a form of "active ignorance" (p. 26), which he further links to a "deeper hermeneutical injustice" (p. 27). Medina's reference to active ignorance and hermeneutical injustice suggests that some cases of injustice initially described as resulting from credibility deficits may, in fact, be more appropriately understood as second- or third-order injustices. This highlights the close connections between different types of epistemic injustice and underscores the presence of blurred boundaries rather than rigid distinctions. The discussion of hermeneutical injustices, as well as the relation between epistemic injustice and ignorance, will be taken up in the following sections.

Medina's analysis resonates with Dembroff and Whitcomb's account of content-focused injustices, discussed above. In Robinson's case, the prejudice does not merely discredit him as a speaker; it also suppresses the very possibility of acknowledging the content of his testimony—namely, women's sexual agency—thereby producing a malignant misrecognition of women's sexuality. Medina's framework thus demonstrates how credibility excesses and deficits, comparative in nature, can intertwine with broader hermeneutical failures, expanding the scope of testimonial injustice beyond Fricker's original formulation.

Holman (2021) also argues that epistemic injustices can be caused by credibility excesses. His position, however, differs from Medina's in that he does not directly correlate credibility excesses with corresponding credibility deficits. To illustrate this, Holman presents a model in which influence, and not only credibility, affects a speaker's capacity to transmit knowledge. Although one might suspect that Medina would consider influence to be an element of credibility as it functions comparatively, the specific mechanisms that govern credibility assignment lie beyond the scope of this thesis. What is central to Holman's account is that a speaker can be harmed as a knower because of a credibility excess attributed to another speaker, even when no prejudice is directed at the first speaker. His central example concerns the undue credibility conferred by some medical doctors on pharmaceutical companies, despite the fact that certain treatments were either unproven or demonstrably ineffective. In this context, researchers who criticized the treatments suffered credibility deficits, not because of identity prejudice but because of the credibility excess given to another agent. Although the dynamics of this case are complex and shaped by several factors, Holman's idea can be clarified through a simpler illustration: imagine I join a cult, and my brother warns me of the (well-documented) negative consequences. If I choose not to believe him and instead trust the cult leader, my brother suffers a credibility deficit. Yet this cannot reasonably be attributed to identity prejudice. According to Fricker's account, this would therefore not qualify as epistemic injustice. However, Holman classifies it as such, since for him the epistemic harm suffered by the disregarded knower is sufficient. He terms these 'collateral epistemic injustices' (Holman, 2021) and distinguishes between their synchronic form—where "an agent is immediately undercut in her capacity as a knower" (p. 36)—and their diachronic form, in which affected agents gradually accumulate credibility deficits over time.

3.1.1.3 Varieties of first-order epistemic injustices not related to testimony

Having considered several extensions of testimonial injustice—including those based on credibility deficits, credibility excesses, and collateral harms—other theorists have moved beyond testimony altogether. Hookway (2010) develops an additional account of epistemic injustice by distinguishing between an 'informational perspective' and a 'participant perspective' on epistemic agents. From the informational perspective, "epistemic interactions are all concerned with the possession and transmission of knowledge" (p.

156). The participant perspective, by contrast, concerns an agent's role in collaborative inquiry. To illustrate this, Hookway describes the case of a student whose questions are dismissed by a professor. When the student asks a question intended not as a request for information but as an invitation to discussion, the professor disregards it. According to Hookway (2010), in doing so the professor "fails to respect the student as a potential contributor to discussion" (p. 155). The student is thereby excluded from recognition as a member of a community engaged in the collaborative pursuit of knowledge. This kind of injustice is distinct from testimonial injustice—even from pre-emptive testimonial injustice—because the student is not attempting to present knowledge but rather to participate in inquiry. The result of injustice from the participant perspective is thus that an agent is not regarded as competent or trustworthy to take part in epistemic activities, such that she "cannot carry out the activity competently" (Hookway, 2010, p. 157). In short, the harm lies not in silencing testimony but in preventing participation in practices whose content is intrinsically epistemic.

Accounts of epistemic injustice have also expanded to include not only cases that affect agents' capacities to share their experiences or participate in inquiry, but also their access to epistemic resources. Coady (2010) argues that the concept of epistemic injustice should encompass injustices suffered by social groups due to the unjust distribution of epistemic goods such as education or information. Although one might be tempted to classify this as a form of social injustice not specifically epistemic, Coady maintains that these goods are intrinsically epistemic in nature. Their unequal distribution can produce what he terms 'unjust ignorance', an ignorance that prevents individuals from acquiring knowledge that would empower them socially. In his example, the denial of educational opportunities can prevent members of a group from voting according to their political interests, since they may lack the informational resources to form an informed opinion. Coady further links this distributive injustice to Fricker's framework. Drawing on Anderson (2012), he notes that someone denied educational opportunities may never acquire what is considered 'standard good grammar', a marker of formal education and therefore of credibility. Such a distributive injustice can make the person more vulnerable to testimonial injustice, since her credibility would be compromised when engaging in epistemic exchanges with certain audiences. Coady's argument is later endorsed by Fricker (2017), who concedes that injustices in the distribution of epistemic resources, although distinct from 'discriminatory injustices'—which include testimonial and hermeneutical forms—nevertheless wrong the victim in her capacity as an epistemic subject, thereby fitting her initial definition. When the unjust distribution of epistemic resources affects agents actively engaged in the pursuit of knowledge, Miragoli (2024) refers to this as a 'zeitetic' injustice.

Closely related to distributive injustices are 'epistemic trust injustices', which focus on the harms done to marginalized groups in their capacity to acquire and make use of knowledge. Unlike distributive injustices, which concern the unequal allocation of epistemic goods, trust injustices concern the erosion or distortion of trust itself. Grasswick (2014, 2018) emphasizes that marginalized groups can be harmed both as recipients of knowledge and in their ability to evaluate the trustworthiness of knowledge sources responsibly. This concern overlaps with Coady's account: the poor distribution of epistemic resources may lead marginalized groups to misplace trust, either by investing it in unreliable sources or by withdrawing it from reliable ones. Grasswick, however, shifts the focus from interpersonal trust to the relationships between communities and institutions. Communities' historical experiences with knowledge-producing institutions—such as their histories of sexism, racism, or exclusion—can significantly shape the trust they place in those institutions. When institutions systematically ignore or marginalize certain realities, they erode the credibility they hold with these groups, thereby weakening epistemic relationships. The consequences of such erosion are twofold. First, marginalized communities may suffer epistemic losses by dismissing knowledge from experts who, despite their institutional affiliations, are capable of offering significant insights. Second, institutions themselves may be impaired in their ability to generate knowledge about marginalized groups. For instance, if members of marginalized communities distrust research institutions, they may be less likely to pursue careers in science or to participate as subjects in medical research, thereby limiting the production of knowledge about their own realities. Mistrust can also lead to broader social harms: for example, individuals may avoid seeking medical care because they do not trust healthcare institutions. Epistemic trust injustices therefore produce both epistemic and social harms, highlighting how historical patterns of exclusion and marginalization can undermine not only credibility but also the very possibility of building reliable epistemic relations between communities and institutions.

Epistemic trust injustices constitute a complex form of epistemic injustice because they primarily affect the credibility attributed by marginalized groups. In other credibility-related injustices (such as those discussed above), the perpetrator is the agent who grants—or fails to grant—credibility to a marginalized speaker. In such cases, addressing the injustice requires changes on the part of the perpetrator, and while these changes may not rectify historical marginalization, they could, at least in incidental cases, have an immediate effect. For example, if a hearer becomes reflexively aware that her credibility judgments are being influenced by prejudice, she may adjust them accordingly and avoid perpetuating the injustice. In the case of epistemic trust injustices, however, the situation is reversed. Although the injustice is perpetrated by scientific institutions, it is marginalized groups who are expected to adjust their credibility judgments. Crucially, this mistrust is not rooted in prejudice but in the historical marginalization these institutions have imposed on their communities. For marginalized groups to restore their trust, change must therefore originate within the institutions themselves, so that they become genuinely reliable for those they have excluded. Moreover, diminished credibility is directed toward institutions or systems rather than individual agents and is grounded in long-standing historical patterns. Consequently, more than incidental or isolated changes are required to secure trust. Trust cannot be restored immediately; it must be rebuilt through sustained transformation. Addressing epistemic trust injustices is thus an inherently complex process, regardless of the degree of change required. Nevertheless, depending on the nature of the changes needed, epistemic trust injustices can be classified as either first-order or third-order injustices. If the omission of certain communities results from erroneous epistemic assumptions (for example, the belief that male and female bodies are identical in their functioning), the injustice would qualify as first-order, since correcting the mistaken assumption would be sufficient to address the problem, even if trust does not immediately follow. By contrast, if the injustice stems from active omission (such as the persistent treatment of male bodies as the default research subject), epistemic trust injustices should be classified as third-order injustices.[1]

A final example of first-order injustices can be found in certain instances of 'epistemic labor injustices', as defined by Pohlhaus (2017). Pohlhaus introduces a novel perspective by examining epistemic injustice through the lens of epistemic labor and knowledge production. He distinguishes three forms of injustice: 'epistemic agential injustices', 'epistemic invalidation', and 'epistemic exploitation'. Of these, agential injustices and some cases of epistemic exploitation can be considered first-order injustices, while epistemic invalidation will be addressed later in this section under the category of third-order epistemic injustices. Epistemic agential injustices refer to wrongs that unfairly compromise someone's epistemic work. These arise when stereotypes targeting certain social groups create a "potential unfair bias through which their epistemic activities may be received" (Pohlhaus, 2017, p. 21). The effect is that agents subject to such stereotypes must undertake additional epistemic labor compared to others, which itself constitutes an injustice. When the remedy lies in adjusting prejudiced attitudes toward marginalized groups, agential injustices fall under the first-order category. However, if agents refuse to adopt more appropriate interpretative frameworks, thereby sustaining exclusionary systems, the same situation shifts into the third-order category. Pohlhaus also discusses epistemic exploitation, which occurs when marginalized groups are required to perform disproportionate epistemic labor, often by having to continually demonstrate or justify the harms they experience. In cases where such demands arise from credibility deficits, they can be classified as first-order injustices. By contrast, when these demands stem from an active refusal on the part of dominant audiences to acknowledge oppression—such as sexism or racism—the requirement that marginalized groups repeatedly prove their experiences exemplifies an entrenched practice of ignorance. In these cases, epistemic exploitation

[1] I would like to thank Dr. Susanne Koch for drawing my attention to the complexities of epistemic trust injustices. I agree that such injustices share key features with third-order injustices, particularly their institutional and historical dimensions, and may therefore be primarily understood in these terms. However, when focusing specifically on the order of change required and on the nature of the omissions or forms of ignorance that underlie them, I contend that epistemic trust injustices can also be classified as first-order injustices—albeit ones whose harms must be remedied through a cumulative process rather than through immediate correction. This, of course, as any other reflection in these pages, reflects a personal interpretation of and it is intended to invite further discussion rather than to foreclose other possible readings.

constitutes a third-order epistemic injustice, as it reflects a refusal to recognize or adopt alternative epistemic frameworks.

In sum, the discussion of first-order epistemic injustices reveals not only the breadth of cases that can fall under this category, but also the fluidity of its boundaries. Testimonial, participatory, distributive, trust-related, and labor-based injustices all show how credibility, participation, and access to knowledge can be compromised in ways that wrong individuals and groups as knowers, even when the underlying epistemic system itself is not directly challenged. Yet many of these accounts also suggest that what initially appears as a first-order problem can, under certain conditions, shade into deeper and more systemic forms of exclusion. When agents refuse to adjust prejudiced attitudes, when ignorance is actively maintained, or when dominant groups decline to revise interpretative frameworks, the harm can no longer be addressed by minor corrections but instead points toward second- and third-order injustices. The first-order category thus offers an important entry point into the study of epistemic injustice, while also reminding us that the lines between different orders are often blurred rather than fixed.

3.1.2 Second-order epistemic injustices

Second-order epistemic injustices differ from first-order cases in that they cannot be remedied simply by correcting prejudiced attitudes or improving the functioning of existing epistemic practices. Instead, they arise when the very epistemic resources of a community are inadequate for certain groups, such that whole domains of experience cannot be properly understood, expressed, or communicated. Addressing these injustices therefore requires revising and expanding the collective interpretative frameworks that structure knowledge. This is the terrain in which hermeneutical injustices, as originally described by Fricker, become especially relevant, alongside further developments that link epistemic injustice to structural forms of ignorance.

According to Fricker (2007), ‘hermeneutical epistemic injustice’ occurs when “a gap in collective interpretative resources puts someone at an unfair disadvantage when it comes to making sense of their social experience” (Fricker, 2007, p. 1). These injustices arise from cognitive dissonances that prevent marginalized groups from developing conceptual categories to articulate their experiences in ways intelligible to privileged groups. Fricker illustrates this with the case of Carmita Wood, a Cornell University employee who endured repeated sexual harassment from a professor. Initially, Wood could not describe what was happening to her and resigned from her job citing only ‘personal reasons’. When she later sought help and described her experiences, other women recognized similar patterns in their own lives. Together, they consulted feminist lawyers and decided to speak out publicly. Yet they realized that the experience they were trying to name lacked a term. After a brainstorming session that considered phrases such as ‘sexual intimidation’ and ‘sexual exploitation on the job’, they settled on the now-familiar concept of sexual harassment. For Fricker (2007), this illustrates how "extant collective hermeneutical resources can have a lacuna where the name of a distinctive social experience should be" (p. 150). Although such gaps affect both disadvantaged and privileged groups, the harm falls disproportionately on the marginalized. In this case, the absence of a category left Wood unable to fully understand or communicate an experience that it was vital in her interest to make sense of, producing what Fricker terms "hermeneutical marginalization" (p. 155). On this basis, she defines hermeneutical injustice as "the injustice of having some area of one's social experience obscured from the collective understanding owing to a hermeneutical marginalisation" (p. 158). Unlike testimonial injustice, which requires an agent who discounts another's credibility, hermeneutical injustice is structural: no single agent perpetrates it. However, as Fricker (2007) notes, the injustice only materializes in practice when someone attempts to render an experience intelligible and fails because of the lacuna in shared resources: "The hermeneutical inequality that exists, dormant, in a situation of hermeneutical marginalisation erupts in injustice only when some actual attempt at intelligibility is handicapped by it" (p. 159).

As in the case of testimonial injustices, some scholars have highlighted the negative effects of hermeneutical injustices to the privileged group. Fricker (2016) has acknowledged that the gap in interpretative resources that creates hermeneutical injustices result in a "genuine deficit in hermeneutical resources for the white community" (Fricker, 2016, p. 174). Therefore, although the marginalized groups suffer the epistemic harms, the privileged groups are often the ones that are hermeneutically deprived (Medina, 2017).

Building on Fricker's work, Medina (2017) offers a more fine-grained classification of hermeneutical injustice based on four parameters: source, dynamics, breadth, and depth. First, regarding source, injustices can be semantically or performatively produced. Semantically produced injustices are Fricker's paradigmatic cases, resulting from gaps in hermeneutical resources. Performative injustices, by contrast, occur when subjects are "judged as unintelligible or less intelligible than other subjects not because of the words they use but because of their communicative performance or expressive style" (Medina, 2017, p. 46). Second, in terms of dynamics, hermeneutical injustices may be structural or interpersonal. Structural cases emerge when institutional designs or social structures prevent the use of certain hermeneutical resources—such as official questionnaires that offer only 'male' and 'female' as gender options. Interpersonal cases appear when someone's intelligibility is undermined in face-to-face exchanges—for example, through constant interruptions or challenges to their meaning. Third, Medina distinguishes hermeneutical injustices by breadth, that is, whether they are isolated (what Fricker calls 'incidental') or widespread ('systematic'). Relatedly, Fricker also differentiates between radical (or maximal) and minimal cases. In maximal cases, no participants in the exchange—including the subject herself—possess the interpretative resources required to understand the experience. In minimal cases, the subject has access to an interpretive framework but encounters a gap when attempting to communicate it to others. This distinction responds to Mason's (2011) critique of Fricker's initial conception, which focused too narrowly on maximal cases. As Mason (2011) observes, "a gap in dominant hermeneutical resources with respect to one's social experiences does not necessitate a corresponding gap in non-dominant hermeneutical resources" (p. 300). Ficker (2016) later acknowledges a "continuum of possibilities" between maximal and minimal forms (p. 165). Finally, Medina (2017) identifies a parameter of depth, which concerns the extent of the harm. In "skin-deep cases" (p. 47), the harm is relatively superficial, producing isolated frustrations without threatening agency. In deeper cases, however, hermeneutical injustice can compromise a person's very capacity to be understood. The most radical form is what Medina (2017) terms hermeneutical death, in which "one's voice is *killed*" (p. 47, emphasis in the original).

Besides hermeneutical injustices, certain forms of testimonial injustice can also be classified as second-order. One of the most influential examples is 'testimonial smothering', described by Dotson (2011) as "the truncating of one's own testimony in order to ensure that the testimony contains only content for which one's audience demonstrates testimonial competence" (p. 244). Dotson (2011) identifies three conditions that must be met for testimonial smothering to occur: "1) the content of the testimony must be unsafe and risky; 2) the audience must demonstrate testimonial incompetence with respect to the content of the testimony to the speaker; and 3) testimonial incompetence must follow from, or appear to follow from, pernicious ignorance" (p. 244). Depending on how the third condition is interpreted, testimonial smothering may be situated either within second-order or third-order epistemic injustices.

Dotson (2011) defines 'pernicious ignorance' as "any reliable ignorance that, in a given context, harms another person (or set of persons)", where 'reliable ignorance' is "ignorance that is consistent or follows from a predictable epistemic gap in cognitive resources" (p. 238). Importantly, pernicious ignorance can be either willful or unintentional. When pernicious ignorance is willful, the case should be considered a third-order injustice, since dominant agents actively refuse to acquire the epistemic resources that would enable understanding. By contrast, if pernicious ignorance is unintentional, the audience merely lacks epistemic resources they have not yet acquired, and the injustice can be classified as second-order, as the solution lies in adjusting and expanding the resources rather than third-order changes.

In closing, second-order epistemic injustices highlight the ways in which inadequate or distorted epistemic resources can marginalize individuals and groups. Unlike first-order cases, which can often be addressed by correcting prejudiced attitudes or practices, second-order injustices expose deeper gaps in collective interpretative frameworks and reveal how some forms of—unintentional—ignorance shape the very conditions of intelligibility. At the same time, the blurred boundary between second- and third-order injustices becomes evident: what begins as an epistemic gap may, in contexts of willful ignorance or entrenched refusal, evolve into structural forms of exclusion. Second-order injustices thus show how epistemic harm often arises not from individual acts alone but from the insufficiency of the shared resources that underpin collective understanding.

3.1.3 Third-order epistemic injustices

Third-order epistemic injustices represent the most entrenched and structurally embedded forms of exclusion. Unlike first-order injustices, which can often be corrected by adjusting attitudes or practices, or second-order injustices, which call for revising and expanding shared epistemic resources, third-order injustices occur when dominant groups actively maintain deficient epistemic systems. In these cases, the harm is not simply a matter of prejudice or of gaps in collective resources, but of entrenched forms of willful ignorance and structural domination that prevent alternative epistemic frameworks from gaining recognition. Because agents themselves operate within these very systems, the injustices they perpetuate are particularly difficult to identify and remedy. Third-order injustices thus expose the limits of existing epistemological structures and reveal how epistemic oppression can be sustained precisely through the mechanisms that are supposed to enable knowledge production.

Dotson (2012) identifies ‘contributory injustice’ as a paradigmatic form of third-order epistemic injustice. As she defines it, “contributory injustice is caused by an epistemic agent’s situated ignorance, in the form of willful hermeneutical ignorance, in maintaining and utilizing structural prejudiced hermeneutical resources that result in epistemic harm to the epistemic agency of a knower” (p. 31). Contributory injustice thus requires two elements: the persistence of prejudiced hermeneutical resources and the agent’s active ignorance in refusing to revise them. It is therefore simultaneously agential and structural. Importantly, contributory injustice also recognizes that there is not a single hermeneutical framework shared by all members of a society, but multiple sets of epistemic resources and epistemologies developed within different communities. For contributory injustice to occur, the situated ignorance of privileged groups must also be willful. As noted earlier in relation to testimonial and epistemic labor injustices, the absence of a willful component does not mean that no injustice has occurred, but rather that the case should be classified as a first- or second-order injustice instead. This does not imply that first- or second-order injustices are less serious than third-order ones; all can be equally harmful and devastating. What differentiates them is not the degree of harm but the kind of epistemic change required for redress.

Closely related to contributory injustice is what Pohlhaus (2012) terms ‘willful hermeneutical ignorance’, which she defines as instances where “marginally situated knowers actively resist epistemic domination through interaction with other resistant knowers, while dominantly situated knowers nonetheless continue to misunderstand and misinterpret the world” (p. 716). Pohlhaus emphasizes two interrelated aspects of knowing: situatedness and interdependence. Situatedness refers to the position of the knower within the world and the social relations that shape this position, while interdependence highlights that knowers rely on collective epistemic resources—concepts, interpretive frameworks, and categories—rather than on individual resources alone. Because these resources are distributed unevenly across social positions, dominantly situated knowers may dismiss the epistemic tools of marginalized groups simply because they do not align with their own experiences. When dominant groups refuse to learn and adopt the interpretive resources needed to understand others' experiences, they commit willful hermeneutical ignorance.

Pohlhaus's account builds on Mason's (2011) critique of Fricker's conception of hermeneutical injustice. Whereas Fricker (2007) describes hermeneutical injustice as a structural gap in collective resources—where neither privileged nor marginalized groups can make sense of an experience—Mason points out that marginalized groups often do develop the resources needed to understand their own experiences. The real deficit lies with privileged groups, who lack, and sometimes refuse, the tools required to engage with marginalized perspectives. This refusal constitutes willful hermeneutical ignorance. The concept is also closely connected to Mills's (2007) notion of 'white ignorance', a "group-based cognitive handicap" (p. 15) produced by white supremacy that prevents white populations from perceiving the realities of other groups. Pohlhaus illustrates this through Fricker's example of *To Kill a Mockingbird*. Beyond Fricker's analysis of credibility deficits, the trial of Tom Robinson also exemplifies willful hermeneutical ignorance: the white jury and community lacked the resources to understand Robinson's experience and actively refused to acquire them. Such practices of ignorance are particularly insidious, since privileged groups can "maintain their ignorance by refusing to recognize and by actively undermining any newly generated epistemic resource that attends to those parts of the world that they are vested in ignoring" (Pohlhaus, 2012, p. 717). In doing so, they further marginalize already disadvantaged groups and entrench structural epistemic exclusion.

The chain effects of willful hermeneutical ignorance are closely connected to the notion of 'epistemicide' (de Sousa Santos, 2014/2016), which also bears a strong relation to Medina's idea of 'hermeneutical death' (§3.1.2). The difference lies in the level of analysis: whereas hermeneutical death is primarily suffered by individual subjects, epistemicide refers to the destruction of entire knowledge systems belonging to social groups. This distinction, however, should not obscure the fact that hermeneutical death can also operate at the collective level. Medina, for instance, cites the practices of slave traders as an example. In order to prevent communication among slaves, traders deliberately separated Africans who spoke the same language, thereby isolating them completely. This extreme form of marginalization not only prevented subjects from sharing their experiences with one another but also compromised their capacity to make sense of those experiences individually. The loss of communicative and interpretative resources led to what Medina calls hermeneutical death: the silencing of one's voice at its root.

Epistemicide, as defined by de Sousa Santos, extends this logic to entire epistemological traditions. It occurs when ways of knowing that do not conform to dominant epistemologies are actively undermined or destroyed. As he puts it, epistemicide is "the death of the knowledge of the subordinate culture" and therefore "the death of the groups that possessed it" (de Sousa Santos, 2014/2016, p. 92). In this sense, epistemicide is not merely about the exclusion of marginal knowledge but about its deliberate eradication, producing social as well as epistemic annihilation. The concept is closely related to epistemologies of ignorance, particularly pernicious forms of ignorance, as it captures how privileged groups can dismiss not only specific epistemic resources created by marginalized communities but also entire epistemological systems.

The pervasiveness of willful ignorance can also be observed in more concrete testimonial practices. One example of contributory epistemic injustice is ‘testimonial quieting’ (Dotson, 2011), which occurs when “an audience fails to identify a speaker as a knower” (p. 242). Dotson draws on Collins’s *Black Feminist Thought* as a paradigmatic case. Collins argues that as a Black woman in the U.S. she is systematically undervalued as a knower due to the ‘controlling images’ that stigmatize Black women. According to these images, Black women are perceived as belonging to four possible categories—mammies, matriarchs, welfare mothers, and whores. As a result, they are cast into what Tuana (2006) calls “epistemically disadvantaged identities” (p. 13), rendering them incapable of being recognized as knowers. Dotson (2011) emphasizes that these prejudices are sustained “not as a simple lack of knowledge, but as an active practice of unknowing” (p. 243). Testimonial quieting therefore necessarily belongs to the category of third-order injustices. It is also worth recalling here the willful form of testimonial smothering, introduced by Dotson alongside testimonial quieting and already discussed in Section 3.1.2, which likewise belongs to the third-order category when it stems from willful situated ignorance.

Related to testimonial quieting, Miragoli (2024) presents a variation he terms ‘testimonial spurning’. Although his discussion focuses on artificial intelligence, testimonial spurning can appear across a wide range of contexts. In such cases, “the communicative failure at issue […] does not concern uptake of the communicative act, but its effect” (p. 16). In other words, the testimony is heard but its intended effects are systematically denied. Miragoli illustrates this with the case of an asylum seeker whose petition is rejected due to biased algorithms. Here, the petition is processed as an asylum application, so the speaker is not silenced, but the credibility of her testimony is nonetheless undermined. The failure lies in the refusal to grant her testimony its appropriate perlocutionary force. As Miragoli (2014) explains, testimonial spurning is “the kind of epistemic violence occurring when active ignorance systematically dismisses the perlocutionary effects one is otherwise entitled to obtain with one’s communicative act” (p. 16).

The final form of third-order injustice, which also connects back to the epistemic labor injustices discussed in Section 3.1.1.3, is what Pohlhaus (2017) terms ‘epistemic labor invalidation’. Whereas epistemic agential injustices and epistemic exploitation can, under certain conditions, escalate into third-order injustices, epistemic labor invalidation constitutes a distinct case in which specific forms of knowledge are systematically downgraded or dismissed as if they were not ‘real knowledge’. A paradigmatic example is knowledge related to interpersonal relations: it is frequently expected of women as part of their ‘natural’ roles, yet simultaneously disqualified as proper epistemic labor. Similar dynamics appear in the marginalization of indigenous knowledge systems or entire areas of scholarly inquiry—such as philosophy, particularly non-Western philosophy—that are often relegated to the periphery of what counts as legitimate knowledge within dominant epistemic frameworks. In extreme forms, this marginalization can culminate in epistemicide (de Sousa Santos, 2014/2016), discussed above. Invalidation of this kind not only undermines the epistemic agency of those producing such knowledge but also entrenches willful ignorance by reinforcing narrow and exclusionary standards of epistemic legitimacy.

Taken together, third-order epistemic injustices reveal the most entrenched and structurally pervasive dimensions of epistemic harm. Unlike first- and second-order injustices, which often arise in interpersonal dynamics or from gaps in collective interpretive resources, third-order injustices expose how dominant groups actively resist, dismiss, or erase alternative epistemologies. Practices such as contributory injustice, willful hermeneutical ignorance, testimonial quieting or spurning, and epistemic labor invalidation show that epistemic oppression does not merely silence individual voices but undermines entire communities' capacity to produce, share, and sustain knowledge. At their most extreme, these practices lead to epistemicide, the destruction of whole systems of knowing, thereby consolidating epistemic hierarchies that sustain broader patterns of domination.

Addressing such injustices requires more than aligning individual behavior with one's values (as in first-order injustices) or revising operative epistemic resources to fill existing gaps (as in second-order injustices). Third-order injustices, by contrast, demand third-loop processes through which marginalized knowers and communities are empowered not only to contribute knowledge but also to interrogate, transform, or even abandon the epistemological systems and social imaginaries that constrain them. Confronting these injustices therefore entails a profound reorientation of epistemic practices: resisting epistemicide, validating alternative epistemologies, and opening space for more plural, equitable, and sustainable epistemic ecologies.

3.2 On individual virtues and structural remedies

The previous section examined variations of epistemic injustice through a degree-of-change lens. The section also showed how epistemic injustices affect individuals and communities across multiple layers of their personal and social lives. According to Fricker's initial account, such injustices are to be remedied primarily through the cultivation of epistemic virtues. Yet in her framework, the relevant virtues are individual, to be cultivated by privileged subjects or those who perpetrate the injustices. As seen in the previous section, the needed changes to remedy epistemic injustices range from simpler attribution adjustments within an established framework to radical reconfigurations of epistemological systems. However, while Dotson (2012) recognizes that individuals may exercise some capacity for transformation—most notably through first-order changes—

she emphasizes the underlying frameworks, structures, and systems that perpetuate injustice. Fricker's reliance on individual virtues has been widely criticized, both for overestimating their capacity to address structural forms of exclusion and for placing the burden of justice exclusively on the perpetrators. The present section considers two major strands of critique that propose alternative approaches: first, the call for structural remedies that operate at the institutional rather than merely individual level; and second, the insistence on recognizing the active role of marginalized groups themselves in demanding and shaping the pursuit of epistemic justice.

In her original formulation, Fricker differentiates between incidental and systematic forms of both testimonial and hermeneutical injustice. She stresses that this distinction is not meant to dismiss incidental cases as ethically trivial, but rather to identify their source. Incidental injustices arise from particular situations where harm occurs without being underwritten by a persistent identity prejudice; they are highly localized and episodic. Systematic injustices, by contrast, stem from entrenched identity prejudices that are wide-ranging and persistent, affecting subjects across multiple dimensions of their social existence. This distinction is important for understanding why remedies limited to individual virtue may suffice in incidental cases but prove inadequate for systematic injustices, which demand broader structural and collective responses. For a case of incidental hermeneutical injustice, Fricker draws on Ian McEwan's novel *Enduring Love*. In the story, Joe is stalked by a religious fanatic who, under the delusion of being in love, seeks to convert him. When Joe attempts to explain the situation to his partner, she initially mocks him affectionately and then begins to worry about his mental state. Seeking help from the police, Joe finds that his experience does not meet the legal criteria for harassment, since it involves neither physical harm nor damage to property. Fricker acknowledges that Joe is harmed by this lack of hermeneutical resources, as his experience cannot be properly articulated within available interpretive frameworks. Yet, because this harm is not tied to an identity prejudice—Joe is, after all, a white, heterosexual man who belongs to a privileged social category—the case must be classified as an incidental hermeneutical injustice.

As Anderson (2012) points out, however, even though Fricker distinguishes between incidental and systematic injustices, she nevertheless presents both as fundamentally transactional rather than structural. This is despite the fact that Fricker (2007) herself concedes that hermeneutical injustice is a "purely structural notion" (p. 159). In Fricker's account, systematicity refers to the persistence of identity prejudice, but the injustice itself still takes shape within a transactional framework: testimonial injustices occur when a speaker's credibility is discounted by a hearer due to identity prejudice, while hermeneutical injustices require that a speaker attempts to articulate an experience that cannot be understood due to interpretive gaps. In both cases, the injustice presupposes the roles of speaker and hearer in an epistemic exchange. Correspondingly, the remedies that Fricker envisions are also individual and transactional, rooted in reflexivity. For testimonial injustice, the virtuous hearer must cultivate a "distinctly reflexive social awareness" that enables her to neutralize prejudice in credibility judgements (Fricker, 2007, pp. 91–92). For hermeneutical injustice, a similar reflexivity is required: an openness to the possibility that the speaker's difficulty in communicating arises not from incoherence or folly, but from gaps in collective interpretive resources (Fricker, 2007).

Building on theories of distributive justice, Anderson (2012) distinguishes between 'transactional' and 'structural' epistemic injustices. As discussed above, transactional theories of justice focus on particular exchanges and interactions between individuals. Concerned with the possibility that individual transactions can create cumulative negative effects, these theories rely on the cultivation of compensatory virtues by individuals. Yet, as Anderson argues, individual virtues cannot address the broader problems generated by the accumulation of local interactions: individuals cannot coordinate efforts on a systemic level, nor always know how to support the disadvantaged. By contrast, structural theories of justice seek to reduce the effects of individual acts by instituting collective principles that regulate transactions. Anderson contends that this distinction can be applied to epistemic injustice: even when individual epistemic transactions appear just, their cumulative outcome may be unjust. Consequently, global epistemic inequalities cannot be adequately addressed through individual epistemic virtues alone, as Fricker suggests, but require structural remedies. This argument highlights the limitations of virtue-based approaches to epistemic justice. Anderson points out that Fricker's 'prejudice model' of testimonial injustice is too narrow, since credibility deficits may arise from structural sources beyond prejudice. Other scholars share this concern. Alcoff (2010) argues that "developing a virtue approach that operates in the volitional, conscious sphere will only be able to provide a very partial antidote to testimonial injustice" (p. 132). She stresses the need for institutional remedies that can address prejudices operating unconsciously and rooted in faulty historical narratives. Similarly, recognition theories reinforce the demand for structural interventions. Giladi (2018), for example, emphasizes the importance of understanding the social scope of epistemic injustices so that the asymmetrical structures sustaining them can be effectively targeted and transformed.

Returning to Anderson (2012), she identifies three structural sources of group-based credibility deficits: differential access to credibility markers, ethnocentrism, and the "shared reality bias" (p. 169). The first source concerns education and standardized grammar as markers of credibility. Education is a legitimate credibility marker, and standardized grammar functions as a marker of education. However, in societies where access to education is systematically denied to certain groups, reliance on these markers excludes those groups from participating fully in collective inquiry. As Anderson (2012) puts it, "[a]n original structural injustice […] generates additional structural inequalities in opportunities for exercising full epistemic agency, which is an injustice to the speakers" (p. 169). In such cases, the injustice may surface in particular epistemic transactions, but its root cause is structural and thus requires structural remedies. The second source, ethnocentrism, is the bias toward one's own social group. This often results in credibility excess for members of the dominant group. While Fricker contends that credibility excess is not itself a form of testimonial injustice, Anderson notes that granting excess credibility to some can simultaneously entail a credibility deficit for others. When social groups are segregated along the lines of structural inequalities, such biases reinforce epistemic disadvantage by systematically excluding marginalized groups from participation in inquiry. Finally, the shared reality bias refers to the tendency to interact with and trust those who share one's perspectives and judgments. When groups are divided by social identities, this bias can prevent privileged groups from accessing the perspectives of disadvantaged groups, thereby impoverishing their interpretive resources. The result is a form of hermeneutical injustice: privileged groups lack the concepts needed to understand marginalized experiences. This, in turn, produces structural testimonial injustice, since it is difficult to grant credibility to testimonies one cannot interpret. Unlike Fricker's account, and following Mason (2011) critique, Anderson's analysis emphasizes that marginalized groups often do possess the hermeneutical resources to understand and articulate their experiences. The injustice lies not in their inability to make sense of their lives, but in the dominant group's failure—and refusal—to understand them.

Anderson emphasizes that in the cases she describes, hearers from privileged groups may not believe themselves to be acting unjustly, either epistemically or morally; rather, they are relying on socially sanctioned credibility markers and epistemic resources. Yet, when systematic group segregation is in place, these seemingly innocent or non-prejudicial interactions can generate hermeneutical and structural testimonial injustices. While the cultivation of individual virtues remains important, it cannot by itself undo the systemic dynamics that reproduce inequality. These must instead be addressed through structural remedies. Although Anderson does not offer a concrete blueprint for such remedies, she proposes 'epistemic democracy' as the institutional virtue of epistemic justice, understood as the "universal participation on terms of equality of all inquirers" (Anderson, 2012, p. 172). Doan (2018) echoes this skepticism about the sufficiency of individual action. His critique targets not only the excessive faith Fricker places in virtuous individuals but also her exclusion of the victims of epistemic injustice from playing an active role in redressing it. While Doan concedes that Fricker focuses on perpetrators because they are the immediate source of the harm, he stresses that this framework casts the privileged as the protagonists of change and relegates the marginalized to passivity. Victims, in this view, are left "discredited, silenced, and excluded, given no role in initiating or guiding the work of correcting epistemic injustice" (Doan, 2018, p. 8). This not only obscures their agency but also introduces practical obstacles: as discussed in relation to second- and third-order injustices (§3.1.2; §3.1.3), perpetrators may be unaware of their privilege or actively invested in maintaining it. In such cases, waiting for privileged agents to transform themselves risks perpetuating rather than resolving epistemic oppression.

Alcoff (2010) makes a related point by highlighting the self-deceptive mechanisms that sustain privilege: "[t]he desire to remain in a dominant position over others often requires maintaining the illusion that our social or career success is totally meritorious. The point is that self-perception, and not just other-perception, needs to be involved in the account of how identity prejudices come to exist" (p. 134). Doan extends this argument, insisting that Fricker's individualist framework not only sidelines victims but also underestimates the complexity of epistemic relations and the historical struggles for recognition. Drawing on what he calls the 'status model of epistemic recognition', Doan locates the fundamental wrongs of epistemic injustice within social relations and institutions themselves. From this perspective, epistemic injustice is not reducible to individual identity prejudice, as Fricker suggests, but is embedded in cultural and institutional norms. Accordingly, remedies that rely "on individual virtues and the self-redemptive initiative of perpetrators" (Doan, 2018, p. 9) are insufficient to meet the structural and collective dimensions of epistemic injustice. Herr (2025) goes further, arguing that Frickerian approaches—such as those discussed earlier—ultimately rely on individuals even when they call for structural remedies, thereby jeopardising the possibility of achieving epistemic justice.

Overall, these critiques underscore the limitations of a virtue-based model that relies on the reflexivity and goodwill of individual agents. While individual virtues may play an important role in mitigating epistemic harm in particular encounters or assimilating structural changes, they cannot on their own overcome the entrenched structures and historical asymmetries that reproduce epistemic injustice. By excluding victims from agency and focusing narrowly on the conduct of perpetrators, such approaches risk obscuring the systemic dimensions of the problem. What emerges instead is a clear recognition that epistemic injustice is not merely an interpersonal failing, but a collective and institutional one. As such, it requires remedies that address the broader social and structural conditions under which credibility is distributed, voices are heard or silenced, and knowledge is recognized or dismissed.

CHAPTER FOUR
AN (OPEN) TAXONOMY OF EPISTEMIC INJUSTICE IN SCIENCE

This chapter provides a conceptual framework for studying epistemic injustice in science through the form of a taxonomy, tracing its presence across different stages of the scientific process, from the production of knowledge to the evaluation of scientific results. The taxonomy is presented as open-ended, following Dotson's (2012) conviction that epistemic injustice can never be fully diagnosed. Such an open characterization remains attentive to further contributions and possible omissions, while also recognizing its own limitations, which are shaped by the very structures it seeks to expose. The framework remains open not only in its dimensions but also in its acknowledgement that epistemic injustices are interrelated practices that cannot be neatly separated. The injustices and exclusions discussed here build on general accounts of epistemic injustice, adaptations to the scientific domain, and variations developed within information science literature. Each stage of the research process is associated with one or more forms of epistemic injustice, without foreclosing the possibility of others. Moreover, the analysis recognizes that injustices at different stages are interconnected and can function as causes for one another, forming a network of exclusions whose nodes cannot be isolated as discrete elements.

The taxonomy is divided into five stages, each addressed in subsequent sections. First, it considers injustices associated with the production of science, including unequal access to material and epistemic resources, the agenda-setting power of different communities, and the collaboration practices that emerge in this context of inequality. It then turns to the communication of science within the scientific community.[2] Drawing on speech act

[2] The author acknowledges that approaches that focus on scientific micro-social processes—such as Mertonian and constructivist approaches— and their treatment of scientific production as a sequence of discrete stages—local construction, subsequent certification through peer review, and later circulation of contributions—has been widely criticized within the sociology of science. This linear model of isolated phases fails to account for broader knowledge structures and for the role that published scientific knowledge plays in the conception and development of further research. Scientific knowledge is produced collectively by scientific communities, as well as by society and other actors involved in the research process. Hence, scientific communication and knowledge transfer should be understood as integral components of knowledge production rather than as isolated stages concerned solely with the dissemination of final outputs. Nevertheless, maintaining a distinction between the different phases of the scientific process remains

theory as a framework, this stage focuses on injustices that occur in the formation and articulation of scientific outputs, during the publication process, and in the uptake and recognition of those outputs by peers. The discussion then shifts to the transfer of science to society and the private sector, followed by an examination of the narration and historicization of science. Finally, the taxonomy concludes with epistemic injustices that arise when science itself is analyzed, whether through evaluation frameworks or academic research. At the end of the chapter, Table 1 provides a summary of epistemic injustices in the scientific process and reflects on the remedies necessary to address injustices present at each stage.

4.1 When producing science

This section examines three ways in which epistemic injustices manifest in the production of science. First, it considers the role of material resources—such as funding, infrastructure, and publishing opportunities—whose unequal distribution can constitute a form of distributive epistemic injustice. Second, it turns to epistemic resources, that is, the availability and visibility of prior knowledge, theories, and methods, showing how their absence or marginalization creates hermeneutical injustices that constrain what can be researched. Finally, it addresses agenda-setting power, highlighting how political, cultural, and institutional forces shape what is deemed worthy of scientific inquiry. Here, epistemic injustice mostly occurs in the form of testimonial injustice, as the contributions of certain researchers or communities are systematically undervalued or dismissed, limiting their ability to participate on equal epistemic grounds.

4.1.1 Access to material resources

Producing science costs money. This money is needed to buy equipment, pay salaries, acquire materials, travel, attend conferences, pay publishing charges, etc. Each country and institution has its own way of distributing funds among researchers—through direct allocations based on performance, project-based schemes, block grants, and other methods (for a comprehensive review of funding schemes, see Cocos & Lepori, 2020). Beyond this, countries and institutions have access to very different amounts of resources, creating

analytically useful for studying epistemic injustice in science, since the injustices related to access to material resources, for instance, differ from those affecting publication or dissemination. The author also recognizes—and this is reiterated throughout the chapter—that these phases and sub-phases are often interrelated, as are the various forms of injustice associated with each.

a first level of inequality that affects peripheral contexts (Fernández Pinto, 2022a, 2022b).

Although material resources are not epistemic goods in themselves but economic ones, they are nevertheless crucial for conducting scientific research, and their distribution creates deep asymmetries that shape who can pursue scientific inquiry, which topics can be studied, and how research can be disseminated. As discussed in Chapter 3 with reference to Coady's (2010) distributive account, the unequal distribution of resources generates epistemic disadvantages by limiting access to participation in collective inquiry. The effects of resource allocation can range from individual disadvantages to the systematic exclusion of entire areas of research.

Moreover, researchers and projects with greater resources often acquire higher credibility because they are better positioned to disseminate their results and participate in academic networks. In line with Anderson's (2012) notion of credibility markers (§3.2), in science credibility is frequently tied to publishing in high-impact journals and attending key conferences. When researchers are excluded from such venues due to limited resources, their credibility diminishes: their testimony—in this case, their research outputs—becomes obscured, and their capacity to participate on equal terms with colleagues in stronger financial positions is undermined.

Building on Medina's (2011) analysis of credibility excess and the comparative nature of credibility (§3.1.1.2), Bai (2020) highlights the circular relation between funding, credibility excesses, and distributive epistemic injustice. Although Bai specifically examines private funding, his reasoning also applies to public systems, where projects, institutions, or researchers benefit from credibility excesses generated by prior funding successes or larger baseline allocations. According to Bai, unequal resource allocation leads to unequal social recognition and subsequent credibility excesses, which in turn constitute a form of discriminatory epistemic injustice. The outcome is that underrepresented groups may be systematically excluded from future funding opportunities—an instance of distributive epistemic injustice. The relationship between funding and recognition, anticipated by Latour and Woolgar (1995), remains evident in contemporaty analysis such as Hessels et al.'s (2019) study on valuation across different research areas. Their interview-based research found that securing funding emerged as a direct source of recognition within research groups across four disciplines. They caution that this dynamic can amplify the 'Matthew effect' (Merton, 1968, 1988), where researchers who have already gained recognition are more likely to receive further recognition, thereby increasing systemic inequality. A paradigmatic example in this regard is the rise of excellence-based funding policies, which promote the financing and differentiation of certain actors considered to be high-performing, privilege particular research topics and methodologies, reinforce homophily, and promote a conservative orientation in scientific practice (Moore et al., 2017).

Beyond the marginalization of particular actors and groups, certain funding frameworks—such as mission-oriented schemes—can also prioritize specific research areas and topics, thereby marginalizing others. An extreme example is the case presented by

Dembroff and Whitcomb (2022; §3.1.1.1), which illustrates content-based forms of testimonial injustice. However, even in the absence of explicit exclusions on certain topics, the privileging of others can hinder the development of alternative areas of knowledge. One example is the European Union's mission-oriented funding scheme, which favors research aligned with particular objectives—such as broad societal relevance, measurability, and cross-disciplinarity (Mazzucato, 2018).

The unequal distribution of the material resources required to pursue scientific research, when coupled with credibility deficits and excesses assigned to particular groups, can therefore generate practices of distributive epistemic injustice (§3.1.1.3; Coady, 2010). These injustices, in turn, may reinforce both discriminatory and distributive inequities, compounding the disadvantages faced by marginalized researchers and research communities.

4.1.2 Access to epistemic resources

Although the type of injustice presented in this section is closely related to the injustices associated with economic goods in their distributive nature, the intrinsic epistemic character of the resources to which this section refers makes them distinctive. Epistemic goods here refer to existing knowledge on the specific topics that a researcher is interested in and seeks to pursue. The availability of these resources determines the theories, hypotheses, and methodologies a researcher can use, and even the topics she might pursue, directly shaping the knowledge she produces and, on larger scales, silencing or obscuring alternative paths and voices.

Lack of access to epistemic resources is usually linked to social factors, such as the absence of economic means to pay for journal and database subscriptions, infrastructural and geopolitical barriers even when resources are formally open, or the limited visibility and accessibility of knowledge that falls outside mainstream scientific circuits. While the first case usually affects researchers from marginalized groups—particularly those in countries with low economic resources, who cannot afford subscription fees or who lack adequate infrastructure—the second can affect both marginalized and privileged groups by preventing access to certain knowledge. In the first case, unequal access to epistemic resources can be framed as a case of distributive injustice (Coady, 2010), since it arises primarily from the unequal distribution of material resources that in turn restrict access to epistemic goods. This includes the lack of funds to pay for subscriptions (Chan et al., 2008), inadequate infrastructure to access content (for example, data repositories requiring high-speed internet) or re-use it, or restrictions imposed on certain countries by dominant actors controlling resources (Bezuidenhout et al., 2025; Gutiérrez Valderrama, 2025; Leonelli, 2023; Shanahan & Bezuidenhout, 2022). In this sense, distributive justice would involve not only fairer distribution of material resources but also the development of open infrastructures suited to researchers with diverse needs and capacities, actively redressing these inequities (Albornoz, et al., 2020).

In the second case, the epistemic injustice is not distributive but hermeneutical. It refers to the silencing of certain research topics, theories, or methods in favor of mainstream narratives, often developed by researchers in privileged groups. This aligns with Fricker's (2007) account of hermeneutical injustice, in which gaps in collective interpretive resources unfairly disadvantage some groups in making sense of their experiences. Applied to science, such gaps constrain which research paths are visible, credible, and therefore possible to pursue. The issue is also directly related to the topic of 'undone science'—which will be discussed in further detail in Section 4.1.3—as access to particular epistemic resources directly shapes the kinds of science that can be produced. However, although both are connected, undone science may be better understood through the lens of testimonial injustice (§4.1.3), while the lack of access to epistemic resources as presented here corresponds more closely to hermeneutical injustice.

Hermeneutical gaps in science can manifest in two main ways. The first is the absence of science regarding a particular issue, where entire topics receive no attention and research simply does not exist. The second occurs when research on certain topics has been conducted but remains relegated to the margins of the scholarly system, with such limited visibility that other researchers cannot access or build on it. This often happens with research produced in particular regions of the world, on local topics, or in local languages not included in mainstream academic databases—or even absent from regional or local repositories. In such cases, research remains invisible and the concepts or tools developed do not reach mainstream circuits, creating a hermeneutical absence. This situation is closely related to the literature on 'archival silences', which refers to "information that is lost, concealed, destroyed or simply not available for scholarly use" (Manoff, 2016, p. 1). Although the concept extends beyond academic literature, it also applies to the scholarly record, where inaccessible information effectively remains 'silent'. In particular, such gaps affect "the quality and completeness of scholarly work now and moving forward" (Hathcock, 2020, p. 206).

Miragoli (2024) illustrates the impact of absent hermeneutical resources on research. In his example, Laure is a last-year botany student looking for a dissertation topic. Having long been interested in indigenous harvesting practices, she has collected testimonies and consulted specialized research from local centers. She proposes to focus on a specific indigenous harvesting technique, but her school rejects the idea on the grounds that such empirical knowledge and peripheral academic literature contradict mainstream scientific facts. Here, the absence of indigenous harvesting research in mainstream academic literature produces a hermeneutical lacuna that prevents Laure from pursuing her project. In Laure's case, the injustice is double: first, a hermeneutical injustice occurs, since the privileged group (the school's committee) fails to acknowledge the gap in their hermeneutical resources; second, by obstructing Laure's exercise of epistemic autonomy, the case also constitutes a zetetic epistemic injustice (previously mentioned in Section 3.1.1.3).

Another example of how absent hermeneutical resources can render topics invisible is presented by Fairbairn (2020) as 'inferential injustice'. Here the gap is not the absence of concepts, but the absence of inferential relationships connecting them. Although his account is not specific to scientific research, it is relevant for understanding how some research questions are conceivable while others are excluded from the research imaginary. Fairbairn describes the case of a woman who suffers a heart attack but is misdiagnosed with a panic attack due to the lack of medical knowledge on how heart attacks manifest differently in women. Although Fairbairn is mainly concerned with the injustices caused by the misdiagnosis, the underlying cause is key here. While heart attacks were already an established research topic, the particular case of women's symptoms was missing, because hermeneutical tools that would connect the concepts were lacking. Fairbairn presents this as a distinctive case of hermeneutical injustice—labeling it 'inferential injustice'—since, unlike common hermeneutical injustices, the relevant concept exists but is disconnected from the particular case.

In sum, the availability of hermeneutical resources frames the topics, methods, and ideas that can be investigated, shaping not only the knowledge that is produced but also the knowledge that is silenced. As discussed in Chapter 3, this dynamic exemplifies hermeneutical injustice (§3.1.2; Fricker, 2007; Medina, 2017), since the absence or marginalization of interpretive tools prevents certain research paths from becoming intelligible or legitimate within dominant frameworks. When these gaps are actively maintained by privileged groups, they shade into contributory injustices (§3.1.3; Dotson, 2012), as willful ignorance (Pohlhaus, 2012) preserves structural biases in epistemic resources.

4.1.3 Agenda-setting power asymmetries

Injustices also occur when actors have unequal power to determine what is worth researching and what counts as scientific knowledge; in other words, when some actors have the capacity to set the research agenda while others are not. Under these conditions, science becomes not only a site of knowledge production but also a mechanism of ignorance production (see Kourany & Carrier, 2020), as reflected in the selective pursuit of particular research lines, technologies, and methods over others. To illustrate this, Kourany (2022) introduces the notion of 'manly science', highlighting how scientific inquiry has historically centered on men while systematically producing ignorance about women. She documents cases across archaeology and biomedical research where women's roles and bodies have been largely ignored (refer to Fairbairn's case in Section 4.1.2 as an example of mainly science in medicine).

As discussed in the previous section, this dynamic can be conceptualized through the notion of undone science, which refers to the "forms of ignorance generated by the broader cultural, historical, and macrostructural conditions that shape research" (Hess, 2022, p. 167). The concept underscores how political, historical, and cultural conditions influence epistemic preferences, shaping what gets researched and what does not. It also highlights the conflicts between actors with different levels of power. A direct example is the case of the Reagan administration's withdrawal of funds from HIV/AIDS research (Dembroff & Whitcomb, 2022; §3.1.1.1). A different kind of agential case appears in Laure's example, previously introduced in Section 3.1.2. While the earlier discussion emphasized its hermeneutical dimension, the focus here is on what Miragoli (2024) terms zetetic injustice, which obstructs epistemic autonomy and undermines a knower's ability "to conduct meaningful research, question, and more generally, inquire into matters that are relevant for them" (p. 12).

Both cases—though perhaps more directly in Reagan's example—show how epistemic injustice harms those who could have benefited from undone science, even when researchers themselves are not directly affected and can shift their work to other topics. Yet when researchers belong to marginalized groups, they too may be directly disadvantaged by the exclusion of certain lines of inquiry from mainstream research agendas. As Hess (2022) notes, undone science includes not only entire areas of inquiry that are left unexplored, but also domains where research output is scarce or unlikely to be pursued in the future.

The predominance of certain topics over others is hardly random but reflects underlying power relations that determine which subjects are deemed 'scientific' and which are not. Although structural in nature, this form of injustice has a clear agential component. Unlike the hermeneutical lacunae described in Section 4.1.2, in this case the necessary hermeneutical resources do exist, but some topics are excluded from mainstream agendas. Researchers must therefore choose between pursuing work relevant to their communities—which may lack recognition and resources—or aligning with dominant frameworks in order to secure funding and career advancement. The pressure to produce research that is considered valuable or significant within international agendas often leads scientists in peripheral contexts to adjust their topics to those prioritized by prestigious institutions and scientific communities, sometimes at the expense of local needs (Gutiérrez Valderrama, 2025). According to Hountondji's (1990) this is one of the most pernicious forms of what he calls extroversion; in this context "theoretical, or socio-theoretical extroversion" which designates "the fact that we allow the content of our scientific production, the questions we pose, and the way we deal with them to be preoriented, predetermined by the expectations of our potential readers [the Western public]" (p. 11). Other scholars have also described this dynamic as 'subordinate integration' (for a recent discussion of the concept, see Kreimer, 2025), or 'epistemic cultural imperialism' (Gutiérrez Valderrama, 2025), which is also related to the production of distributive injustices towards citizens (§4.3.1).

The lack of agenda-setting capacity for certain scholars and topics has several consequences. It results in the absence of research responding to specific needs that are not considered global, devaluing work that addresses local concerns. As Ford and Alemneh

(2024) observe, this means that "certain studies are never conducted, and for some studies that are conducted, the results or findings never find their way into the body of knowledge" (p. 1061)—a phenomenon they identify as a form of hermeneutical death in academia. This contributes to what Patin et al. (2021) call the 'Third Harm', the exponential perpetuation of ignorance across generations through institutionalization, since only certain epistemologies and research lines are legitimized. Such epistemological limitations also compromise science's objectivity by preventing alternative perspectives from engaging with, and challenging, dominant frameworks (Harding, 2015).

Injustices of this kind can also be linked to testimonial injustice (§3.1.1.1; Fricker, 2007), since the testimony—understood here as scientific contributions—from certain groups or about certain topics is systematically undervalued, obscured or 'smothered' (Dotson, 2011). Yet, as noted in Chapter 3, the harm often extends beyond credibility deficits. When entire domains of inquiry are excluded despite the existence of adequate concepts, the result is a form of zetetic injustice (§3.1.1.2; Miragoli, 2024), which obstructs researchers' ability to pursue questions relevant to their communities. In more extreme cases, as Ford and Alemneh (2024) suggest with the notion of hermeneutical death, these exclusions approach hermeneutical injustices (§3.1.2; Medina, 2017), where the suppression of certain research agendas impoverishes the collective interpretive framework of science. Finally, when powerful actors actively maintain these exclusions—as in the systematic privileging of dominant research agendas or the marginalization of local epistemologies—they exemplify contributory injustices (§3.1.3; Dotson, 2012). Taken together, these forms of injustice reveal how agenda-setting asymmetries silence alternative knowledge paths and entrench epistemic hierarchies within scientific practice.

4.1.4 Collaboration

Finally, this subsection focuses on the specific case of research collaboration. While research collaboration is frequently presented as a neutral or even universally beneficial practice, collaborative arrangements are often structured by asymmetries of power, prestige, and institutional capacity that reproduce rather than mitigate inequalities in global science. Peripheral scholars often engage in asymmetrical collaborations with the intention of make their work more visible, advance their agendas or obtain resources needed to conduct research and publish in international outlets (Leonelli, 2023; Gutiérrez Valderrama, 2025). In such contexts, researchers from marginalized or peripheral communities are disproportionately positioned as junior partners, while privileged collaborators from well-resourced institutions accrue the majority of recognition and authority. These dynamics raise critical questions about how collaboration both enables and constrains epistemic agency, and about the subtle ways in which injustice can be embedded in ostensibly cooperative scientific practices.

Boshoff's (2009) study of research collaboration in Central Africa illustrates this. He shows that over 80% of publications from Central African countries involve foreign collaborators, most often from former colonial powers, with local researchers frequently relegated to roles in data collection, fieldwork, or logistical organization. Despite their indispensable contributions, Central African scientists rarely occupy lead authorship positions, and their intellectual input into research design or interpretation is frequently overlooked. The result is a pattern of 'neo-colonial' collaboration in which the epistemic benefits—publications, visibility, and career advancement—flow disproportionately to Global North partners. Koch (2025) and colleagues have recently examined the roles of African local collaborators in international research partnerships and the ways in which inequalities persist and are reproduced. They show that African collaborators often assume responsibility for fieldwork, while European partners retain control over the 'how to' of conducting research. This division, they argue, is shaped by researchers' positions within global science and the forms of capital they possess. As a result, the distribution of roles established during the project design phase does not necessarily materialize in practice, as internalized habitus can reinforce hierarchical patterns despite formal arrangements. Such cases exemplify how collaboration, far from equalizing the playing field, may instead entrench existing hierarchies of scientific capital and marginalize the knowledge practices of those with less institutional power. In this unequal context, privileged communities have the power to fully exercise their epistemic agency, while peripheral scholars have less epistemic authority and are prevented from fully exercising their capacities (Gutiérrez Valderrama, 2025).

The exclusions described above constitute both testimonial and labor epistemic injustices. In her account of testimonial injustice, Fricker (2007) distinguishes between being treated as an informant and as a mere source of information. As she explains, "informants are epistemic agents who convey information, whereas sources of information are states of affairs from which the inquirer may be in a position to glean information" (p. 132). A testimonial injustice arises when a subject is demoted from the role of informant—an active epistemic agent—to that of a passive source of information. This demotion also constitutes a participatory epistemic injustice (§3.1.1.3), in Hookway's (2010) terms, since it denies the subject recognition as capable of engaging in activities that are intrinsically epistemic, such as scientific inquiry. Moreover, unequal collaborations may also involve epistemic labor invalidation and epistemic exploitation (§3.1.1.3; §3.1.3; Pohlhaus, 2017): when the situated knowledge of particular groups or regions is dismissed as lacking cognitive effort or 'real knowledge', treated as if it were automatically available by virtue of social identity, or reduced to raw information for others to process.

4.2 When communicating science

Alongside the actions required to produce scientific knowledge, communication is an essential part of the scientific enterprise. It is through dissemination that science advances and builds cumulatively on prior discoveries. Scientific communication has distinctive features that set it apart from everyday communicative acts: it occurs in specific venues, follows established formats, and is recognized by the community as a valid form of knowledge exchange. Yet, despite these distinctive traits, it can be analyzed through the broader framework of speech act theory, which has also been applied to the study of epistemic injustice (Buckwalter, 2019). This section adopts that perspective to examine how injustices emerge at different stages of the communicative process in science.

According to speech act theory, communicative acts can be distinguished into locutionary (producing a meaningful utterance), illocutionary (performing an act with intent, such as publishing to seek legitimation), and perlocutionary (producing effects on the audience, such as uptake, citation, or influence).[3] Each stage opens the door to distinctive epistemic injustices. At the locutionary level, non-native English speakers may face locutionary silencing when linguistic barriers prevent their work from being intelligible within dominant venues. At the illocutionary level, the act of submitting a paper or presenting research may fail to be recognized as legitimate due to biased gatekeeping, resulting in testimonial and participatory injustice. Finally, at the perlocutionary stage, even formally published contributions can be ignored or undervalued leading to testimonial smothering, participatory injustice, or hermeneutical gaps. For analytical clarity, the section examines each stage separately, while recognizing that scientific communication is a layered process where injustices at one level can pre-empt or compound those at subsequent stages.

[3] Scientific communication is in practice a complex process that can be disaggregated into multiple, overlapping communicative acts. For instance, the exchange between author and journal may involve both illocutionary and perlocutionary dimensions, while the exchange between author and readers after publication also carries its own illocutionary and perlocutionary force. For the sake of analytical clarity, however, this manuscript adopts a simplified model that associates each stage of scientific communication with its primary act: locutionary, illocutionary, or perlocutionary. This does not exclude the possibility of overlaps or exceptions. For example, even if a manuscript is published in a well-established journal, readers may still dismiss it due to identity prejudice against its authors or because it is framed as a local case study with little assumed generalizability. Nonetheless, the working assumption here is that publication in a recognized journal at least secures minimal recognition of the contribution as ‘scientific’, even if its subsequent perlocutionary impact remains limited or absent.

4.2.1 Utterance

There are several kinds of utterances in science communication, the two most common being academic articles and conference participation (including presentations and proceedings). Other scientific utterances include books, blogs, or preprints, alongside more informal formats that may also convey scientific content. Yet, scientific utterances have distinctive characteristics, both in their form—most often written texts rather than spoken language—and in their expected effects on hearers (Bloomfield, 1935). They typically follow formalized conventions, circulate in specific venues, and are recognized by the scientific community as legitimate vehicles of knowledge exchange.

Following speech act theory, for an utterance to have a locutionary effect it must be performed in a meaningful manner. In science, this often means that outputs must be produced in English, now established as the lingua franca of international research. However, the hegemony of English itself constitutes a barrier for non-native scholars (Flowerdew, 2007; van Leeuwen et al., 2001; Lillis & Curry, 2010), generating inequalities among members of the community. These inequalities can be especially acute in fields where linguistic nuance is central, such as philosophy. For example, difficulties in writing in English may prevent some researchers from completing the locutionary act of communication, as their messages cannot be conveyed intelligibly within dominant parameters. This can limit opportunities to publish in international venues and lead some researchers to choose local, non-English outlets, often at the cost of visibility and recognition[4]. In terms of epistemic injustice, this dynamic creates credibility deficits, in Fricker's (2007) sense, for those unable to meet the linguistic expectations of dominant communities.

Restricting mainstream scientific communication to English can thus result in practices of locutionary silencing (Langton, 1993), impeding researchers from completing locutionary acts. Locutionary silencing has been directly linked to epistemic injustice: speakers who fail to communicate in an intelligible manner, according to community standards, may be perceived as possessing less knowledge or evidence than those whose speech is not silenced. In this context, credibility deficits compound into participatory injustice (§3.1.1.1), excluding researchers from access to key epistemic communities, and into testimonial injustice (§3.1.1.1), as their contributions are systematically undervalued. Conversely, those with greater visibility in English-language venues benefit from credibility excesses, in Medina's (2011; §3.1.1.2;) terms, further reinforcing asymmetries by accumulating recognition and authority unavailable to non-English speakers. In some cases, these situations can also constitute what Medina (2017) calls performative hermeneutical

[4] Although not directly related to utterance performance, Hountondji (1995) points to the incongruity faced by African scholars who are expected to focus their inquiries exclusively on their immediate environments (see next section on 'mental extroversion'), yet are still required to report their findings in foreign languages. As a result, even research centered on local realities becomes oriented outward—toward audiences and systems of recognition located in the Global North. This element of Hountondji's academic dependency intersects with other forms of epistemic oppression and injustice.

injustice, which, although seemingly a subtype of hermeneutical injustice, is more closely related to the denial of marginalized discourses by privileged groups on the grounds of perceived unintelligibility, rather than to an actual absence of the interpretive resources by the marginalized groups. Together, these credibility deficits and excesses illustrate how linguistic hegemony not only mediates participation in scientific communication but also reproduces structural patterns of epistemic injustice.

4.2.2 Dissemination

Following the speech act model, once an utterance has been performed, it must also be received as intended by the speaker—in scientific communication, as a legitimate act of knowledge. In practice, legitimacy in science is largely conferred through publication in academic journals[5], especially those indexed in international databases such as Web of Science or Scopus, which have long been regarded as authorities on journal quality due to the perceived objectivity of their selection criteria (Lillis & Curry, 2010). Participation in international conferences operates in a similar way. While other venues exist, academic articles and conference proceedings remain the primary channels of recognition. Since commercial databases, publishers, journals, conferences, etc. are mainly located in the North, this automatically creates a dependence situation for scholars in the Global South (Alatas, 2003).

Both journals and conferences have in common that they rely on gatekeeping processes—editorial and peer review—that decide whether submissions meet the standards of quality and scope required for legitimation. Submitting a manuscript to a journal can thus be seen as an illocutionary act: the author intends her research to be recognized as legitimate scientific knowledge. Illocutionary silencing occurs when this act fails because the hearer (here, the journal or reviewers) either does not uptake the contribution as intended (Langton & Hornsby, 1998) or fails to recognize the speaker's authority to perform it (McGowan, 2017). While not all forms of rejection constitute silencing—for instance, rejection on methodological grounds since the work is still acknowledged as science, though flawed—other forms of rejection do. These include dismissals based on identity prejudice (see Fricker, 2007), divergence from dominant cognitive or theoretical orientations (Ajdari, 2023), lack of references to Global North scholarship (Goitom, 2019), or even insufficient conformity to academic English conventions (Arnbjörnsdóttir & Ingvarsdóttir, 2017). Briggs and Weathers (2016), in their study of acceptance rate trends in *African Affairs* and the *Journal of Modern African Studies*, suggest that the

[5] As noted earlier, there are multiple scientific communication venues, and newer channels such as preprint servers are gaining. Nevertheless, journals remain central, mainly due to their weight in research evaluation. The dissemination process described here thus does not fully apply to preprints. For the purposes of this manuscript, however, the focus remains on the most common forms of scientific dissemination—journals and academic conferences—for which the framework developed here is most directly relevant.

decreasing acceptance rates for submissions by African authors may be partially explained by reviewer bias, particularly implicit bias among reviewers affiliated with Global North institutions. Alongside the rejection of individual manuscripts, a similar form of silencing occurs when journals are excluded from mainstream academic databases. As discussed in Section 2.2 and at the beginning of this subsection, these databases are often regarded as cognitive authorities, and the outputs they index are thereby validated as legitimate scientific knowledge. In cases of journal exclusion, however, silencing does not target a single author but an entire scientific community. In both instances, the problem lies not in the quality of the contribution or the journal itself, but in the failure to recognize it as science.

Illocutionary silencing in these contexts reflects failures of authority recognition. As McGowan (2009) argues, silencing occurs when a hearer refuses to acknowledge a speaker's authority within a domain. Caponetto (2021) develops this with examples from male-dominated fields, where women's expert contributions are disregarded despite their intentions being clear: "the hearer grasps the speaker's intention […] but since he mistakenly believes that she lacks the authority to perform the act in question, he fails to recognize that her utterance counts as that very act" (p. 197). The same dynamic operates in science when marginalized researchers' contributions are systematically dismissed.

These dynamics map onto several forms of epistemic injustice. Research outputs can be understood as a form of expert testimony (Cox, 2023). When such testimony is denied uptake on the basis of social identity prejudice, it constitutes a testimonial injustice (§3.1.1.1; Fricker, 2007). Manuscripts rejected because of authors' identity thus exemplify testimonial injustice, while dismissals based on divergence from dominant cognitive orientations or association with marginalized groups illustrate content-focused injustices (§3.1.1.2; Dembroff & Whitcomb, 2022). The systematic privileging of Global North canons or Anglophone standards further illustrates the comparative nature of credibility (Medina, 2011; §3.1.1.2), where excesses for some groups entail deficits for others. Some of these mechanisms—such as conformity to academic English conventions or reliance on Northern literature—operate through credibility markers (§3.2; Anderson, 2012) that directly shape the perceived authority of the speaker, or in this case, the author. These failures of recognition also have a participatory dimension (§3.1.13; Hookway, 2010; Grasswick, 2017). As Grasswick (2017) stresses, credibility deficits in joint epistemic endeavors are not only testimonial but also participatory injustices: when members of underrepresented groups receive less uptake, their capacity to engage in collective inquiry is curtailed. Implicit biases regarding scientific skill therefore operate not just at the level of credibility but as barriers to full epistemic participation (§3.1.1.3). The effects of these biases are discussed by Hountondji (1990, 1995) through the notion of 'mental extroversion', whereby African scientists confine themselves to a subordinate role as mere informants. Since mainstream journals rarely expect marginalized researchers to produce theoretical contributions, these scholars might internalize such expectations and restrict their own work to descriptive accounts of their societies, without interpretation or theorization (Connell, 2007; Hountondji, 1995). Refraining from discussing certain topics in response to the hearer's reactions also constitutes an instance of testimonial quieting (§3.1.3; Dotson, 2011). Finally, when gatekeepers—such as peer reviewers and, especially, commercial databases—willfully choose to uphold prejudiced infrastructures, contributory injustices are at play. This is particularly relevant in the case of commercial data sources, whose reliance on biased resources has been extensively documented in the academic literature (e.g., Chavarro, et al., 2018).

These injustices also intersect with distributive ones (§3.1.1.3; Coady, 2010). Scholars have pointed out that the rise of Open Access has led, among other consequences, to increasing global inequality and to the exclusion of researchers with fewer resources from new publishing models, such as pay-to-publish systems (Becerril García, et al., 2023; Pinfield, 2024). As Cox (2023) argues, journal rankings operate as mechanisms of credibility assignment: when APCs restrict access, credibility is distributed on non-meritocratic grounds. Several scholars have further linked Open Access models to imperialism and academic neo-colonialism (Piron, 2018; Sengupta, 2021). In the African context, they have been associated with 'linguicide' and 'epistemicide' as well as 'epistemic alienation' (Mboa Nkoudou, 2020, p. 26). These dynamics have also been directly connected to epistemic injustice (e.g., Pinfield, 2024). In particular, they reinforce testimonial injustice (§3.1.1.1; Fricker, 2007), as peripheral researchers are denied credibility, and participatory injustice (§3.1.1.3; Grasswick, 2017), as their contributions are systematically excluded from central scientific communities. This exclusion disproportionately affects researchers from the Global South. Beyond career impacts—such as fewer citations, reduced visibility, and limited collaborations—the epistemic consequences include diminished confidence and the silencing of alternative knowledge paths.

4.2.3 Uptake

This subsection turns to the perlocutionary effects of scientific communication—that is, the influence of an utterance on its audience. Although an essential step, according to some authors, recognition is not exhausted by journal publication or conference acceptance. As Longino (1990) emphasizes, "[p]ublication in a journal does not make an idea or result a brick in the edifice of knowledge. Its absorption is a much more complex process, involving such things as subsequent citation, use and modification by others, etcetera" (p. 69). In her view, scientific claims count as knowledge only when they are subject to critical uptake within a community of inquirers (p. 86). This resonates with Latour's (1987) observation that a scientific statement becomes a fact only as a consequence of what others do with it.

From this perspective, citations play a central role as forms of uptake. If certain groups' work is ignored, their contributions are not recognized as proper knowledge. Returning to speech act theory, a scientific utterance that fails to generate perlocutionary effects—

engagement, influence, incorporation—has not been fully acknowledged as scientific. In other words, knowledge requires an epistemic exchange between author and audience. Dutilh Novaes (2020) argues that, for this to occur, the audience must first be exposed to potential 'exchange partners', then select which partners to engage with given limited time and attention, and finally actively interact with their statements. Epistemic injustice can occur at both the selection and the engagement stage: in the first, when comparative choices are motivated by epistemically irrelevant factors such as gender or race (Dutilh Novaes, 2020; Medina, 2011); in the second, when the identity of the speaker influences the judgement of the hearer (Dutilh Novaes, 2020).

Citation practices thus become a locus of epistemic injustice. McCusker (2019) shows how gendered citation patterns produce participatory injustice, as excluding groups from uptake denies them recognition and credibility. Other studies point to language-based exclusions. For instance, Schwitzgebel et al. (2018) found that English-language philosophy journals overwhelmingly cite only English articles, while multilingual journals cite across languages. For Koskinen & Rolin (2021), this systematically diminishes the value of work written in non-English languages, leaving it invisible in international contexts. Similarly, Stroupe et al. (2025) show how citation patterns in 'Nature of Science' research disproportionately privilege white men, embedding their experiences and perspectives as disciplinary foundations. This is closely related to the well-known phenomenon of the 'Matthew effect' (Merton, 1968), where few scientists accumulate recognition whle others' contributions remain overlooked.

Epistemic exchanges between actors are thus central to how scientific knowledge is constructed, and citations form a crucial part of these exchanges. Yet citations also shape which contributions become the epistemic foundations of a discipline. Fairbairn (2020) describes this in terms of an 'inferential web'—the background of epistemic resources and relations that guide judgments about evidence, information relevance, argument quality. In research contexts, it shapes, for example, which hypotheses are considered worth testing given existing knowledge. When these webs are shaped by prejudice or stereotypes, some hypotheses remain invisible and judgments become distorted, producing inferential injustice.

Moreover, citation biases are exacerbated by search engines and algorithms, which prioritize relevance primarily in terms of citation counts. This creates a vicious cycle in which already-cited publications become more visible and therefore more likely to be cited again, while less-cited work is further disregarded as irrelevant. As Ma (2022) argues, this dynamic—combined with broader socio-cultural factors—can effectively bury the voices of minorities, rendering their contributions undiscoverable.

The injustices associated with citation practices are therefore multiple. First, the failure to recognize someone's work constitutes participatory injustice via testimonial injustice (§3.1.1.1; Fricker, 2007; Grasswick, 2017), as noted in Section 4.2.2. These practices also align with Miragoli's (2024; §3.1.3) notion of testimonial spurning, in which testimony is formally published yet its credibility and intended effects are denied on the basis of biased or prejudiced assumptions about the speaker. Cases of perlocutionary silencing (Langton, 1993) can also erode self-perception, leading individuals to doubt the adequacy or relevance of their testimony, or even their intellectual ability, thus producing testimonial smothering (§3.1.3; Dotson, 2011). In the case of inferential injustice—which also applies to other injustices tied to underrepresentation (e.g. Stroupe et al.'s NOS study)—Fairbairn identifies it as hermeneutical injustice, since it arises from flaws in hermeneutical resources. He also emphasizes, however, the role of contributory injustice in maintaining prejudiced resources. As discussed in Section 3.1, the type of injustice ultimately depends on the form of ignorance that sustains it. Regardless of type, such injustices may contribute to de Sousa Santos's (2014/2016), notion of epistemicide (§3.1.3).

Finally, it is also worth briefly addressing epistemic injustice in scientific conferences. Unlike journal publications, conferences are sites where recognition occurs face to face, a dynamic uncommon in most scientific exchanges. In these contexts, testimony appeals directly to the audience, making it impossible to ignore without response. For instance, if a presenter asks a participant whether they would like to hear about a poster, the participant must either agree or actively decline; even silence constitutes a negative response. Wanderer (2012) provides a framework distinguishing between ignoring and rejecting, emphasizing that their harms differ. Testimonial ignoring causes harm through repeated failures of uptake, whereas rejection can be harmful even in a single instance. Returning to the conference example, active rejection constitutes testimonial injustice for the speaker and may also prompt further forms of pre-emptive injustice (§3.1.1; Fricker, 2007) or lead to testimonial smothering (Dotson, 2011).

4.3 When transferring science

Scientific knowledge does not exist in isolation from society; its orientation, circulation, and reception are deeply shaped by social structures, power relations, and economic interests. These dynamics shape whose needs science serves, which voices are amplified or silenced, and how citizens engage with and trust scientific institutions. These dynamics create conditions under which epistemic injustices can occur, not only within the academy but also in how knowledge reaches—or fails to reach—citizens and how it is influenced by external actors.

This section addresses two central contexts where such injustices arise. The first concerns whether society's epistemic needs are met—or left unmet—depending on research agendas, access to knowledge, and conditions of epistemic trust. Here, injustices take the form of hermeneutical, distributive, or trust-related harms. The second context examines the role of private industry in shaping scientific inquiry, where the influence of commercial interests promotes commercially favorable knowledge, generates ignorance about socially relevant topics, and produces instances of hermeneutical, contributory, and testimonial injustice.

4.3.1 To society

For scientific knowledge to directly benefit citizens, they must be able to receive claims from scientists in an epistemically responsible way. Several conditions are required for this to occur. First, science must address socially relevant needs. Second, access to knowledge can be mediated—or obstructed—by social institutions and structural inequalities. Finally, conditions of oppression may undermine citizens' trust in scientific institutions.

In the first case, when scientific research on socially relevant topics is lacking, the epistemic needs of the population remain unmet. This form of undone science is tied to the processes through which research priorities are established (§4.1.3) and highlights conflicts between dominant and subordinate social actors, as well as the broader cultural, historical, and structural conditions that generate prioritized and marginalized areas of inquiry (Hess, 2022). As Kourany (2022) argues, such dynamics produce ignorance about topics that directly affect large segments of the population, leaving their needs unserved. This ignorance aligns with Fricker and Jenkins's (2017, p. 271) notion of 'practical conceptual ignorance' and connects to hermeneutical marginalization and injustice (Bain, 2022). When this ignorance is sustained by dominant actors, it also constitutes a form of contributory injustice (Dotson, 2011).

In the second case, even when relevant research is conducted, if the knowledge it produces does not reach the population—or only reaches privileged citizens—excluded groups become victims of unjust ignorance stemming from the inequitable distribution of epistemic goods (§3.1.1.3; Coady, 2010). Such epistemic marginalization not only perpetuates ignorance but also generates broader social consequences, limiting the capacity of disadvantaged groups to achieve greater social empowerment (Coady, 2010). Irzik and Kurtumuș (2024) differentiate between primary and secondary forms of distributive injustice depending on whether the knowledge concerned is that which citizens need directly (primary) or that which public officials require to carry out essential tasks such as providing health care, implementing social policies, or maintaining the legal system (secondary).

Finally, epistemic trust injustices (§3.1.1.3; Grasswick, 2017) occur when subordinate groups lack the conditions necessary to ground trust in experts. Trust is indispensable if citizens are to benefit from scientific resources, yet trustworthiness is situated and depends on the evidence available in each context. For marginalized groups, when scientific institutions have historically contributed to their oppression—for example, by neglecting research topics of central importance to them while prioritizing the interests of dominant communities—distrust becomes a rational stance. This distrust, however, has further epistemic consequences: groups that do not trust science are less likely to participate in it, whether as research subjects or as knowledge users, thereby reinforcing cycles of ignorance and exclusion.

4.3.2 To the private sector

Private industry and scientific research benefit mutually: while research provides valuable knowledge to companies, private firms supply significant funding to scientific activity. Yet this partnership is not without risks, particularly regarding the influence that private funders may exert on the orientation of research. This dynamic can be captured by the concept of wishful speaking, in which a scientific actor endorses a claim in order to secure some benefit (John, 2018). In such cases, private funders may guide scientists toward commercially favorable choices. A clear example is the research sponsored by tobacco companies to dilute evidence of tobacco's harmful effects (see for instance Galison & Proctor, 2020). Similar concerns arise in medical research: funding from pharmaceutical companies often prioritizes projects with higher commercial potential over inquiries into causation and prevention (van de Klippe et al., 2023). This generates ignorance around socially beneficial topics, producing both hermeneutical and contributory epistemic injustices (§3.1.2; §3.1.3; Fricker, 2007; Dotson, 2011).

Holman (2021) further argues that wishful speaking creates collateral testimonial injustice (§3.1.1.2), whereby credibility excess is granted to unreliable actors. In turn, speakers who actually possess rational authority are accorded less credibility, undermining their capacity as knowers.

4.4 When historicizing science

Historicizing science is not a neutral act of retrieval but a process of selection and interpretation that confers—or withholds—epistemic standing. Archival theory has long rejected the view of the archive as a neutral repository. Rather, archives are sites of power that sustain certain narratives while excluding others (Carter, 2006). Silences in such repositories forcibly suppress alternative voices and dissenting perspectives, reinforcing the authority of dominant groups. In science, archival silences have been connected to epistemicide (de Sousa Santos, 2014/2016) and to the ways in which epistemicidal practices are perpetuated through epistemic injustices (Youngman et al., 2022). Injustices of this kind are closely related to the unavailability of epistemic resources from particular groups and communities, as discussed in Section 4.1.2.

Examining scientific narratives from a 'situated' perspective, Massimi (2022) identifies two varieties of epistemic injustice in how scientific histories are constructed: epistemic severing and epistemic trademarking. Epistemic severing occurs when the contributions of particular communities are erased—sometimes willfully, sometimes through structural norms that privilege textual over oral, codified over artisanal, or 'universal' over local knowledge—thereby breaking the historical lineages that made scientific achievements possible. For instance, in his historical study of sociology, Connell (2007) criticizes the extent to which metropolitan perspectives are embedded in contemporary sociological discourse—particularly in what is regarded as essential or foundational to the discipline—while systematically neglecting social theorizing from the Global South. Epistemic trademarking arises when, once those lineages have been severed, knowledge is appropriated and rebranded, often consolidating plural contributions under a single figure or label. A clear example is the reduction of entire bodies of work to 'Newtonian mechanics', which obscures the collective nature of the knowledge that both preceded and followed Newton.

Building on literature on archival silences and the epistemicide framework, Youngman et al. (2022) propose the notion of 'commemorative injustices', a family of injustices that occur when the historical record is distorted in ways that marginalize certain groups by dismissing or misrepresenting their knowledge. Commemorative injustices also threaten knowers' capacity to learn from and situate information about the past, thereby inhibiting their epistemological development. Within this category, 'memorial injustice' arises when events or agents are either not commemorated at all or commemorated in ways that suppress essential context, producing skewed or absent memory objects. 'Performative injustice' refers to the appearance of repair without its substance—such as token history months, proclamations, or land acknowledgments that substitute display for structural change—thereby entrenching the status quo while mimicking recognition. 'Documentary injustice' occurs when records are misdescribed, withheld, or curated in ways that inhibit epistemic development; once embedded, such records lead to further misinterpretations and exclusions.

These injustices reflect enduring historical patterns that have shaped who is recognized as worthy of producing, preserving, and disseminating knowledge (Fanon, 1961/2004). They are closely connected to hermeneutical and contributory injustices (§3.1.2; §3.1.3; Fricker, 2007; Dotson, 2012), as they marginalize the interpretive resources of certain groups and dismiss their epistemic contributions. Ultimately, such practices perpetuate epistemicide (§3.1.3; de Sousa santos, 2014/2016) by systematically silencing and devaluing entire knowledge systems.

4.5 When analyzing science

The analysis of science through evaluation systems and scientometric tools is not a neutral exercise but one that actively shapes which forms of knowledge are recognized, valued, or rendered invisible. When based on selective data sources and narrow indicators, these practices privilege dominant scientific communities while marginalizing others, thereby reproducing epistemic injustices.

Since the 1990s, the emergence of large commercial bibliographic databases and data-analysis tools has profoundly transformed how scientific activity is monitored and assessed. These infrastructures not only facilitated the rise of a global community of scientometric research but also influenced the design of research evaluation systems that have become widespread in recent decades for supervising the performance of researchers and institutions. In particular, the constitution of Thomson Reuters bibliometric index (ISI-Web of Science) and the universalization of its inclusion criteria have contributed to the homogenization of journal formats within academic metropolises and, subsequently, in the databases that emerged across the world since the 1990s (Beigel, 2013b). Evaluations of scientific publications, university accreditation processes, and the career advancement of scholars from peripheral communities are now often based on those same standards (Beigel, 2013a). Likewise, global reports on science tend to rely on such indices—a trend that exposes ongoing tensions between notions of quality and excellence (Cetto & Alonso, 2011). Accompanying this process, the use of bibliometric indicators and methods gradually consolidated into a scientometric practice imbued with an aura of neutrality (Leydesdorff, 1995), which was progressively adopted worldwide to assess research capacity and guide public investment decisions. As Hicks et al. (2015) have pointed out, the reliance on the impact factor can generate biases in fields with a local dimension, which are not captured by high-impact English publications.

This section examines such injustices both in the context of research assessment and within quantitative science studies, where scientific outputs are treated not only as results of research but as research objects themselves. In the first case, scientometric analyses detached from social and cultural contexts or reliant on incomplete and biased datasets are associated with contributory injustices, while in the second, evaluation frameworks are primarily linked to testimonial injustices.

4.5.1 In scientometric research

Scientometric tools are powerful instruments for studying science. However, scientometric studies typically rely on publication data to quantitatively examine scholarly literature, addressing who publishes, when, where, and on what topics, as well as the impact of these publications at different levels—such as author-level metrics, journal indicators, university rankings, and patterns of citation and collaboration. The data sources for these analyses are usually commercial bibliographic databases such as Web of Science or Scopus, which, although often presented as neutral measures of scholarly quality, have long exhibited linguistic and geographic biases (e.g., Asubiaro & Onaolapo, 2023; Archambault et al., 2009), rooted in colonial assumptions about where legitimate scientific practice takes place (§2.2; §2.4). When these metrics are treated as objective data detached from the cultural norms and social structures that shape why certain works are less read, less cited, or entirely absent, they risk reproducing inequalities in science and research (Ma, 2022). More inclusive or regional databases and repositories have progressively entered scientometric research, broadening coverage. Yet important limitations remain, especially in regions where much of the academic literature appears in local outlets that are often invisible even to specialized or local platforms. Furthermore, even when records are covered, incomplete metadata can distort the outcomes of scientometric analyses.

Academic databases and repositories, as infrastructures for storing information about scientific outputs, can be understood as a specific kind of digital archive. Viewing the gaps in these systems through the lens of archival silences situates them not merely as technical oversights but as consequences of structural power relations and material constraints—for instance, the loss of physical copies of journals prior to digitization due to inadequate conservation infrastructures (Manoff, 2016). Regardless of the cause, silences must be acknowledged if they are to be remedied (Carter, 2006), or at least taken into account when interpreting data.

When such silences go unacknowledged, they foster what Medina (2011) terms 'meta-insensitivity'—"the lack of awareness of what we know and don't know" (p. xiii)—which he links to hermeneutical injustices. Building on archival silences literature, Lassen et al. (2024) highlight the epistemic risks of applying computational tools to skewed or limited datasets, concluding that these 'unfair' tools misrepresent reality and perpetuate the silencing of marginalized voices. Yet, given the growing body of work acknowledging the limitations of both mainstream and regional data sources (Alonso-Álvarez, 2024; Asubiaro & Onaolapo, 2023; Chavarro, et al., 2018), the case of scientometric silences arguably falls closer to willful ignorance than to simple meta-insensitivity. As such, it can be understood as a form of contributory injustice (§3.1.3; Dotson, 2012) in science, where the persistence of known gaps reflects not mere oversight but the active perpetuation of exclusion.

4.5.2 In research assessment contexts

Research evaluation systems and their associated incentives and rewards play a decisive role in structuring how science is produced, circulated, and recognized (Whitley, 2007). Yet these systems frequently reproduce and exacerbate epistemic injustices, particularly for researchers working in peripheral or marginalized regions and communities. Like scientometric studies, research evaluation systems have historically depended on quantitative indicators such as research outputs, citation counts, and publication in high-impact venues indexed in commercial bibliographic databases like Web of Science and Scopus (Kulczycki, 2023; Vessuri et al., 2014). This reliance reproduces the limitations and biases of commercial databases, invisibilizing significant portions of scientific production, particularly from peripheral regions and communities that are poorly represented in these sources. Evaluation systems have also been linked to cultural imperialism, whereby privileged scientific communities in the Global North universalize their own standards of quality and measure all others against them (Hall, 2018). This dynamic legitimizes entrenched inequalities in knowledge production (Rowlands & Wright, 2020). For subaltern research communities, the result is systematic misrecognition: they are construed as epistemically inferior for failing to align with dominant models of knowledge production (Tanesini, 2022).

Citation indexes were initially designed as tools to trace knowledge circulation (Garfield, 2006; Gingras, 2016), but they were later repurposed as instruments of quality assessment. This shift transformed inclusion in such databases from a marker of participation in established scientific exchanges into a prerequisite for being recognized as a legitimate contributor (Vessuri et al., 2014; Voges, 2023). Similarly, journal impact factors—originally designed to assess journals—are routinely misapplied to evaluate individual scholars, thereby strengthening the publishers' role in scholarly communication (Leonelli, 2023). Across most systems of scientific assessment worldwide, papers published in high-impact journals remain the primary recognized research output, while other valuable components of the research process—such as data, models, software, and instruments—are often dismissed as mere means to the production of articles.

The reliance on metrics has been widely criticized for constructing hierarchies that disregard epistemic cultures and norms (Ma, 2020). Instead, a model of 'scientific meritocracy' (Reinhart & Schendzielorz, 2020) emerges, in which hierarchies of prestige are presented as the outcome of fair competition, masking the systemic inequalities that shape them (Mijs & Savage, 2020). Biases in peer review, disparities in productivity along gendered and racial lines, and unequal working conditions all influence the very indicators on which careers and reputations depend. These dynamics contribute to testimonial epistemic injustice (§3.1.1.1; Fricker, 2007) by encouraging evaluators—and potential readers—to assign diminished credibility to work ranked 'lower', regardless of intrinsic quality. In such cases, scholars' testimonies are not fully recognized as knowledge claims (Rowlands & Wright, 2020; Ma, 2022), which is also related to testimonial spurning (§3.3; Miragoli, 2024), and can contribute to testimonial quieting (§3.1.3; Dotson, 2011). Moreover, given the current interest, knowledge, and advances in research evaluation, the deliberate use of unjust evaluative frameworks can itself be regarded as a contributory injustice (§3.1.3; Dotson, 2012). Alongside testimonial and contributory injustices, these practices are closely connected to dynamics discussed in earlier sections—such as the alignment of peripheral communities' research agendas with mainstream priorities (§4.1.3)—as a strategy to comply with prevailing research assessment systems.

4.6 Remedies for epistemic injustice in science: an overview

The taxonomy developed in this chapter has shown that epistemic injustice in science is multi-layered, heterogeneous, and distributed across the full arc of scientific practice. By disaggregating injustices according to the epistemic good at stake—credibility, intelligibility, participation, epistemic resources—and the stage in which they materialize—production, dissemination, transferring, historizing, and analysing science—, the chapter made visible how similar harms take on different meanings depending on the level at which they occur, and how distinct practices can generate injustices of the same type. It also demonstrated that forms of injustice that may initially appear analogous—such as overlooking testimony in citation versus rejecting a manuscript as 'non-scientific'—operate through different mechanisms and therefore require different modes of response.

Situating these mechanisms within Dotson's (2012) three orders of epistemic change further clarifies the differences between injustices that can be addressed within existing epistemic frameworks and those that demand transformation of the frameworks themselves. First-order injustices involve misattributions of credibility, participation, or epistemic and material resources within an otherwise functional system; second-order injustices reveal distortions or gaps in the interpretive resources that structure epistemic judgment; and third-order injustices point to entrenched epistemic systems that marginalize entire ways of knowing through practices that sustain ignorance or erase alternative epistemologies.

The Table (Table 1) below synthesizes these insights. For each stage of scientific practice, it identifies the relevant type of epistemic injustice, locates it within Dotson's three-order model of epistemic change, and outlines the kind of transformation required to redress it, accompanied by one or two concrete examples. In this way, the table serves as a synthetic representation of the analytical distinctions developed in the chapter while also mapping plausible forms of remedy. The table is organised according to the stages described earlier, each linked to its primary type of injustice—mainly testimonial, hermeneutical, contributory, participatory, or distributive—and to a secondary type. Here, the secondary type refers to more specific instances or extensions of the primary type (e.g., hermeneutical death as an intensified form of hermeneutical injustice, or testimonial rejecting as a particular modality of testimonial injustice). The injustices are then classified according to Dotson's orders of epistemic change. In some instances, the same injustice may fall into different orders depending on the specific circumstances; this is also indicated in the table. The final column offers a general interpretation of the kind of remedy required for each injustice, followed by examples that situate the theoretical remedy in concrete practices. Specific remedies are not provided for all secondary injustices, since distinct cases within the same primary type and sharing the same order of change often require comparable responses. Rather than offering exhaustive solutions, the table aims to illustrate how different injustices call for different forms of intervention.

Following Section 3.2, the remedies presented here are conceived primarily as structural or institutional, even though their implementation typically requires uptake by individual agents—for example, adjusting citation practices to include marginalised communities in accordance with a protocol or initiative. The table thus highlights that epistemic justice cannot be achieved solely through individual virtue or isolated corrective gestures. While reflexive adjustments remain relevant for addressing first-order harms, the majority of injustices identified in the taxonomy require collective and structural responses. Among them, redesigning epistemic infrastructures, recovering marginalized hermeneutical resources, redistributing epistemic authority, or cultivating institutional practices that facilitate plural participation in science. Taken together, the taxonomy and its associated remedies provide a practical map for understanding how epistemic injustices emerge across different stages of scientific practice and what forms of change are necessary to address them.

Table 1. Epistemic injustice in the scientific process: types, orders of change, and illustrative remedies

Stage	Primary type	Secondary type	Order of Change	Remedy / Example
When producing science				
Access to material resources	Distributive	—	First	Correction in attribution of: material/financial resources → funding instruments not tied to missions or prior performance, e.g. basal funds, lotteries.
Access to epistemic resources	Distributive	—	First	Correction in attribution of: epistemic/academic resources → remove material and technical barriers to accessing knowledge, e.g. open-access publication; adaptation of platforms and repositories to the computer infrastructure of less-resourced communities.
	Hermeneutical	Zetetic Inferential Hermeneutical death	Second / Third	Change in frameworks that sustain inequalities: broaden hermeneutical resources → expand interpretive frameworks so that diverse knowledge becomes intelligible and usable., e.g. development of inclusive, discipline oriented, or regional databases. Shift in hermeneutical resources: recognition of alternative knowledges → integration of non-canonical epistemologies, e.g. formal inclusion of Indigenous land-based knowledge systems.
Agenda-setting asymmetries	Testimonial	Testimonial smothering	First / Second	Correction in attribution of: worth → revision of worth judgments in scientific relevance attribution, e.g. redefining 'scientific relevance' so it is not anchored solely in Euro-American conceptual interests. Change in frameworks that sustain inequalities: openness towards alternative or peripheral knowledges and knowers → revise interpretive filters that treat certain topics (local needs, gendered bodies, non-Western concerns) as epistemically trivial or peripheral, e.g. moving away from male-defaults, Western defaults, urban defaults, or human-centered defaults in science.
	Hermeneutical	Zetetic	Second	Change in frameworks that sustain inequalities: revision of academic hierarchies → broaden definitions of scientific significance to include undone science and locally relevant topics, e.g. dedicated calls for topics

Stage	Primary type	Secondary type	Order of Change	Remedy / Example
		Hermeneutical death		historically neglected, revision of database indexing policies to include journals covering neglected domains
	Contributory	—	Third	Shift in hermeneutical resources: transformation of epistemic infrastructures that define what counts as a legitimate research line → transformation of the epistemic infrastructures and political-evaluative mechanisms that determine agenda-setting power, e.g. governance reforms to include Global South scholars in defining international research agendas
Collaboration	Participatory	—	First	Correction in attribution of: opportunity for epistemic participation → ensure that all collaborators have access to epistemic roles within the project, including research design, methodological decisions, analysis, interpretation, and authorship, e.g. shared decision-making structures.
	Testimonial	—	First	Correction in attribution of: epistemic agency → ensure collaborators are recognized as active epistemic contributors rather than passive sources of data, recognition of situated expertise, e.g. equitable partnerships in North–South collaborations.
	Epistemic labor	Exploitation	First / Third	Correction in attribution of: labor recognition → fair recognition of diverse forms of epistemic labor that are often invisibilized, e.g. initiatives like Contributor Roles Taxonomy (CRediT), institutional policies requiring co-governance of data, authorship, and research direction in international projects to prevent epistemic extraction. Shift in hermeneutical resources: transform interpretive frameworks that naturalize extractive roles for marginalized collaborators → redistribute the responsibility for epistemic labor, e.g. Two-Eyed Seeing frameworks.
		Invalidation	Third	Shift in hermeneutical resources: transform which forms of labor count as epistemic contribution. → rebuild interpretive frameworks so that forms of labor typically associated with researchers from the periphery (field expertise, contextual interpretation, community knowledge, linguistic mediation) are recognized as cognitively substantive.
When communicating science				

Stage	Primary type	Secondary type	Order of Change	Remedy / Example
Utterance	Participatory	—	First	Correction in attribution of: opportunity for epistemic participation→ ensure that scholars can perform scientific utterances that fulfill the communicative conditions (linguistic, stylistic, normative) required to be potentially considered as scientific acts, e.g. translation support, multilingual publication pathways.
	Testimonial	—	First	Correction in attribution of: locutionary force to testimony → multilingual accessibility, e.g. Helsinki Initiative on Multilingualism in Scholarly Communication.
Dissemination	Distributive	—	First	Correction in attribution of: financial burden in scientific publishing → community-led, diamond-open-access journals, repositories, e.g. AfricArXiv and Redalyc
	Participatory	—	First	Correction in attribution of: recognition of epistemic participation → ensure that marginalized authors' communicative acts are recognized as valid attempts to participate in the scientific community, e.g. MetaROR publish-review-curate approach.
	Testimonial	Both content or non-content-focused	First	Correction in attribution of: illocutionary force to testimony → counter failures of authority recognition that lead to illocutionary silencing, e.g. protocols to reduce biases in peer-review, e.g. open peer-review); revision of inclusion criteria and procedures of academic database, e.g. Redalyc open criteria.
		Testimonial quieting	Third	Shift in hermeneutical resources: transformation of how data infrastructures encode credibility and authority → open, transparent indexing algorithms, repositories involving marginalized communities, e.g. OpenAlex, LA Referencia.
Uptake	Participatory	—	First	Correction in attribution of: recognition of epistemic participation → redirect engagement practices so that structurally marginalized contributions are acknowledged and incorporated, e.g. use search engines, algorithmic tools or repositories that surface low-visibility work.

Stage	Primary type	Secondary type	Order of Change	Remedy / Example
	Testimonial	Rejecting Pre-emptive	First	Correction in attribution of: perlocutionary force to testimony → counter prejudiced credibility judgments during citation, or conference uptake, e.g. citation justice initiatives, Cite Black Women collective, appointed commentors in conferences.
		Spurning Smothering	Third	Shift in hermeneutical resources: replace biased heuristics for assigning credibility → promotion of citation diversity, e.g. citation diversity statements, procedural accounts of search breadth.
	Hermeneutical	Epistemicide	Third	Shift in hermeneutical resources: transformation on epistemic infrastructures and cognitive schemas that determine visibility and perceived relevance → construction and use of inclusive databases, e.g. JOL projects, OpenAlex.
When transferring science				
To society	Distributive	Primary / Secondary	First	Correction in attribution of: scientific knowledge → ensure equitable access to socially relevant research outputs., e.g. scholarly dissemination activities designed to reach non-academic audiences.
	Trust	—	First	Correction in attribution of: trust → rebuild trustworthy relationships between scientists and communities, e.g. citizen-science, participatory research.
	Contributory	—	Third	Shift in hermeneutical and epistemic resources: institutional reflexivity on how science serves (and fails to serve) social needs → Ensure that research agendas incorporate the epistemic priorities of marginalized communities, not only those of dominant actors, e.g. public-interest research funding streams targeting historically neglected topics
To private sector	Testimonial	Collateral	First	Correction in attribution of: credibility → ensure that scientific authority is not distorted by commercial interests, e.g. transparency norms in industry-funded research.
	Hermeneutical	—	Second	Change in hermeneutical frameworks: broaden agendas to include non-commercially aligned questions → prevent interpretive schemas from being shaped by commercial priorities by embedding non-commercial

Stage	Primary type	Secondary type	Order of Change	Remedy / Example
				epistemic considerations, e.g., public funding calls specifically oriented toward neglected or non-profitable health problems.
	Contributory	—	Third	Shift in hermeneutical resources: restructure decision-making power → prevent private funders from shaping epistemic agendas in ways that sustain ignorance, e.g. periodical audits.
When historicizing science				
—	Hermeneutical / Contributory	Commemorative	Second	Change in frameworks that sustain inequalities: recovery of erased contributions and epistemic traditions → rebuild historical interpretive frameworks by actively recovering marginalized contributions, restoring epistemic agency to erased groups, and correcting archival silences, e.g. Matilda project.
		Epistemicide	Third	Shift in hermeneutical resources: plural historiographies of science → replace Eurocentric interpretive schemas with multi-standpoint, reconstructions of scientific history, e.g. Connell's (2007) *Southern Theory* reconstructing non-Northern social thought traditions.
When analyzing science				
In scientometric research	Contributory	—	Third	Shift in hermeneutical resources: redefinition of scientific production → Inclusive infrastructures (open, multilingual, and regionally representative), e.g. OpenAlex, AJOL.
In research assessment	Testimonial	Basic form	First	Correction in attribution of: research quality → Equitable evaluation based on output quality, e.g. qualitative evaluations.
		Quieting Spurning	Third	Shift in hermeneutical resources: reconfiguration of what counts as (quality) research, validity and excellence → design of alternative evaluation and valuation frameworks e.g. consideration of alternative outputs, narrative evaluations.
	Contributory	—	Third	Shift in hermeneutical resources: transformative evaluation cultures → redesign of evaluation systems to reflect alternative epistemologies, e.g. Ubuntu or Buen Vivir.

CHAPTER FIVE

BIBLIOMETRICS FOR THE STUDY OF EPISTEMIC INJUSTICE IN SCIENCE

Bibliometric methods have long been applied to the analysis of social phenomena (Cole & Cole, 1967; Fanelli & Glänzel, 2013; Colavizza et al., 2019). For these methods to effectively capture and explain social dynamics, however, core sociological concepts must first be operationalized. One of the main objectives of this thesis is to examine epistemic injustice—a concept rooted in social epistemology—through the use of bibliometric approaches.

This chapter first outlines how specific instances of epistemic injustice in science are operationalized and subsequently analyzed in the following chapters. The taxonomy introduced in Chapter Four provides the conceptual foundation for identifying which forms of epistemic injustice are most suitable to study through bibliometric methods. While other dimensions can also be explored—such as access to material resources through funding acknowledgements or intra-group injustices using author-level data—bibliographic data and tools are particularly suited to analyzing injustices related to publication and uptake. Consequently, this thesis focuses primarily on these two stages. Nevertheless, as discussed in Chapter Four, every stage of the scientific process is traversed by multiple forms of injustice. To assume that all of them can be addressed through bibliometric methods would be to overlook the complexity and nuance of epistemic injustice. How could one demonstrate testimonial quieting without engaging directly with the 'quieted' individuals or communities? Or assess epistemicide and hermeneutical death without a historical study of a discipline or field? These are phenomena that bibliometrics alone cannot capture. Using metrics as assessment tools for social phenomena would risk reproducing some of the very practices this thesis seeks to make visible (§4.5). Yet, as Ma (2022) observes, metrics can also "give voice to problems of power, diversity, inequality, and injustice" and serve as data "to reveal systematic inequalities in academic research" (p. 401).

Bibliometric data thus constitute both a tool for uncovering instances of epistemic injustice and, if misused, a potential source of it, given the biases and omissions—especially concerning marginalized communities—embedded in many datasets. For this reason, the thesis also examines two bibliographic data sources that can be understood as partial remedies toward epistemic justice, as they seek to improve the visibility and accessibility of research and data, particularly from underrepresented regions and groups. Although these initiatives are most directly related to the publication and uptake stages, they also contribute to other areas of the scientific process, such as scientometric research and research evaluation (see Table 1). As noted above, multiple forms of injustice intersect across all stages of the scientific process. Addressing the full spectrum of epistemic injustice in science therefore requires a range of strategies—from adjustments in credibility attribution, to the development of new infrastructures, to broader systemic transformations. The bibliographic data sources analyzed here cannot, on their own, serve as comprehensive remedies, but they represent partial contributions that expand and deepen our understanding of science.

The chapter is organized as follows. First, it operationalizes the concept of epistemic injustice for its study through bibliometric methods. Second, it considers the role of bibliometric infrastructures as potential remedies for epistemic injustice. Third, it introduces the main data sources used in the articles comprising this dissertation. Finally, it briefly presents the methodologies applied in each of the studies.

5.1 Operationalization of epistemic injustice practices through bibliometric variables

An important methodological starting point for studying epistemic injustices through bibliometric methods is the operationalization of the concept. As discussed in Sections 4.2.2 and 4.2.3, epistemic injustices associated with academic publication and uptake can be understood as participatory injustices in the form of testimonial injustice. According to Hookway (2010), epistemic injustice occurs when an individual who seeks "to be recognized as a member of a community of people collaborating in the attempt to improve understanding or advance knowledge" is denied such recognition. In the context of science, Grasswick (2017) identifies testimonial injustices as "key examples of participatory injustice", since "suffering a credibility deficit due to social prejudice when making a relevant knowledge claim within the context of joint inquiry is one obvious way to have one's participation stymied" (p. 316).

Two assumptions follow from this definition. First, in order for epistemic injustices to be considered participatory, they must result in the exclusion of certain groups as members of the community. In this sense, and as stated in Section 2.1 journals can be seen as infrastructures for scientific communities, and as subcommunities of the broader scientific community. Second, scientific outputs must be understood as relevant knowledge claims or testimonies. As discussed in Section 4.2.2, scientific outputs can indeed be interpreted as a form of testimony. Coady (1992) distinguishes between 'formal' and 'natural' testimony: while the former refers to institutionalized or legal contexts, the latter refers to everyday communicative acts in which a speaker conveys information to a recipient. Cox (2023) argues that scientific outputs meet the criteria of natural testimony in this narrow sense: researchers report results, provide supporting evidence, and direct their claims to an audience in need of such evidence. Moreover, since researchers fulfil the criteria of ‘testimonial experts’ (Goldman, 2001) by virtue of their domain-specific knowledge, scientific outputs can also be considered a particular form of expert testimony.

A second step is to operationalize the factors that determine the existence of testimonial injustice. In natural testimonial exchanges, credibility deficits arise when the hearer fails to recognize the speaker as a knower and dismisses her knowledge claims. As noted in Section 4.2.2, in scientific publishing this can occur in multiple ways: for instance, when a manuscript is rejected on unjust grounds or when a publication venue is excluded from mainstream circuits of knowledge. At the journal level, the failure to recognize certain outlets as valid knowledge venues leads to the dismissal of all the outputs they contain. A clear example is the widespread characterization of non-mainstream journals as ‘predatory’, which indirectly labels their content as low-quality research (Krawczyk & Kulczycki, 2021; Inouye & Inouye, 2021). In the uptake stage, recognition is exemplified by the use of scientific outputs, most commonly measured through citations. As Longino (1990) argues, mere publication does not confer epistemic recognition: for a contribution to be acknowledged as knowledge, it must be engaged with by others, a process often reflected in “subsequent citation” (p. 86). In this sense, citations may serve as a proxy for credibility, since they signal that a scientific output has been recognized as legitimate knowledge.

Finally, for these credibility deficits to constitute testimonial injustice, they must stem from social prejudice. Fricker (2007) defines prejudice as judgments that associate certain groups with negative attributes. In the context of science, the failure to recognize outputs—either at the publication or uptake stage—must therefore be attributable not to quality deficits but to prejudicial factors. Such identity prejudice may target individual attributes, such as gender (McCusker, 2019), or reflect broader social and cultural norms functioning as credibility markers (Anderson, 2012). These include divergence from dominant theoretical orientations (Ajdari, 2023), the absence of references to Global North scholarship (Goitom, 2019), or insufficient conformity to conventions of academic English (Arnbjörnsdóttir & Ingvarsdóttir, 2017).

5.1.1 Testimonial and participatory injustice at dissemination stage

Individual scientific outputs are not directly included in academic databases; rather, they are indexed through the journals in which they are published. This thesis therefore employs journals as the primary unit of analysis for examining participatory injustices at the dissemination stage. Moreover, given that assessing quality at the article level is unfeasible in large-scale analyses, journals serve as a more practical reference unit, allowing quality criteria to be analyzed and compared at a manageable level.

For the study of social identity prejudice, several general characteristics of journals are considered: their geographical location, the language of publication, and the disciplinary field to which they belong. This list is not exhaustive, however, as other identity-related factors may also shape how a journal is perceived. In cases of regional bias, for example, relevant indicators might include the presence of a country name in the journal title, the geographical location of editors, or the institutional affiliations of contributing authors. Future research could explore these and other potential factors.

Table 2 summarizes the theoretical elements, definition and variables used in this study to examine epistemic injustice at the dissemination stage. Two main dimensions are considered. First, credibility deficit is operationalized as the exclusion of outputs from mainstream knowledge circuits, measured by whether a journal is indexed in Web of Science or Scopus. Second, social identity prejudice is assessed through journal characteristics—namely, geographical location, language, disciplinary area, and perceived quality. Together, these variables allow for a systematic investigation of how epistemic injustices are reproduced through publication practices.

Table 2. Operationalization of concepts from epistemic injustice at the dissemination stage using bibliometric variables

Theoretical element	Operationalization	Variable
Credibility deficit	Exclusion of outputs from mainstream knowledge circuits	Journal indexed in Web of Science / Scopus
Social identity prejudice	Journal characteristics	Geographical location; language of publication; disciplinary field; journal quality

5.1.2 Testimonial and participatory injustice at uptake stage

For the study of uptake, journals are again used to define and delimit the scope of analysis. Uptake itself, however, is measured at the article level, since articles are the primary recipients of recognition and use. Aggregate measures at the journal level risk distorting results, as uptake may be unevenly distributed across articles and article-specific characteristics may shape how they are received. As Longino (1990) has already noted, citations constitute a central form of uptake and are therefore employed here as the key operational indicator.

Article-level analysis also allows the inclusion of variables that cannot be considered at the dissemination stage, such as the institutional affiliation of authors or the substantive content of the publication. Nevertheless, journals continue to play an important role in shaping uptake, since characteristics such as their thematic scope or inclusion in mainstream databases directly affect the visibility and citations of the articles they publish.

Table 3 summarizes the conceptual framework and variables used to analyze epistemic injustice at the uptake stage. Two main dimensions are considered. First, credibility deficit is operationalized through citation measures, which capture how scientific outputs are received and recognized within the community. Indicators such as average citations per article, the share of uncited articles, and the time until first citation provide complementary perspectives on the extent to which research gains epistemic uptake. Second, social identity prejudice is addressed through article- and journal-level characteristics that may influence recognition. These include the institutional affiliation of authors, the geographical focus of the article, as well as journal features such as geographical scope and inclusion in Web of Science or Scopus. Taken together, these variables allow for a systematic analysis of how biases in the recognition of scientific outputs can generate epistemic injustices at the uptake stage.

Table 3. Operationalization of concepts from epistemic injustice at the uptake stage using bibliometric variables

Theoretical element	**Operationalization**	**Variables**
Credibility deficit	Citation measures	Average citations per article; share of uncited articles; time to first citation
Social identity prejudice	Article and journal characteristics	Author affiliation country; geographical focus of article; journal's geographical scope; journal inclusion in WoS/Scopus

5.2 Conceptualization of bibliographic infrastructures as remedies for epistemic injustice

In addition to analyzing epistemic injustice, this thesis also examines two initiatives that can be considered as potential—albeit partial—remedies to such injustices. While bibliographic infrastructures cannot directly eliminate the biases and unjust practices embedded in journals or mainstream databases, they provide alternative sources of data that enhance the visibility and accessibility of scholarly publications outside high-impact venues and commercial indexes. By de-hierarchizing knowledge circuits and offering a more inclusive view of what and who constitutes the 'scientific community' (§2.1), these infrastructures help to bridge divides between central and peripheral circuits of science (Beigel, 2016). Reducing these barriers may, in turn, foster greater uptake of research produced in peripheral contexts, since all publications can be accessed from a single source. Beyond publication and uptake, open and inclusive bibliographic infrastructures also have the potential to mitigate injustices at other stages of the scientific process (see Table 1). They can lower barriers to accessing epistemic resources, provide new outlets through which peripheral communities may exercise greater agenda-setting power, and contribute to reducing archival silences. Furthermore, they support fairer evaluation practices by enabling assessments that extend beyond mainstream journals and by providing richer datasets for bibliometric analyses. Nevertheless, despite their promise, alternative bibliographic infrastructures must be critically assessed in order to understand both their potential and their limitations.

This thesis focuses on two such infrastructures. The first, OpenAlex, launched in January 2022, is an open and comprehensive bibliographic database that emphasizes inclusivity over selectivity, claiming enhanced coverage of the humanities, non-English scholarship, and research from the Global South. Like Scopus and Web of Science, OpenAlex offers a search interface, but it also provides structured data access via a complete data dump and an API for retrieving specific records. The second, AJOL, established in 1998, is a regional indexing platform designed to improve the visibility of African research. Unlike OpenAlex, AJOL does not include a search engine or structured data export functionality. Instead, it provides a curated catalogue of African journals, a framework for assessing their quality, and direct access to articles when available in open access. OpenAlex and AJOL are discussed in detail in Chapters Seven and Eight, respectively. This section briefly introduces their objectives and outlines the methodological approach used in each case.

5.3 Data definition and sources

This section describes the data used in the analyses presented in this thesis. It introduces the criteria applied to define the scope of African scientific literature and the bibliographic data sources from which the information was obtained. Section 5.3.1 explains the operational definition of African scientific production and the rationale behind the used selection criterion. Section 5.3.2 presents the four main data sources employed across the studies—AJOL, OpenAlex, WoS, and Scopus—and summarizes their characteristics, coverage, and main limitations. Together, these subsections provide an overview of the datasets and selection procedures used throughout the thesis, outlining the main features that inform the subsequent analyses.

5.3.1 African scientific literature

Depending on the research objective, the most common approaches to defining a country's academic production rely either on author affiliation (e.g., Bentley, 2014) or on the location of the journal (e.g., Tijssen et al., 2006). This thesis adopts the latter approach—the journal's location—as the primary criterion, for several reasons. First, as discussed in Sections 2.1 and 2.2, journals are central structures within scientific communities and constitute the main units evaluated by mainstream bibliographic databases. Relying on journals rather than individual articles or authors therefore allows the analysis to focus on the criteria, narratives, and consequences of inclusion and exclusion that shape the global knowledge system. Second, as stated at the beginning of this chapter, the potential of bibliometric methods to study epistemic injustice is significant but inherently limited. While individual journals act as gatekeepers and may reproduce injustices through biased peer-review or editorial practices, the analysis of such micro- or meso-level phenomena is better suited to other methodological approaches. Focusing on journals as the primary analytical units enables this study to address structural biases that operate at the institutional level—such as the inclusion and exclusion criteria of major commercial databases. Finally, this thesis draws on multiple bibliographic data sources that vary in completeness and development. It is therefore essential to base the analysis on data fields that are consistently covered across sources. Whereas author affiliation data are sometimes incomplete, inaccurate, or missing, journal location is systematically available in all datasets used here. This criterion also makes it possible to incorporate alternative or emerging databases that may not yet be fully standardized but are particularly relevant for studying African research production.

Accordingly, African scientific literature in this thesis is defined as publications appearing in journals based in an African country. Depending on the data source, this information is found in different fields and may be determined using distinct criteria. As Mongeon and Paul-Hus (2016) ask: "What criteria should be used to determine the country of a journal? Should it be determined by the country of its publisher or of its editor? Perhaps it should be determined by the location of all the authors signing an article?" To avoid inconsistencies, whenever multiple sources were combined, a unified journal master list was created including all journals classified as African by any of the databases used. This master list was then applied uniformly across sources to ensure consistency. For analyses conducted at the article level, all records belonging to journals included in the master list were retrieved from each data source.

5.3.2 Data sources

Four main data sources are used across the papers that compose this manuscript. Although the specific methods and dates of data retrieval, cleaning, and curation are described in each individual paper, this section briefly introduces the four core sources. In some studies, additional datasets were employed for specific analytical tasks; these are described in the corresponding chapters.

African Journals Online

African Journals Online was launched in 1998 by the International Network for the Availability of Scientific Publications (INASP) in collaboration with the Public Knowledge Project (PKP). Its original coverage comprised 50 African journals. As of October 2025, AJOL hosts more than 900 journals from 39 African countries. According to its official site, it includes over 419 active journals (232 of which are open access), encompassing more than 260,000 issues and full-text articles.

AJOL is a nonprofit indexing and hosting platform whose mission is to improve the visibility, accessibility, use, and awareness of African-published, peer-reviewed research. It applies a quality evaluation framework known as Journal Publishing Practices and Standards (JPPS), assessing journals at entry and in periodic reviews. The platform offers technical support and training to participating journals, encouraging adoption of best editorial practices and open access or fee-free publishing models. Despite its breadth and structured organization, AJOL is not designed as a bibliometric database. It does not provide standardized article-level metadata nor facilitate advanced query construction (e.g. cross-journal search by author, title, keywords, or topic). The public interface allows browsing by journal, volume, and issue, but does not support systematic search across content. Hence, AJOL does not systematically expose metadata fields for large-scale bibliometric use; only certain bibliographic fields are publicly visible and may be harvested manually or via web scraping.

OpenAlex

OpenAlex is an open, nonprofit scholarly metadata platform launched in January 2022. It serves as a free and fully open source of scholarly metadata designed to enhance the transparency, evaluation, representation, and discovery of research (Priem et al., 2022). Unlike traditional proprietary bibliographic databases such as Scopus and Web of Science, OpenAlex emphasizes comprehensiveness over selectivity, claiming broader coverage of the humanities, non-English publications, and research from the Global South. Its nonprofit character and open-data model make it possible to conduct bibliometric analyses without the access limitations or licensing restrictions typical of commercial data sources.

Although still in its early stages of development, OpenAlex has rapidly gained traction within the academic community as a reliable and reproducible open data source for scientometric research. For instance, in December 2023, Sorbonne University transitioned from Web of Science to OpenAlex (Sorbonne University, 2023), and in January 2024 the Centre for Science and Technology Studies (CWTS) at Leiden University released the Leiden Ranking Open Edition based on OpenAlex data (Van Eck et al., 2024; Waltman et al., 2024).

OpenAlex aggregates metadata from a variety of providers—including Crossref, ORCID, ROR, DOAJ, institutional repositories, and publisher websites—and interlinks entities such as works, authors, institutions, journals, topics, and funders within a single knowledge graph. The platform records bibliographic information such as titles, abstracts (when available), publication dates, citation links, author affiliations, and other relational metadata. It also applies a hierarchical classification system that organizes scholarly content into domains, fields, subfields, topics, and keywords, which can be used to describe and group works, authors, journals, and institutions. By 2025, OpenAlex had indexed more than 240 million works, becoming one of the largest open bibliographic infrastructures. Its open model supports unrestricted reuse, facilitating transparency and reproducibility in bibliometric research. Compared with proprietary databases such as Scopus or Web of Science, OpenAlex emphasizes comprehensiveness, offering broader coverage of the humanities, non-English publications, and research from the Global South.

Web of Science

Web of Science is a commercial bibliographic and citation database maintained by Clarivate Analytics. It originated in the 1960s with the creation of the Science Citation Index (SCI) by Eugene Garfield and the Institute for Scientific Information (ISI), marking the beginning of citation indexing in the modern sense. WoS has since expanded into a multidisciplinary platform comprising several indexes, including the Science Citation Index Expanded (SCIE), Social Sciences Citation Index (SSCI), and Arts and Humanities Citation Index (AHCI), as well as regional collections such as the Emerging Sources Citation Index (ESCI).

WoS operates on a selective coverage model, indexing journals that meet predefined criteria related to editorial quality, peer-review processes, publication ethics, and citation performance. Each journal is evaluated by Clarivate's editorial team before inclusion. The database provides detailed metadata for each record, including titles, abstracts, keywords, author affiliations, and cited references, allowing for in-depth bibliometric and citation-network analyses. Access to WoS is subscription-based, and data use is subject to Clarivate's licensing restrictions, which limit large-scale extraction and redistribution. Despite these limitations, WoS remains a key infrastructure for global research assessment and bibliometric analysis.

WoS has long been considered a standard reference source in research evaluation systems, academic rankings, and policy analyses. Its curated structure and long historical coverage make it particularly valuable for longitudinal studies of scientific output and impact. However, the selective nature of its inclusion policy results in uneven representation across regions, languages, and disciplines, with an overrepresentation of journals published in English and based in the Global North (Mongeon & Paul-Hus, 2016; Vessuri et al., 2014).

Scopus

Scopus is a multidisciplinary bibliographic and citation database launched by Elsevier in 2004. It was developed as a large-scale, commercial alternative to Web of Science and has since become one of the most comprehensive citation indexes available. Scopus covers peer-reviewed journals, conference proceedings, books, and book series, encompassing scientific, technical, medical, social sciences, and arts and humanities disciplines.

The inclusion of sources in Scopus is governed by the Content Selection and Advisory Board, an independent group of experts responsible for evaluating journals based on editorial quality, peer-review practices, publication ethics, and relevance to the scientific community. Scopus provides structured metadata—including article titles, abstracts, author affiliations, keywords, references, and citation counts—that support a wide range of bibliometric analyses. As a proprietary database, Scopus requires a paid institutional license, and the extraction or redistribution of its data is restricted by Elsevier's terms of use.

While Scopus includes a larger number of indexed journals than WoS, its coverage remains selective, and biases similar to those identified in WoS have been reported—particularly the underrepresentation of non-English language journals, local publications, and research from low- and middle-income countries (Mongeon & Paul-Hus, 2016).

5.4 Methodology of the included publications

This section briefly describes the specific methodologies used in each article included in this compilation. In some cases, the articles include additional analyses that contribute to the overall objective of the paper and go beyond the strict analyses of epistemic injustices to offer a broader context of the analyzed phenomenon. Besides this overview, each article included in this compilation has a full methodology section in its corresponding chapter.

Epistemic injustice at dissemination stage: Exploring research quality and journal representation: a comparative study of African Journals Online, Scopus, and Web of Science

The study of epistemic injustice at the dissemination stage is presented in Chapter Six. This article employs a two-step analysis to examine the representation of African journals in three academic data sources—AJOL, Scopus, and Web of Science—based on their geographical location, language of publication, and research area. As discussed in Section 5.1.1.1, however, it is also essential to account for the quality of journals indexed in these sources. To this end, the article qualitatively compares the inclusion criteria of Scopus and WoS with the quality framework applied by AJOL. A thematic analysis was conducted to identify recurrent themes and subthemes in these criteria, which were then used to analyze similarities and differences across the three data sources.

For the representation analysis, the relative coverage of each data source was calculated in terms of journal country, publication language, and disciplinary area. To enable this, a master list was constructed that included all journals indexed in the three data sources under study, complemented by Ulrich's Periodicals Directory, which at the time constituted the most comprehensive catalogue of African journals.

Epistemic injustice at uptake stage: Citation patterns of local and non-local African publications: A comparative analysis of five measures of local research

Chapter Seven examines epistemic injustices at the uptake stage through the lens of local research. This research category is particularly relevant because it has been conceptualized in diverse ways across the academic literature, making it well suited for operationalization through the different variables defined in Table 3. The chapter thus analyses the uptake of various forms of local research, characterized by these variables and measured using the citation indicators presented in Table 3. In addition, it explores the geographical profiles of citing publications in order to assess both the local and international impact of local research.

Several approaches were used to operationalize the concept of local research. First, a publication was classified as local if it appeared in a journal not indexed in Web of Science or Scopus. At the journal level, a publication was considered local if the journal title included the name of the country in which it is published. At the document level, an article was classified as local if its title explicitly mentioned the country of the publishing journal. Finally, the institutional affiliation of authors was also taken into account: a publication was considered local if either all, or at least one, of its authors were affiliated with an institution located in the same country as the publishing journal.

The dataset, based on AJOL and OpenAlex data, was then divided into local and non-local publications. For both groups, summary statistics were calculated for the average number of citations per article, the average time (in years) to first citation, and the percentage of uncited publications. To investigate the characteristics of citing publications, these were also classified into local and non-local categories using the same criteria and assigned to the country of their publishing journal. Several indicators were calculated to capture the profiles of citing publications. First, the locality status of citing publications was examined to determine whether local research tends to be cited more frequently by other local publications. Second, the international scope of the citations was assessed by distinguishing whether they originated from the same country as the cited publication or from other countries. Finally, a country-specific case study focused on South Africa traced the geographical origin of publications citing South African local research, thereby identifying regional and international audiences engaging with this body of work.

OpenAlex as a (partial) remedy for epistemic injustice: Coverage and metadata completeness and accuracy of African research publications in OpenAlex: A comparative analysis

In the case of OpenAlex (Chapter Eight), the analysis pursued three main objectives: to assess the coverage of African research publications in comparison with Scopus, WoS, and AJOL; to evaluate the availability and completeness of OpenAlex metadata relative to Scopus and WoS; and to determine the accuracy of OpenAlex metadata against these proprietary sources.

The study was carried out in three steps. First, publication coverage was assessed by performing exact DOI matching across OpenAlex, AJOL, Scopus, and WoS, thereby determining the extent to which African publications indexed in these sources were also represented in OpenAlex. Second, metadata completeness was analyzed through a comparison of metadata fields across OpenAlex, Scopus, and WoS. AJOL was excluded from this step, as it does not function as a bibliographic database in the same sense and lacks structured export features. To refine the completeness assessment, two subsets of OpenAlex publications were distinguished: those also available in Scopus or WoS and those exclusive to OpenAlex. This comparison enabled an evaluation of whether metadata completeness differs between OpenAlex-exclusive publications and those also indexed in proprietary sources. Third, metadata accuracy was examined by manually validating a random sample of 60 publications, equally divided between the two subsets. For each publication, metadata provided by OpenAlex was cross-checked against the information contained in the original online or PDF version of the publication.

AJOL as a (partial) remedy for epistemic injustice: A small step towards the epistemic decentralization of science: A dataset of journals and publications indexed in African Journals Online

In the case of AJOL (Chapter Nine), the methodological approach differs substantially. Because data cannot be directly downloaded from AJOL's website, the first objective of the analysis is to construct a relational database from the information available online that can be directly reused by other researchers. A second objective is to assess AJOL's metadata coverage across its available fields. Given that AJOL's metadata is more limited than that of other bibliographic sources, the analysis also includes a matching procedure between AJOL publications and OpenAlex records using unique identifiers, thereby allowing additional metadata to be retrieved from external sources. Finally, the study aims to provide an overview of AJOL's coverage in terms of journal geolocation, journal quality, open access, and publication date.

The dataset was built using web scraping techniques. Publication metadata was retrieved with the ojsr R package (Becerra, 2024), which extracts article metadata from Open Journal Systems (OJS) pages through their HTML head tags. Journal-level information was collected from various AJOL website pages using the rvest R package

(Wickham et al., 2024). Both publication- and journal-level metadata were retrieved in February 2024.

For the matching process, AJOL articles were compared against the OpenAlex data dump (Priem et al., 2022) using journal titles, DOIs, and other available metadata fields. After data processing and cleaning, a relational database was constructed and subsequently used for the coverage analysis.

CHAPTER SIX

EXPLORING RESEARCH QUALITY AND JOURNAL REPRESENTATION: A COMPARATIVE STUDY OF AFRICAN JOURNALS ONLINE, SCOPUS, AND WEB OF SCIENCE[6]

6.1 Introduction

In the last years, conversations about diversity and inclusion in science have proliferated across the scientific literature (Khanna, 2022; Ràfols et al., 2022; Stirling, 2007). However, the visibility of academic production outside the mainstream knowledge systems is still scarce. Recent literature has highlighted the biases of Scopus and Web of Science—the two most authoritative global academic databases—towards research produced in non-Western countries, non-English journals, and research from the arts and humanities (Chavarro, 2017 et al.; Archambault et al., 2006). In order to mitigate this gap, scholars have emphasized the importance of using more inclusive databases—such as Crossref, Dimensions, or OpenAlex—and the value of field-specific and regional sources for certain analyses (Mongeon & Paul-Hus, 2016; Tijssen et al., 2006). However, the use of alternative sources has also raised concerns. First, concerns are often raised about the quality and credibility of journals outside international journal indexes (Mills et al., 2023). Even though other academic data sources—e.g. SciELO, Redalyc, or AJOL—have also developed their own quality frameworks, the perceived credibility of journals not included in traditional databases is still limited. Second, although the use of more extensive, regional and field-specific databases can improve the representation of certain regions, languages, and disciplines in science, their coverage needs to be assessed to be

[6] This chapter corresponds to the published article: Alonso-Álvarez, P. (2024). Exploring research quality and journal representation: A comparative study of African Journals Online, Web of Science, and Scopus. *Research Evaluation, 33*, rvae057. https://doi.org/10.1093/reseval/rvae057

aware of their limitations—see, for instance, Asubiaro and Onaolapo's (2023) discussion on Crossref's limited coverage of African journals.

This paper aims to examine a regional academic data source (AJOL) and compare it with traditional databases (Scopus and WoS) considering both journal quality and coverage[7]. Particularly, the article intends to answer the following research questions:

1. How do the quality criteria employed by AJOL, Scopus, and WoS compare in terms of similarities and differences?
2. How representative is the coverage of AJOL, Scopus, and WoS of African journals in terms of countries, languages and disciplines?

6.2 Theoretical framework

6.2.1 Epistemic injustices in science

The unequal knowledge production and circulation structure divides the world's scientific system into a dominating mainstream circuit and a peripherical one. This situation has been proven to disproportionally favor the influence of specific groups in science and therefore create 'conditions of structural injustice' (Young, 2006), which affect communities under systematic threats of domination. Specifically, as scientific practices are forms of knowing, these conditions can constitute forms of epistemic injustices, defined as the devaluation of someone's capacity as a knower based on assumptions that separate knowers from those whose capacity as a knower has been eroded (Fricker, 2007). In the scholarly communication system, those assumptions can determine what might constitute as valid knowledge in a particular academic context and might be supported and perpetuated by technical, social, and financial mechanisms. In particular, epistemic injustices in science are related to credibility imbalances in the creation of knowledge and the subsequent lack of credibility experienced by scholars located in peripheral regions (Mills et al., 2023, p. 86; Mills et al., 2021), the universalization of western scientific models, designs and research agendas (Alatas, 2013), or the objectivization of specific countries and

[7] The author acknowledges that AJOL and Scopus and WoS operate in a radically different manner in terms of objectives, resources, and infrastructure. While AJOL is a non-profit journal indexing platform that aims to increase the visibility and use of African-based research, Scopus and WoS are commercially owned, and their objective is to identify and index high-quality journals at the global level. To assess journals' quality, AJOL employs the Journal Publishing Practices and Standards (JPPS) system, developed by AJOL in collaboration with the International Network for Advancing Science and Policy (INASP). However, JPPS is not used a selection criterion for the inclusion and exclusion of journals in AJOL, but as a transparency tool for users to know which journals meet certain criteria. In the case of Scopus and WoS, their quality frameworks do serve as a selection criterion. Nonetheless, the comparison of the different quality frameworks is still relevant to know the similarities and differences and reflect about common and diverse notions of quality.

regions as knowledge objects while others become scientific subjects and producers (Mignolo, 2018, p. 160). Ultimately, epistemic injustices deprive communities from participating in 'research and knowledge-making processes' silencing their knowledges.

Structural epistemic injustices are also directly reflected on the current scholarly communication model, which has been highly criticized due to its reliance on the major citation indexes, forcing journals and scholars from peripheral regions to compete on an unequal playing field. While the leading publishing houses are mainly located in the Global North (Hountondji, 1990), scholarly Southern journals often face important financial and political barriers to competing with Western commercial journals and publishers (Mills et al., 2023, p. 36). Although one of the objectives of the Open Science framework was to reduce these barriers, making science more inclusive and reducing regional (as well as other) divides, the principles and application of the movement have been criticized for reproducing the same values and imbalances it tries to challenge (an example of this discussion can be found in Albornoz et al., 2020). For instance, previous studies have also found that the current model of Open Access, primarily based on the payment of Article Processing Changers (APCs), is a barrier for institutions and countries with lower resources (Klebel & Ross-Hellauer, 2023), which indirectly finance publishing houses located in the North (Ellers et al., 2017). Moreover, journals from Southern countries have faced since 2011 the uncertainty and stigma that come with the ghost of predatory publishing, a terminology that has been highly criticized (Bell, 2017; Mills et al., 2021; Teixeira da Silva & Gichuhi Kimotho, 2022; Truth, 2012).

In peripheral regions, the pressure of the well-known 'publish or perish' is even higher as scholars have to decide between accepting Western standards or cultivating local issues, perspectives, and approaches (Hanafi, 2011; Nyamnjoh, 2004). Also, the current hegemony of English as the language of science is itself a barrier for non-native scholars (Flowerdew, 2007; van Leeuwen et al., 2001; Lillis & Curry, 2010). Finally, inequalities remain unsolved even if Southern scholars comply with Western rules. For instance, Liu and colleagues (2023) found that non-white researchers appear on fewer editorial boards, spend more time under review, and receive fewer citations when compared to white scientists doing similar research.

6.2.2 Mainstream and local circuits of knowledge: A complex relationship

Although there are some early discussions about its objectivity (for instance, Garfield, 1997), the WoS has mainly been seen as an authority on the identification of high-quality journals based on the perceived objectivity of its selection process (Lillis & Currys, 2010). Questioning WoS inclusion criteria, Chavarro et al. (2017) concluded that a journal's publication country, language, or research area significantly affects the journal's probability of being indexed by WoS. Thus, journals from specific regions or those that cover certain research areas will have a higher probability of being included in WoS than others, even if their editorial standards or h-index are the same. Critiques of Scopus and WoS quality assessments stress the commercial nature of the systems and their definition as for-profit companies that are only accountable to their shareholders rather than the public or the research community (Tennant, 2020). As academic journals play an essential role in disseminating knowledge, ignoring journals from specific regions or research areas diminishes the importance of local and regional research outside the knowledge centers—mainly Europe and North America—and perpetuates inequalities in science production and dissemination.

Several local and international initiatives have emerged in recent years to reduce regional inequalities and build alternative national and transnational publishing circuits. In the late 90s, alternative JIS emerged to counteract biases on traditional systems such as Scopus and WoS (Chavarro, 2017, p. 163). Previous studies have reported that traditional indexation platforms—like Scopus or WoS—cannot be used as representative of the global publication system. A recent study by Khanna et al. (2022) estimated that Scopus and WoS cover only 1.2 and 7.2% of world journals using Open Journal Systems (OJS), an open-source and free software created to improve the management and dissemination of academic journals. Moreover, previous academic literature has identified regional and discipline biases in Scopus and WoS coverage. Archambault and colleagues (2006) found that certain countries and areas were underrepresented in WoS. For instance, they found that Social Sciences and Humanities (SSH) journals in Afrikaans were underrepresented by 66% in WoS when compared to Ulrich.

In their study of Scopus and WoS coverage, Mongeon and Paul-Hus (2016) highlighted the importance of using field-specific or national citation indexes—over multidisciplinary and international databases—for certain types of analyses. However, regional JIS and databases also differ from one another in terms, for instance, of journals' research areas or language. In a study on Brazilian papers beyond the Web of Science, Brasil (2021) showed the differences between Latindex, SciELO, and RedALyC coverage. Latin American scholars have also highlighted the importance of regional publication structures to reduce the dominance of global systems (Beigel, 2014). In Africa, initiatives such as AJOL are also trying to increase the visibility and use of regional scientific production.

6.2.3 The case of African journals

Previous studies that have studied geographical coverage of journal indexing systems are usually limited to the Global North (Archambault et al., 2006; Mongeon & Paul-Hus, 2016) or Latin American countries (Chavarro et al., 2017; Rodrigues & Abadal, 2014; Rozemblum et al., 2021). In particular, scientometric research about Africa has been scarce and usually focused on specific fields or countries (for instance, Bambo and Puris, 2020; Matthews, 2013; Narvaez-Berthelemot et al., 2002; Usman and Ewulun, 2019 or, in early examples Konrad and Wahl, 1990; Chatelin & Arvantis, 1992; Gaillard, 1992). In one of the first systematic studies of African countries, Arvanitis et al. (2000) compared research outputs at the national level using the PASCAL database. In 2007, Tijssen assessed African research using the Web of Science. The study revealed significant differences between African countries and regions regarding publication output, international collaboration, citations, and research specialization. The author also acknowledges the important limitations of WoS's coverage of Africa and the importance of regional indexing sources. In another publication focusing on the South African case, the estimations showed that less than 8% of the journals recognized by the South African Department of Education appeared in the Science Citation Index and the Social Sciences Citation Index of the Web of Science (Tijssen et al., 2006).

Recent studies that focus on the coverage of African journals by different academic data sources confirm the limitations of mainstream indexes (Scopus and WoS), although highlighting the possibilities of alternative bibliographic sources, like Crossref (Asubiaro et al., 2023). The study presented here tries to overcome some of the limitations of this previous work. First, although the authors themselves acknowledge that they are not trying to build an exhaustive dataset, not including African journals that are indexed in Scopus and WoS but not in AJOL or Ulrich might affect the results of the analysis. The magnitude of the effect will depend on the number and characteristics of the journals that are left outside the study. In the same sense, AJOL is not analyzed like the other databases but is directly included in the master list, preventing the authors from identifying biases in the platform itself. Finally, although the results show an overall picture of how Scopus, WoS, and Crossref cover African journals in absolute terms, the analysis of the representativeness of the indexing platforms in terms of journals' country, field, and language might benefit from more specific indicators. This study aims to expand Asubiaro (2023) and colleagues' analysis and contribute to the increasing academic literature on epistemic inclusion and diversity in science.

6.3 Data and methods

Following the research questions' structure, the analysis section is divided into two main parts. First, the article first examines the journal quality criteria applied by AJOL, Scopus, and WoS using a thematic analysis approach. Then, the paper analyzes the representativeness of each index in terms of country, research area, and language coverage.

6.3.1 Quality criteria analysis

Journal quality is usually measured using quantitative/objective—based on citations (e.g., Garfield, 1999; Saha et al., 2003)—and qualitative/subjective criteria—based on the fulfillment of specific conditions that vary depending on the evaluator (Pölönen et al., 2021). Quantitative criteria have also been identified with research impact and are considered insufficient to assess research and/or journal quality (Dunleavy, 2022; Ferrara & Bonaccorsi, 2016). In this sense, scholars have argued that evaluating journal quality should be based on the assessment of journals' internal policies and procedures rather than on impact measures (Dunleavy, 2022; Moradzadeh et al., 2023). Moreover, in the last years, many scholars and organizations have argued that quantitative metrics are heavily context-dependent and proposed new evaluation methods based on mixed or qualitative evaluations (e. g. Hicks et al., 2015; or COARA, 2022). Qualitative criteria are thus increasingly used to assess if a journal meets specific quality standards. However, there is no unique set of criteria used by scholars or indexing platforms, but many, depending on the evaluator's priorities. An example of the significant differences between evaluators is the simultaneous inclusion of the same journals in allowlists—containing reputable or trustworthy journals—and blocklists—listing untrustworthy ones (Strinzel et al., 2019). Following previous literature on the topic, this article distinguishes research impact from research quality and, therefore, only analyzes the subjective criteria employed by each database.

The quality criteria are extracted from the databases' websites:

- AJOL criteria were retrieved from the Journal Publishing Practices and Standards (JPPS) website.[8] AJOL employs the JPPS framework to assess journal quality, developed conjunctly by AJOL and the International Network for Advancing Science and Policy (INASP). JPPS classifies journals into six categories depending on the JPPS criteria they meet: inactive title, no stars, new title, one star, two stars, and three stars. It is worth noting that, differently from Scopus and WoS, AJOL does not employ JPPS as an inclusion/exclusion criterion, but as tool to assess and enhance the quality of the journals. This means that journals that do not meet JPPS's quality criteria can also be included in AJOL under the no-stars category. New title, one star, two stars, and three stars work hierarchically in which a higher category includes all criteria from the previous one and other additional requirements. Finally, the inactive category includes journals that are not up to date in the Journals Online System (JOL).
- For Scopus, quality criteria are retrieved from the Elsevier content policy and selection[9]. Elsevier has two phases for a journal to be included in the system: a minimum set of criteria that all journals must fulfill and a second list of criteria that are then evaluated by the Content Selection and Advisory Board (CSAB).

[8] https://www.journalquality.info/en/

[9] https://www.elsevier.com/solutions/scopus/how-scopus-works/content/content-policy-and-selection

- Finally, WoS selection process and quality criteria are retrieved from the Clarivate curation process available on their website[10]. Their process has four phases: initial triage, editorial triage, editorial evaluation (quality), and editorial evaluation (impact). As impact is not considered in this study, only the criteria from the first three phases are employed for the analysis.

Scholars have developed different taxonomies for analyzing journal quality, depending on the objectives of their study. In an extensive analysis of journal quality, Moradzadeh and colleagues (Moradzadeh et al., 2022) examined previous literature on the topic and grey literature—guidelines of key publishing organizations and academic publishers and inclusion criteria from academic databases—to conduct a comprehensive review of subjective quality criteria. Using an inductive thematic approach, they identified 203 criteria divided into five main themes. Other studies have followed similar approaches to analyze journal allowlists and blocklists (Strinzel et al., 2019) and identify predatory journals (Cobey et al., 2018). Therefore, I used thematic analysis to identify themes and subthemes regarding journal quality. The analysis was conducted in three steps. First, I read and coded the three databases' quality criteria. Codes were not developed *apriory* but inductively as a result of an iterative process where new codes were created until all criteria had an assigned code. Second, I grouped the initial codes into broader themes. Third, the final themes and subthemes were compared with previous literature to verify that they were consistent with previous research. Finally, the 33 quality criteria were identified and classified into 5 main themes and 14 subthemes—see Section 6.4.1.

6.3.2 Journal coverage analysis

As there is no single authoritative list of journals based in Africa, a journals' master list was created for the analysis. The master list includes all African-based journals indexed in the three analyzed data sources—AJOL, WoS, and Scopus—and in the Ulrich's periodicals directory (Ulrich), which was used as a baseline. Ulrich has been considered in previous academic literature as a benchmark to assess other indexes (Archambault et al., 2006; Mongeon & Paul-Hus, 2016; de Moya-Anegón, 2007) and to mitigate the biases and limitations of traditional JIS (Mabe & Amin, 2001; Mabe, 2003; Morris, 2007; Wang et al., 2017). Although some studies have highlighted its limitations—time lag for new journals to be included, lack of revision of the information provided by publishers, and biases towards English journals (Morris, 2007)—, Ulrich is still one of the most comprehensive databases for scholarly journals at the global level (Grimes & Morris; Tenopir & King, 2014). A journal was categorized as African and, therefore, included in the master

[10]https://clarivate.com/products/scientific-and-academic-research/research-discovery-and-workflow-solutions/webofscience-platform/web-of-science-core-collection/editorial-selection-process/editorial-selection-process/

list if any of the data sources classified it as African-based. The master list is openly available in OSF at https://doi.org/10.17605/OSF.IO/E2F6Z, direct link: https://osf.io/zc6wb.

Ulrich's journal information was manually downloaded from the directory. As Ulrich has different records for each journal's print and online versions, the two versions were merged into only one record, including ISSN and eISSN. After removing duplicates and inactive journals, 1,032 journals were retrieved. Although Ulrich is undoubtedly the database with the highest coverage, some journals covered by AJOL, WoS, and Scopus are not included in the directory. Therefore, they were also used to make the master list as extensive as possible.

AJOL journals' data was downloaded from the AJOL website using R and R Studio. Data was downloaded in April 2023. The journal titles, country, and research area were retrieved using *rvest* (Wickham, 2022), an R package for web scraping. For the ISSN, I downloaded the metadata from all publications in AJOL using *ojsr* (Becerra, 2022), an R package developed to download metadata from OJS sites. I merged them with the journals' dataset to get the ISSN of the journals. Then, the journal data was reviewed manually to account for possible mistakes in the download. After removing inactive titles, 424 journals remained. The complete AJOL dataset (as for April 2023), including journal ISSN, title, country, research area, JPPS status, open access status is openly available in OSF at https://doi.org/10.17605/OSF.IO/E2F6Z, direct link: https://osf.io/stz3n (title, country, JPPS statis, open access status) and https://osf.io/8eg2x (research area).

For Scopus, I downloaded all journals belonging to the region 'Africa' from the Scimago Journal Ranking (SJR) 2021 (196 journals). Finally, for WoS, I used the Journal Citation Reports (JCR) 2021 as a proxy and retrieved journal information from its website (241 journals).

All datasets were merged to get a master list that included all journals covered by Ulrich, AJOL, Scopus, and WoS. The merging was done by ISSN and title, and all matches were manually verified. The ISSN Portal was used to resolve inconsistencies between datasets. The results' visualization was generated using *nVennR* (Pérez-Silva et al., 2018), an R package designed to create quasi-proportional Venn and Euler diagrams with any number of sets.

6.3.2.1 Country data

The publishers' countries were retrieved from Ulrich, AJOL, Scopus, and WoS datasets. In 15 journals, the country recorded in one dataset did not match the country in another. The ISSN Portal was used to verify the journals' country in these cases. In 6 cases, the ISSN portal did not find any results with the reported ISSN, so those journals were removed from the country analysis. One other journal was removed from the analysis as it did not have country data in any of the datasets. Therefore, the analysis includes 1,359 journals.

Relative country coverage was calculated to assess whether or not there is an overrepresentation or an underrepresentation of a country within a data source. Relative country coverage was calculated using both absolute and relative numbers. Absolute numbers are used to contextualize the number of journals based in each country. The relative coverage is calculated as the proportion between the number of journals in a country covered by a database and the total number of journals in that country covered by the master list. If *c* is a specific country and *DB* is the database being analyzed, the relative coverage of the country by the database would be defined by the equation:

$$Relative\ coverage_{c,DB} = \frac{\frac{Number\ of\ journals_{c,DB}}{Number\ of\ journals_{DB}}}{\frac{Number\ of\ journals_{c,master\ list}}{Number\ of\ journals_{master\ list}}}$$

Thus, if the relative coverage is between 0 and 1, the country is underrepresented in the database when compared to the complete set. If the relative coverage is above 1, the country is overrepresented compared to the complete set. As Ulrich covers most of the journals, its relative coverage score is always close to one, not providing significant information. Thus, it was not included as a separate analysis but just used as part of the master list.

6.3.2.2 Research area data

Research areas were retrieved from the four databases. Ulrich, AJOL, Scopus, and WoS all have different research area categories; therefore, research areas were normalized using the Revised Field of Science and Technology (FOS) Classification in the Frascati Manual (OECD, 2007). I correlated categories in the studied databases with one of the broad category fields of the FOS classification: natural sciences, engineering and technology, medical and health sciences, agricultural sciences, social sciences, and humanities. Those unclear categories—for instance, Ulrich had a category that was ‘analysis’—were not classified. Journals were allowed to belong to more than one category. Further work of this project will try to improve the classification system to include all journals in the databases. The analysis of research areas finally included 1,295 journals.

The same method used for the country data was applied to calculating coverage numbers.

6.3.2.3 Language data

Language data came from different sources. In the case of journals indexed in Ulrich and WoS, the metadata in the databases recorded the language in which the journal accepted manuscripts. In the case of AJOL and Scopus, no language was recorded. AJOL’s articles' metadata includes a 'language' field. However, this option was discarded after manual checks as it was often incorrect. Therefore, I used an automated search in the ISSN portal for the journals missing a language and retrieved the languages recorded. Then, I used the DOAJ database (downloaded in May 2023) to retrieve the language of those journals that still did not have one assigned. After merging all data, there were still 321 journals whose language was not identified. In those cases, I manually did online searches on the journals' pages to find them. The journals for which the information was unavailable were removed from this analysis. When a journal was published in several languages, the language field was set to 'Multi-language'. The language analysis included 1,260 journals.

Coverage was calculated as in the previous sections.

6.4 Results and discussion

6.4.1 Quality criteria analysis

The analysis resulted in 33 quality criteria classified into five main themes: (i) journal content and structure, (ii) journal policies, (iii) scientific rigor, (iv) editorial structure, and (v) publication volume and availability. Each theme is divided into various subthemes and dimensions. The distribution of criteria across indexes is summarized in Table 4. The complete list of criteria can be found in Table S1 in the supplemental material[11].

Table 4. Quality criteria required by WoS, Scopus, and JPPS

Theme	**Subtheme**	**Dimension**	**WoS**	**Scopus**	**JPPS NT**	**JPPS ★**	**JPPS ★★**	**JPPS ★★★**
Journal content and structure	Journal identification	ISSN	•	•	•	•	•	•
		Title	•		•	•	•	•
		Publisher	•		•	•	•	•
		Contact details	•		•	•	•	•
	Website (if one)	Minimum content specified	•	•			•	•
		Content up-to-date	•				•	•
		Functionality and quality	•	•			•	•
	Publication guidelines	Guide for authors			•	•	•	•

[11] Available at: https://osf.io/e2f6z/files/x7bke

	Articles content and format	Articles within the scope of the journal	•	•	•	•	•	•
		Author identification	•		•	•	•	•
		Article titles and abstracts in English	•	•	•	•	•	•
		Language clarity	•	•			•	•
		Minimum basic information on each article			•	•	•	•
		Format and style guidelines					•	•
		Funding information	•					•
		Appropriate Citations to the Literature	•		•	•	•	•
		Bibliographic Information in Roman Script	•					
Journal policies	Publishing integrity	Plagiarism, retraction, manipulation, and/or correction policies	•					•
	Intellectual property	Copyright and licensing			•(*)	•(*)	•(*)	•(*)
		Authors permissions						•
	Diversity policies	Editorial board diversity	(**)	•				•
		Authors diversity	(**)	•				
Scientific rigor	Content	Scholarly content	•	•	•	•	•	•
	Peer review	Peer review	•	•	(***)	(***)	•	•
		Type of peer review		•	(***)	(***)	•	•
	International standards	Editorial standards based on international publication committees	•					R
Editorial structure	Editorial team/board	Identification of the Editorial team	•		•	•	•	•
		Editorial board aligned with the journal's scope	•					

		Editorial board adequate size	•					
	Other governing bodies	Identification of other governing bodies					•	•
Publication volume and availability	Timeliness and updates	Defined publication frequency	•	•	•	•	•	•
		Publication volume	•			•	•	•
	Preservation	Archival arrangement with third-party						•
		Archival content available online						•

JPPS's categories: new title (NT), one star (★), two stars (★★), and three stars (★★★).
•: criteria required by the JIS.
R: criteria recommended by the database.
(*): JPPS does not provide a unique copyright and licensing policy criterion. Still, it states that this information must be included in the journal's website and the 'About the journal' section.
(**): WoS refers to author and Editorial Board diversity to stress that they must be consistent with the journal's scope.
(***): Peer review is not included in JPPS's new titles and one-star journals, but AJOL requires it; therefore, all journals in AJOL are peer-reviewed.

The following paragraphs analyze the themes and subthemes in which quality criteria are divided. It finally discusses the three approaches towards research quality and its implications.

(i) Journal content and structure

The journal content and structure section is divided into four subsections: journal identification, website, guidelines, and article content and format. All data sources specify a minimum set of characteristics that uniquely identify a journal. Whereas Scopus only refers to the ISSN and publisher, WoS and JPPS name its title, and WoS make explicit its characteristics— 'a journal must have a distinct title that is aligned with the registered ISSN, the journal's stated scope, published content, and community demographic (editorial board and authors)' (Table S1). WoS and JPPS also specify the contact details a journal has to provide—in the case of JPPS: 'The name of the publisher, institution and/or society by which the journal is published (with all relevant contact details, including physical address, phone numbers, email addresses and website address)' (Table S1). Regarding the website, although all databases refer to its 'quality', only WoS and JPPS define 'quality'. For WoS, this means that the journal's website 'ensures easy access' (Table S1) to the journal's content and characteristics; for JPPS, 'quality' also includes a 'well-working site', (Table S1), but it adds references to the graphic design of the site 'no garish or over-decorated, flashing images', (Table S1) which seems intended to assure professional looking websites.

JPPS is the only platform that requires journals to provide 'clear and comprehensive instructions to authors'. The content of the instructions varies depending on the category in which the journal is. In the first category (new title), the instructions should only include a style guide, a description of how to submit an article, and an email. However, if the journal wants to get two or three stars, the list should include information about copyright, subscription, publication, or any other charge that might be applied to the authors or institutions.

Regarding articles' content and format, there are several requirements that all the databases share, such as all articles being within the scope of the journals and translation of all titles and abstracts to English, assuring the clarity of the texts. Both WoS and JPPS also require appropriate citations to previous literature. However, WoS is more specific about the format of the bibliography, which should be in Roman Script, and JPPS invests several paragraphs describing the minimum information an article should include and some style guidelines, including references about the layout of the articles and the quality of tables, graphs, and images.

Whereas Scopus and WoS refer to the minimum content of all dimensions—the journal, website, and articles—, JPPS includes references to style and design practices that journals should follow, especially in higher categories. It is worth noting that JPPS defines itself as an educational tool for journals, which might explain the references to journals' appearance. As it is used by journals that might suffer from credibility issues (Mills et al., 2021), JPPS provides an exhaustive list of criteria that might help to overcome these barriers.

(ii) Journal policies

Most policy dimensions are covered only by either the WoS or JPPS three-star category. Regarding publishing integrity policies, WoS does not require a specific policy, but it states that '[i]t is not the intention of our review to enforce ethical and plagiarism standards. As required, however, we will undertake investigation of questionable content or false claims' (Table S1), suggesting the presence of *ex-post* mechanisms. JPPS, on the other hand, requires journals to publish their policies, 'including plagiarism, copyright violations, errata, retractions, data sets, gender, racial and language policies' (Table S1).

Regarding diversity policies, Scopus and JPPS—three stars—refer to the regional diversity of editors. JPPS also incorporates a recommendation about gender balance, and Scopus states that the geographical diversity of the authors will be considered in the evaluation. WoS refers to the diversity of both editors and authors but only requires that it is consistent with the journal's scope. The rest of the dimensions—intellectual property and sharing policies—are just a requirement for JPPS. JPPS requires all its titles to state their copyright and licensing statement clearly and then stresses this aspect for the three-star category, where it requires that the journals clarify authors' permissions further.

(iii) Scientific rigor

The theme of scientific rigor is divided into peer review and adherence to international standards and editorial policies. While Scopus and WoS require that all the journals are peer-reviewed, JPPS criteria do not include peer review until its two-star category. However, WoS also makes an exception, allowing other '[t]ypes of review that are particular to certain scholarly communities, where they are broadly accepted (e.g., arts or law journals)' (Table S1). Apart from the existence of the peer review, both Scopus and JPPS require an explanation of the process and its validity. Therefore, none of the platforms defines what is a valid peer review nor a minimum set of criteria it has to meet—for instance, whether or not it is anonymous, double-anonymous, or the number of reviewers—, and some even let journals use other kinds of review processes—WoS and first JPPS categories. WoS, however, includes some indications about what 'deficient' peer review is, including but not limited to the 'presence of articles outside the journal's scope or irrelevant citations' (Table S1). In this sense, WoS also requires that editorial policies are consistent with international standards. JPPS encourages journals to become COPE and OASPA members in its last category. Lastly, Scopus requires that the journals have a 'convincing' editorial policy but does not define the term nor give any other indication.

(iv) Editorial structure

Only WoS and JPPS refer to the Editorial Board or other governing bodies. WoS employs two paragraphs ensuring that all members of the Editorial Board are 'identifiable and available for contact' (Table S1)—which means that their institutional affiliations, persistent digital identifiers, and link to institutional profiles must be provided—and that the composition of the Board is consistent with the content of the journal in terms of affiliations, geographic diversity, and publication records. JPPS requires the names and titles of Editorial Board members to be provided and stresses that all members should be 'actively and verifiably' (Table S1) working on the journal. Its three-star category also requires that the affiliation details of the Editorial Board and any other governance committee are provided on the journal's website and recommends including contact email addresses and links.

(v) Publication volume and availability

All databases require a defined publication frequency that the journal should state. However, WoS and JPPS allow journals to declare if they operate under an irregular schedule. In the case of JPPS, if this is the case, the journal should explain the process. Both WoS and JPPS also require a minimum volume of publications. Still, while JPPS clearly defines the minimum number of publications for each category, WoS states that '[t]he volume of scholarly articles published annually should demonstrate the journal is attracting sufficient interest from the relevant scholarly community to be sustainable' without defining 'sufficient' (Table S1). Finally, the JPPS three-star category requires journals to archive their content and make it available online.

Based on its perceived objectivity, Scopus and WoS have been largely considered as sources of journal authority (Lillis & Curry, 2010). However, its status has recently been contested due to its linguistic, geographical, and disciplinary biases (Archambault et al., 2006; Chavarro et al., 2017; Asubiaro et al., 2023). Moreover, in recent years, Scopus and WoS status has been challenged by new databases that support a more inclusive global research system—e.g. OpenAlex—and scholars have defended the idea of diversity in science as beneficial in promoting innovation, accommodating pluralism, and improving resilience, among other factors (Stirling, 2007). The analysis of the quality criteria used by different academic databases and indexing systems contributes to the discussion on measuring research excellence and offers a new perspective on the objectivity of quality criteria. Past literature on the topic identified over 200 quality criteria used by databases, scholars, and other institutions, meaning there is no single method for evaluating quality (for instance, Moradzadeh et al., 2022). New frameworks that define quality guidelines also focus on specific communities and, therefore, prioritize certain themes and dimensions—for instance, the Extensive Quality Standard in Institutional Publishing (EQSIP), developed within the DIAMAS project (DIAMAS, 2023), which devotes an entire section to Open Science practices. Although all evaluation systems share some common criteria, each one has different priorities and understandings of what quality means and the minimum standards a journal must accomplish. Giving traditional indexes the monopoly of journal quality creates profound asymmetries between journals and regions and contributes to a hierarchical perception of science, where journals outside mainstream indexes are automatically associated with mediocrity.

Moreover, ignoring that specific quality criteria and guidelines have been developed in concrete socio-historical contexts and represent a limited conception of how science should be produced and disseminated reduces quality to a unique vision and promotes Scopus and WoS as reference points for journal and editorial standards. It also places traditional indexes as the only credible sources of knowledge and, therefore, as cognitive authorities (see Chavarro, 2017, pp. 45-49). Therefore, this article supports a 'situated' nature of quality, which, echoing Albornoz and colleagues (2020), needs to be contextualized and claims for a 'critical reflective process for identifying and assessing how different forms of epistemic injustice are deeply embedded in the current global knowledge production system' (Albornoz, Okune & Chan, 2020, p. 66). Ignoring this situated nature might also constitute what Medina (2017) identifies as a semantically produced epistemic injustice, as quality aspects conceived by different communities would be removed from the meaning of research quality.

Moreover, the emergence and growth of alternative academic data sources have offered other perspectives and highlighted the biases traditional indexes present, challenging WoS's and Scopus's objectivity and their position as the only valid cognitive authorities. This analysis shows the existence of similarities between the quality criteria employed by traditional and alternative databases and the presence of other more subjective factors that depend on their priorities. As stated above, it is important to note the different nature and objectives of the quality frameworks used by AJOL, Scopus, and WoS. However, the comparison between the three systems can help to show the existence of multiple approaches to research quality, which can be further explored by historical and contextual analysis.

6.4.2 Journal coverage analysis

6.4.2.1 Database coverage

The first step of the analysis shows the number of journals each data source covers and how databases overlap. Figure 1 shows that Ulrich covers most African-based journals and many unique journals (751). However, all AJOL, Scopus, and WoS include journals not found in Ulrich (262, 100, and 104, respectively). After Ulrich, AJOL is the database with the most unique journals (237) and also the second database with the highest total coverage (424), followed by Scopus (196) and WoS (238). As stated before, even though AJOL indexed 628 journals when the data was downloaded, more than 200 were inactive, showing that despite AJOL still having the highest coverage—after Ulrich—almost one-third of the journals are inactive. Scopus and WoS share a similar number of journals. However, the titles vary from one another.

Figure 1. Euler diagram of African journals coverage in AJOL, Scopus, WoS, and Ulrich

Overall, the figure shows that none of the databases covers all African-based journals, and all are needed to improve the coverage of the dataset. This finding also indicates that it is likely that many journals do not appear in any of the databases, so the results of the following analyses must be interpreted cautiously, considering that they are only a part of a broader landscape. In terms of circuits of knowledge (Beigel, 2013), the journals retrieved for this analysis include two out of the four categories: 'mainstream' circuits (Scopus and WoS) and open-access regional circuits (AJOL), but it is still missing open-access transnational circuits (DOAJ, ArXiv, AfricArXiv, or SciELO SA) and local circuits of non-indexed publications. Further project steps aim to include these last two categories using additional data sources, like OpenAlex, DOAJ, and the Open Journal Systems database (Khanna, 2022).

Regarding the reasons that explain each database's different coverage, each one’s entry criteria have to be considered. As shown in section 6.3.1, all three AJOL, Scopus, and WoS have quality criteria the journals have to fulfill to be indexed. These criteria and the known inclusion biases (Chavarro et al., 2017) might explain why some journals are left outside. Also, journals have to apply to be indexed in AJOL, Scopus, and WoS, so some journals might choose not to—or might not be able to—follow the process. In the case of AJOL, some journals, especially those owned by commercial publishers that already have a consolidated publishing infrastructure, might not need AJOL’s support or visibility. Moreover, data sources might differ in their definitions of African-based. For instance, AJOL requires that the journal must be published by a clearly stipulated publishing entity […] that is based in the African continent. Management of publishing strategy, peer-review, and production operation should be run from an African country or countries, and at least half of the Editorial Board should be based in Africa’.[12] Scopus, as stated by SCImago in the response of a consultation made by this author, considers the country of the journal’s publisher. Therefore, some journals might be considered as African-based by Scopus but not AJOL.

The reason for Ulrich’s limited coverage is less apparent. Morris’s (2007) reflection on the coverage limitations of the database identifies several possibilities, such as new journals not being included immediately and regional and language biases. Therefore, I manually checked the age of 30 random journals not indexed in Ulrich to control for possible time lags. Of the 30 revised journals, three did not report an initial year (although for two of them, the first issues reported in AJOL were from 2023), one journal started in 2023, one in 2020, two in 2018, one in 2017 and the remaining 22 began in 2013 or earlier. Therefore, journal age could be the reason for some of the journals, but not a general cause of exclusion as most started more than ten years ago, which seems like a reasonable time for Ulrich to record them. Regarding biases, and as Ulrich covers most of the journals in the database, the distribution by country, research area, and language is very

[12] https://www.ajol.info/index.php/ajol/resources-for-journals

similar to the distribution of the master list. A more comprehensive dataset would be needed to properly assess whether Ulrich's coverage represents the African publishing ecosystem. As new and promising academic databases appear, future research might be able to explore this limitation further.

6.4.2.2 Country coverage

The four maps in Figure 2 show the total number of journals per African country (the biggest map on the left) and AJOL, Scopus, and WoS relative coverage of each African country. Countries with a relative coverage score between 0 and 1 are underrepresented in the specific JIS when compared to the master list. If the relative coverage is above 1, the country is overrepresented compared to the master list. In some cases, countries are highly overrepresented in one database (for instance, South Sudan in the case of AJOL) because there is only one journal from that specific country, and it is included in only one index. It is thus helpful to consider both the absolute and relative numbers when doing the analysis.

The countries hosting most journals are Nigeria (347), South Africa (346), and Egypt (211). On the other hand, some countries do not appear in any of the databases[13]. AJOL has relatively high coverage of all regions, although lower in some specific countries, such as Egypt, Morocco, Namibia, or Mozambique. In comparison, Scopus's and WoS's relative coverage is low, with some exceptions—i.e., the northern region and South Africa. The rest of the countries are below one.

[13] Burundi, Cape Verde, Central African Republic, Chad, Congo, Democratic Republic of Congo, Djbouti, Equatorial Guinea, Eritrea, Gabon, Guinea, Guinea-Bissau, Lesotho, Liberia, Mali, Mauritania, Niger, Sao Tomé and Principe, and Somalia.

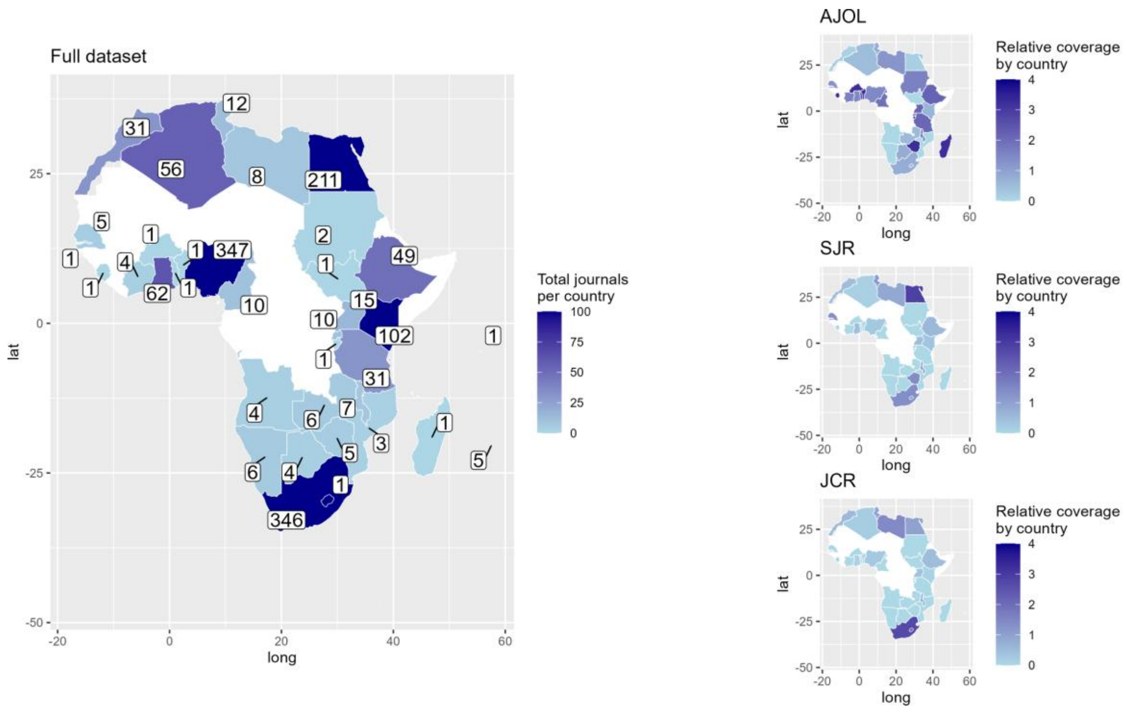


Figure 2. Number of journals per country (left) and relative coverage of African countries by AJOL, Scopus, and WoS (right). White spaces represent countries not covered by the datasets.

The maps above have different readings. First, some countries are not covered by any databases, so any analysis that exhaustively addresses the African academic and public system will need to include alternative data sources, as local knowledge about non-indexed journals is crucial. Including new sources of data might also improve the inclusivity of scientometric studies and offer a better representation of the existing scientific plurality. This is especially true for French-speaking countries as most of them are absent in all the data sources. Further projects should explore the possibilities of bibliographic data sources that have better coverage of francophone scientific literature. Second, AJOL is the most representative JIS regarding journals' country coverage. As AJOL—unlike Ulrich—includes metadata about the journals and the articles published in those journals, scientometric studies about Africa might want to explore this database in further detail. The results also show that Scopus and WoS are highly biased towards very few countries. Therefore, analyses that use these indexes to study African scientific production must be cautious about the generalizability of their results.

Finally, one limitation of the study comes from the definition of the country of a journal. As stated by Mongeon and Paul-Hus (2016), '[w]hat criteria should be used to determine the country of a journal? Should it be determined by the country of its publisher or of its editor? Perhaps it should be determined by the location of all the authors signing an article?'. Operationalizing the nationality of a journal presents several challenges as publishers are sometimes delocalized, and journals are encouraged to apply editorial board and author diversity policies (see section 6.4.1). Moreover, these criteria might also be used to measure journals' internationalization rather than nationality. This study uses the publisher's location to assign the journal country, as it is the criteria also used by the four data sources. However, it is worth noting that this approach might have limitations—i.e., the information might not be referring to the geographical localization of the journal but to other business-related information. A deeper analysis of this topic might benefit from including other criteria and assessing their meaning and significance.

6.4.2.3 Research area coverage

Figure 3 shows the total number of journals per FOS research area (upper left corner) and the relative coverage of AJOL, Scopus, and WoS. Again, Ulrich was not included in the visualization, as all the values were approximately 1. The solid black circular line shows the 1, so areas above the line are relatively overrepresented, and those below the line are underrepresented. Looking at the total numbers, the majority of the journals belong to Social Sciences (831), followed by Medical and Health Sciences (543) and Natural Sciences (540). Engineering and Technology is the research area with the lowest number of journals (178). The plots show that AJOL's and WoS's relative coverage is close to the master list's coverage, while Scopus's scores highly vary. The plots show that Scopus is generally biased towards more technical disciplines, as Natural Sciences and Medical and Health Sciences are overrepresented, and Engineering and Technology is close to 1. Conversely, Humanities, Social Sciences, and Agricultural Sciences are highly underrepresented. Medical and Health Sciences is the only area overrepresented in the three databases.

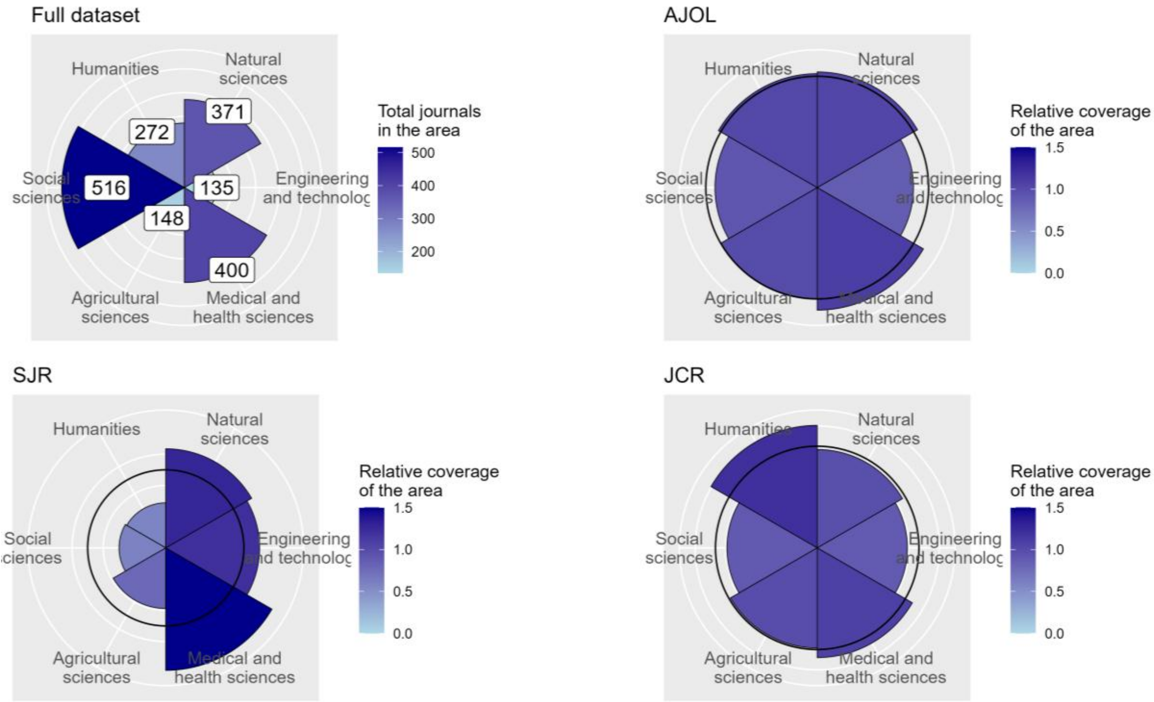


Figure 3. Number of journals by FOS research areas (upper left plot) and relative coverage in AJOL, Scopus, and WoS

Previous studies agree that Scopus and WoS tend to underrepresent Humanities and Social Sciences. When focusing on Scopus, previous research found that Scopus area coverage is homogeneous, except for Arts and Humanities (De Moya-Anegón, 2007). In the Figure above, Scopus coverage is far from homogeneous, but Humanities and Social Sciences are still highly underrepresented. Although categories are not directly comparable, Medical and health sciences overrepresentation in Scopus is somewhat expected, although to a lesser extent (Mongeon & Paul-Hus, 2016). Medical and Health Sciences' high scores in Scopus might also be related to the interest these areas—such as, for instance, immunology and infectious diseases—have in the international community and the high share of funds they receive from international organizations (Kozma et al., 2018). Regarding WoS, the overrepresentation of Humanities is initially surprising as they are known to have a more limited coverage than technical disciplines. However, this result is aligned with recent academic literature on regional coverage of academic databases (Asubiaro & Mills, 2024). From the perspective of postcolonial studies, this might result from the division of scientific labor between the North and the South. For postcolonial scholars, the Global North has always had the scientific legitimacy and the theorizing capacity. At the same time, the Global South has historically been relegated to mere cultural production but outside the traditional scientific circuits (Mignolo, 2018). However, confirming this hypothesis would need a detailed historical revision that falls outside the scope of this work.

6.4.2.4 Language coverage

Table 5 shows the total number of languages used by the journals (first column) and the relative coverage of AJOL, Scopus, and WoS. As for countries and disciplines, relative coverage scores above 1 mean that the languages are relatively overrepresented, and scores below 1 are underrepresented. Most journals only accept English manuscripts (1017) or are multi-lingual. A minority of journals accept other languages: French (19), Arabic (6), Portuguese (5), Swahili (2), and Afrikaans (1). From the 207 multi-language titles, most (179) combine English with another language. After English, French is the most used language by multi-language titles (96), followed by Afrikaans (51) and Arabic (37). Other African languages are a minority: Swahili appears in 6 journals, Amharic in 6, one journal accepted any African language, and one journal allows its authors to write in any of the South African languages. As most journals in all data sources publish in English, relative coverage scores must be evaluated carefully also considering the databases' absolute numbers. For instance, although AJOL seems to have a significant overrepresentation of journals in Swahili, the absolute numbers show that only two journals are fully published in Swahili. Since they are only included in AJOL, Swahili appears to be highly overrepresented. The same happens with Afrikaans in Scopus.

Table 5. Number of journals by language (first column) and number and relative coverage* in AJOL, Scopus and WoS

Language	Masterlist (n)	AJOL (n)	AJOL relative coverage	Scopus (n)	Scopus relative coverage	WoS (n)	WoS relative coverage
English	1017	290	1	141	1	179	1
Multi-language	207	54	0.9	31	1.1	55	1.4
French	19	6	1.1	1	0.4	0	0
Arabic	6	0	0	0	0	0	0
Portuguese	5	0	0	0	0	0	0
Swahili	2	2	3.6	0	0	0	0
Afrikaans	1	0	0	1	7.2	0	0

*Darker blues represent higher relative coverage

As English predominance is well-known in the academic publishing system, it is unsurprising that most journals in the master list publish in this language. Previous research has found similar results in all of the data sources: Scopus and WoS (Vera-Baceta et al.,2019), AJOL (Asubiaro et al., 2023), and Ulrich (Morris, 2007). Results here show that although active journals covered by AJOL have doubled since the previous analysis (Asubiaro et al., 2023), the proportion of non-Anglophone journals remains low.

Although English is undoubtedly the most popular publication language, the low levels shown in this analysis are likely a bias of our master list and the sources used to develop it—Khanna et al. (2022) found that ‘only’ 49.7% of all OJS journals are published in English. The results show that non-English journals are also left outside AJOL, a specific African platform. Moreover, and as seen in Section 6.4.1, even journals that do not publish in English are required to provide an English title and abstract to be included in AJOL, Scopus, and WoS making the language a requisite for publication. Although some scholars highlight the importance of English as the global academic language, many point to the implications for non-English speaker authors. As English is often included as a quality criterion by indexing systems (see Section 6.4.1) and therefore linked to the validity of academic knowledge, it is also a source of structural epistemic injustices, especially for those groups that might not have the opportunity to access an English education. Non-native English speakers also spend more time conducting research (Amano et al., 2023), which creates additional financial costs (Canagarajah, 1996; Ramírez-Castañeda, 2020). Moreover, some non-native English speakers also have difficulties writing in English and are not familiar with the preferences for academic English writing (Arnbjörnsdóttir & Ingvarsdóttir, 2017, pp. 73-87), which in some cases implies the rejection of their work by journals (for instance, Mills et al., 2023, p. 125).

A significant limitation of this analysis is related to multilanguage titles. Multi-language appears in WoS when a journal includes publications in more than one language, usually one of them being English. However, Ulrich does not follow this criterion. It sometimes lists all the languages a journal uses; others use the ‘multi-language’ label. All journals under the multilingual category were checked manually. However, many of them were not found or did not make their language explicit on their website. To unify the criteria, all journals that used more than one language were classified as multi-lingual.

6.5 Conclusions

This article has examined the inclusion criteria of AJOL, Scopus, and WoS (the latter through the analysis of the JPPS system) and studied the representation of African-based journals in the three indexes. The analysis of the quality criteria showed the differences between evaluation methods, being JPPS, both a credibility framework and improvement tool for Southern journals, and Scopus and WoS indexing system. It also presents the similarities and differences between the specific criteria, showing the subjective nature of quality assessments and the need for a situated approach toward scientific quality that highlights the importance of socio-historical contexts.

Quantitative analysis has proven the existence of biases in both AJOL and traditional academic databases in terms of country, area, and language. The results show that many African countries are underrepresented in traditional databases, and 19 countries (35% of the African countries) do not appear in any of the indexes. Regarding research areas, technical fields show a low presence in all databases, while Social Sciences are the category with the highest number of journals. Finally, the language analysis shows that most journals are published only in English or in English and another language—usually French. The results presented here show the limitations of current indexing systems, including regional ones, in showing scientific diversity. They also contribute to the ongoing conversation about epistemic injustices and structural inequalities in science. They also highlight the importance of incorporating diversity and inclusion in scientometric studies and science evaluation and describe the current situation concerning the representation of African journals in three data sources. Future steps of this project intend to explore new sources of data and further delve into epistemic imbalances from different points of view, focusing primarily on the implications of these inequalities from both a scientific and social perspective

CHAPTER SEVEN

CITATION PATTERNS OF LOCAL AND NON-LOCAL AFRICAN PUBLICATIONS: A COMPARATIVE ANALYSIS OF FIVE MEASURES OF LOCAL RESEARCH[14]

7.1 Introduction

Local research has garnered increasing attention in recent years, with a growing body of scientific literature emphasizing its importance—particularly for peripheral communities that are underrepresented in global or mainstream research contexts. Research grounded in local realities is essential for understanding the specific conditions and needs of diverse communities and for designing effective, context-sensitive policies. However, limited resources and the imposition of international research agendas often hinder the development of studies addressing local issues that may be considered irrelevant by the broader, predominantly Western, academic community. For instance, Moscona and Sastry (2021), in a study on agricultural research, found that Asia and Africa suffer greater productivity losses than other regions due to the adoption of technologies ill-suited to their local conditions. They argue that much of agricultural research is aligned with the priorities of high-income countries and therefore fails to address the challenges faced elsewhere. Similar disparities have been identified in fields such as medicine, where previous studies have shown that research efforts in some countries are not directed toward their own societal needs, but rather aligned with Western research agendas—often as a result of the pressure to conform to the priorities of international publishing systems (Ciarli & Ràfols, 2019; Kumar et al., 2023).

However, despite the growing academic interest in local research in recent years, there is still no clear consensus on what constitutes local research (Di César e & Robinson-García, 2024). This lack of conceptual clarity affects scholarly work, with some studies applying divergent definitions of local research, while others fail to define the term

[14] This chapter corresponds to the published preprint: Alonso-Álvarez, P. & Boshoff, N. (2025). Citation patterns of local and non-local African publications: A comparative analysis of five measures of local research. *Zenodo*. https://doi.org/10.5281/zenodo.17865911

explicitly. This issue is particularly relevant in the context of research evaluation studies (e.g., Tijssen & Winnink, 2023), as different definitions can lead to different results and, consequently, to different policy recommendations. Similarly, conceptual ambiguity is also present in several research initiatives aimed at increasing the recognition of local research and promoting alternative evaluation frameworks (e.g., Delgado-López-Cózar et al., 2021; Hicks et al., 2015).

Conceptualizing local research is essential for operationalizing the term in a consistent and replicable way, enabling a more accurate understanding of its specific characteristics, contexts, and societal relevance. A well-defined concept facilitates the recognition of its diversity and improves the validity and interpretability of bibliometric analyses, which often depend on how local research is delineated. Furthermore, a robust conceptual framework is critical for informing the development of research policies and evaluation systems that aim to more effectively support and assess locally oriented research.

Achieving consensus on the definition of local research is particularly important for scientific communities in the Global South, where structural inequalities in visibility and recognition often relegate regionally focused research to the margins of global scientific discourse. These challenges are especially acute in the African context, where a substantial portion of research is published in local or regional journals with limited representation in major global indexing databases (Alonso-Álvarez, 2024; Asubiaro & Onaolapo, 2023). Since bibliometric analyses typically rely on these databases (e.g., Confraria & Godinho, 2015; Sooryamoorthy, 2022), the impact and relevance of publications excluded from them frequently remain invisible.

The current bibliometric study calls for an exploration of different understandings of 'local' in relation to research because its broad aim is to examine the citation patterns of local African research. Based on previous studies of the citation related associations of different approaches for operationally defining local research (see Section 7.2 for a discussion), it is expected that the way in which local research is operationalized may influence its subsequent citation performance. Five objectives guided the study:

- to bibliometrically operationalize selected conceptual definitions of local research
- to explore the relationships between the different operationalizations of local research
- to study the citation performance of local research according to three measures: (1) average citations per publication, (2) average years to first citation, and (3) percentage of publications with zero citations
- to explore the profiles of publications citing local research according to their own locality status and geographical location
- to examine the geographical distribution of citations to local research using South Africa as a case study.

The next section (Section 7.2) presents the different conceptualizations of local research and previous work on the citation performance of each definition of local research. Section 7.3 presents the approaches used for their bibliometric operationalization, the data sources, and outlines the methodology. Section 7.4 presents and discusses the results. Finally, Section 7.5 concludes.

7.2 Conceptualization local research

In this analysis, we adopt three of the most widely used approaches for conceptually defining local research and operationalize them at the publication level. This section outlines the conceptual foundations of each approach, drawing on existing academic literature, and examines their associated citation patterns.

7.2.1 Database indexing-based approach

7.2.1.1 Conceptualization

The indexation of journals in certain scholarly publication databases has contributed to the distinction between international and local knowledge production. Two such databases in particular—Web of Science and Scopus, due to their high equation with what is considered 'mainstream'—have contributed to the segmentation of scholarly output into international, regional and national circuits of knowledge (Beigel, 2014). Whereas international circuits are defined by publications that are indexed in the mainstream databases, regional circuits are defined by publications in region-specific platforms (such as Scientific Electronic Library Online [SciELO], Latindex, or AJOL), and national circuits by publications in locally published journals. Publications in mainstream databases have become synonymous with 'global science' (Beigel, 2021), thereby relegating journals outside these databases to 'peripheral' journals (Salager-Meyer, 2015) and the work published in them to the category of 'local science' (Guédon, 2011).

Classifying journals as global or international based on their indexing in mainstream databases, takes for granted the perceived objectivity of the databases' selection criteria (Lillis & Curry, 2010). Yet, these selection criteria—often presented as universal—have been criticized for perpetuating geographical, linguistic, and disciplinary biases (Chavarro et al., 2018). Moreover, despite their potential to reinforce database-related inequalities, mainstream databases continue to be widely used to identify local journals for bibliometric analysis (e.g., Tijssen, 2007; Sivertsen, 2016), often also involving other criteria, such as the language of the publication (Milia, et al., 2022; Milia & Arvanitis, 2025). This practice continues because, compared with regional and national collections of publications, mainstream databases have relatively cleaner and more structured metadata, which is needed for bibliometric analysis.

7.2.1.2 Associated citation patterns

In terms of citations, inclusion in mainstream databases significantly enhances a journal's visibility and facilitates the dissemination of its content, thereby reaching a more international audience (Buela-Casal et al., 2006). Unsurprisingly, indexation in WoS and Scopus has been associated with higher citation counts (e.g., Chavarro, et al., 2018). Country-based studies have further shown that publications and journals indexed in WoS, compared to those that are not, tend to receive more citations from other WoS-indexed sources—for instance, in the contexts of Croatia (Andreis & Jokić, 2008), Armenia (Gzoyan et al., 2023), Germany (Chi, 2014), and South Africa (Tijssen, 2007). However, many studies analysing the relevance of local scientific literature solely rely on the citations by publications indexed in mainstream databases (i.e., WoS). This means that they do not include the citations by non-indexed documents, which might show a different picture of how local literature is cited.

Some studies that have included non-indexed sources show that when citations from non-indexed publications (i.e., outside WoS and Scopus) are included, alternative patterns emerge. There is evidence that local journals often cover topics not addressed by mainstream-indexed journals but which may be of high relevance to specific research communities. For example, in a study on Passiflora flower research, Chavarro, Tang, and Ràfols (2017) found substantial differences between the topics addressed by articles indexed in WoS and those that were not. A clear citation pattern emerged: non-indexed papers were more likely to cite other non-indexed papers. Similarly, Lopez-Piñeiro and Hicks (2015) showed that the topics of Spanish sociology publications published in WoS greatly differ from those published in a domestic database of social sciences journals.

Also, research has shown that publications not indexed in mainstream databases are mainly cited by domestic audiences. Early studies in the Brazilian context also found that articles indexed in SciELO but not in WoS were more frequently cited by local publications—also not indexed in WoS (Mugnaini, et al., 2007). In their study of Armenian domestic journals, Gzoyan et al. (2023) found that publications not indexed in WoS were mainly cited by authors located in Armenia. Similarly, in an analysis of Malaysian journals indexed in WoS, Abrizah et al. (2013) found that of the five journals that contributed the most citations to Malaysian journals, three were also Malaysian journals themselves. These findings suggest that analyses relying solely on mainstream databases overlook a substantial portion of the citation landscape—particularly citations to local academic literature—and may therefore underestimate its visibility, relevance, and scholarly impact.

7.2.2 Toponym-based approaches

7.2.2.1 Conceptualization

Toponym-based approaches rest on the premise that local research is site-specific and thus rooted in specific local, regional, or national contexts (Sommer, 1990; Chavarro et al., 2014). Studies implementing this approach typically focus on a specific country or geographic area that serves as the setting, the territorial scope, or the sociocultural or political backdrop of the research activity. A commonly used method in this approach involves identifying toponyms and demonyms in the titles, abstracts, or keywords of publications. Toponyms refer to names designating geographic locations—including cities, regions, and countries (e.g., Cape Town, Western Cape, South Africa)—whereas demonyms refer to the people associated with those locations (e.g., Capetonian, South African). This study adopted a toponym-based approach to identify local research at both the journal and publication levels.

Journals often embody research communities with shared topical, contextual, or methodological interests. In this sense, studies frequently assume that research published in nationally oriented journals reflects local concerns (e.g., Jamali, 2024; López Piñeiro & Hicks, 2015; Miguel et al., 2015; Navas Fernández et al., 2018; Tijssen, 2007). Since journal titles typically reflect a journal's scope—including thematic and geographic dimensions—the presence of a country name in a journal title may indicate a deliberate focus on locally contextualized research. It may also signal the journal's intended audience by aligning with regional or national priorities. In bibliometric analyses, journal titles have been used as means to delimit local research in specific national contexts (e.g., Abrizah et al., 2013). The presumed link between journal titles and local research is further reflected in the trend toward de-nationalizing journal titles—removing country names—as part of a rebranding strategy aimed at enhancing international visibility (Khelfaoui & Gingras, 2025).

At the publication level, toponyms are also widely used to identify local research, as they indicate contextual anchoring in local, regional, or national issues (Chavarro, et al., 2014). Bibliometric applications of this approach include regional studies on Latin America and the Caribbean (e.g., Arias & González, 2021; Miguel, et al., 2024), sub-Saharan Africa (Hedt-Gauthier et al., 2019), and national analyses of Canadian (Larivière, 2014), Colombian (Gonzalo-Ordoñez et al., 2010), or South African local research (Wright et al., 2017).

7.2.2.2 Associated citation patterns

Although the associated citation patterns of geo-localized journal titles remain an understudied topic, recent studies have shown that journals including a country name in their title are often perceived as having a local or national focus and, in some cases, as being of lower quality; the exception being that journals from one's own country are generally perceived as being of higher quality than journals from other countries (Jamali, 2024). To enhance their visibility, many scholarly journals have adopted a strategy of de-nationalizing their titles—removing country references and switching to English titles.

This shift has been associated with increased citation rates and a decrease in the proportion of national citations, contributing to greater impact and internationalization (Khelfaoui & Gingras, 2025).

Research on the use of toponyms in scholarly publications has revealed significant regional disparities: authors in the Global South are more likely to geo-contextualize their research than authors in the Global North (Castro Torres & Alburez Gutierrez, 2022; Castro Torres, 2024; Mongeon et al., 2022). For instance, research has found that psychological studies conducted in experimental settings in non-Western countries are more likely to mention the country in the study title than those conducted in Western countries (Kahalon et al., 2021). This pattern reinforces the perception that research from the North is 'universal', while academic work from the South is considered relevant only within local contexts (Castro-Torres & Alburez-Gutiérrez, 2022).

Moreover, geo-contextualized articles have been linked to a citation disadvantage (Burns & Anwarul Islam, 2024; Kahalon et al., 2021), with implications for the visibility and scholarly recognition of Southern authors. However, in a study about the citation impact of geo-localized Italian publications, the authors found that for a limited number of research areas, mainly related to health, environmental and geosciences, the citations were higher for publications with 'Italy' in the title (Abramo, et al., 2016). Recent research comparing the use of toponyms in publication titles from the Global South has also yielded mixed findings. In some research areas, geo-contextualized publications show, on average, a higher impact than non-geo-contextualized articles (Mongeon et al., 2022).

Although still a hypothesis, previous research has suggested that articles with country names in their titles may benefit from a within-country citation advantage, particularly when the geographical context is central to the study. While such titles may limit the perceived relevance of the article for international or global audiences due to their narrower focus, they can enhance the study's visibility and perceived relevance among domestic audiences, thereby attracting more citations from the referenced country or region (Burns & Anwarul Islam, 2024).

7.2.3 Author-based approaches

7.2.3.1 Conceptualization

Another common approach to locality considers the affiliations of the key actors involved in the publication process, which are the authors. Author affiliation is a widely used indicator of both research internationality and collaboration (Buela-Casal et al., 2006). This approach has been applied in studies that examine locality across various contexts (Grančay, et al., 2017; Hladchenko & Moed, 2021; Moed et al., 2015; Moed et al., 2020). In particular, it has been used to study the relevance of local African scientific production in the global scientific landscape (Tijssen et al., 2006; Tijssen, 2007). It has also been used to analyse the geographical distribution of certain areas of research (Boshoff et al., 2024a), and the visibility of research from specific countries (e.g., Boshoff et al. 2024b on the invisibility of Tanzanian forest science), and also used jointly with other approaches, such as toponym approaches (Hedt-Gauthier et al., 2019).

7.2.3.2 Associated citation patterns

International collaboration has been consistently associated with higher citation impact (Didegah & Thelwall, 2013; Kwiek, 2021). In general, publications involving international co-authorship tend to receive more citations than those authored solely by researchers from the same country. Prior research also suggests that the higher impact of internationally co-authored work may be linked to the different topics it addresses. For example, using Library and Information Science as a case study, Vélez-Estevez and colleagues (2022) found that papers resulting from international collaboration tend to focus on emerging or ‘hot’ topics in the field, while domestically authored publications are more likely to address well-established themes. Studies focusing on sub-Saharan Africa using WoS-indexed publications report similar findings: articles produced through international collaboration generally receive more citations than those authored within a single country, with the strongest effects observed in collaborations involving non-African partners (Onyancha, 2020). Country specific studies have also found similar patterns; for instance, for South Africa, Sooryamoorthy (2017) linked international collaboration—particularly with non-African researchers—to higher citation impact. However, collaborations among African countries alone did not show the same citation advantage.

Academic literature has widely documented the phenomenon of domestic citations to papers from the same country. National citation bias and country self-citations are well-documented in scientometric studies (Baccini & Petrovich, 2023; Pasterkamp et al., 2007; Wang et al., 2024). Publications have generally more impact in their immediate environments resulting in higher number of citations by national colleagues (Lancho Barrantes et al., 2011). For instance, Abramo, D’Angelo and Costa (2021) demonstrated that domestic Italian publications were mostly cited by other domestic publications. In a study of six major science producer countries, Khelfaoui et al (2020) found that national references are higher in publications authored by only domestic authors, and more pronounced in the social sciences and humanities than in the natural sciences and engineering.

7.3 Data and methods

7.3.1 Operationalization of local research approaches

The operationalization of the different approaches towards local research is presented in Table 6. For the database indexing-based approach, a publication was considered local when it appeared in a journal not indexed in either WoS or Scopus. This study adopted two toponym-based approaches. At the journal level, a publication was considered local if it appeared in a journal whose title included the name of the country in which it is published. For instance, the South African Journal of Science is published in South Africa, and its title includes the country name. At the document level, a publication was considered local if the title of the article included the name of the country that publishes the journal. For this analysis, only toponyms of countries were considered. Subnational names—such as those of regions, provinces, or cities—are excluded. Consequently, publications that refer solely to subnational units without explicitly naming the country were not classified as local. Finally, the author-based approaches presented here considered a publication to be local if all or at least one of the authors were affiliated with an institution in the country that publishes the journal.

Table 6. Operationalization of local approaches

Approach	**Criteria**	**Definition**
Database indexing-based approach	Journal in WoS/Scopus	A publication is considered local when it appears in a journal that is not indexed in WoS or Scopus.
Toponym-based approach	Journal title	A publication is considered local if it appears in a journal whose title includes the name of the country in which it is published.
	Article title	A publication is considered local if the title of the article includes the name of the journal's country
Author-based approach	All authors	All the authors are affiliated with an institution in the same country as the journal
	Any author	At least one author is affiliated with an institution in the same country as the journal

7.3.2 Data

The analysis relied on four sources of data, two of which were key for most of the analyses:

- AJOL: Journal data retrieved from the AJOL website in February 2024 using the R library rvest (Wickham, 2022).
- OpenAlex: Publication and journal data retrieved from the CWTS in-house version of OpenAlex, updated until August 2024.

The metadata of publications in AJOL journals published between 2016 and 2018 were extracted from OpenAlex. Only publications from AJOL journals in OpenAlex were selected, and not also other African publications in OpenAlex, to ensure that all items in the dataset are peer-reviewed journal articles, thus meeting a minimum shared quality standard. This was done because peer review cannot necessarily be assumed for all publications classified as articles in OpenAlex. Although AJOL journals are supposedly African-based, not all of them were located in Africa according to OpenAlex. Since the publication metadata used in the analysis is sourced from OpenAlex, we filtered out articles from journals not classified as African by OpenAlex to ensure data consistency. Table 7 shows the number of publications and unique number of journals during each step of the publication selection process. The final set of AJOL publications —AJOL in OpenAlex by ISSN matching (2016-2018, restricted to African-based journals)— was the one used in the analysis. Finally, publications citing the AJOL publications within a five-year window were also retrieved, as indicated in Table 7.

Table 7. Number of publications and unique journals during each step of the publication selection process

Stepwise publication sets	**# publications**	**# journals**
Step 1: AJOL in OpenAlex by ISSN matching (all years)	304,407	571
Step 2: AJOL in OpenAlex by ISSN matching (2016-2018)	45,554	389
Step 3: AJOL in OpenAlex by ISSN matching (2016-2018, restricted to African-based journals)	42,092	373
AJOL publications in Step 3 that have been cited	24,933	354
Publications citing the AJOL publications in Step 3 (5 years citation window)	121,003	20,380

AJOL publications were classified according to OpenAlex's domains (social sciences, life sciences, health sciences, and physical sciences). Additional metadata was retrieved from OpenAlex, including publication year, title, authors' affiliation country, and the journal's country. These were used in executing the author-based and toponym-based approaches to locality. The GeoNames database was used to extract toponyms from article and journal titles.

Two other data sources were used for the database indexing-based approach to locality:

- WoS: The CWTS in-house version of WoS, updated until September 2024, which includes the Science Citation Index Expanded (SCIE), the Social Sciences Citation Index (SSCI), the Arts & Humanities Citation Index (AHCI), and the Emerging Sources Citation Index (ESCI).
- Scopus: The CWTS in-house version of Scopus, updated in March 2024.

7.3.3 Statistical analyses

In terms of analysis, we first created profiles of the countries and research areas in our dataset, as well as presenting the distribution of local versus non-local publications and citations according to the five locality criteria. We then calculated the correlation between the five criteria. For each locality criterion, we computed three sets of summary statistics—the average number of citations per paper, the average time (in years) to the first citation, and the percentage of publications with zero citations.

To explore the profile of publications citing local literature according to their locality status and geographical origin, we calculated several indicators to assess the types of publications citing local research, based on different locality criteria and research areas. First, we examined the locality status of the citing publications to determine whether local literature tends to be cited more frequently by other local publications. Second, we assessed the international scope of the citations—that is, whether citations to local literature originate from the same country as the cited publications or from other countries. Finally, we conducted a country-specific analysis focused on South Africa to identify the geographical origin of publications citing South African local literature. This allowed us to trace the citation flows and identify regional or international audiences engaging with local research.

All analyses employed a variation of the same metric: an adjusted share of citations. We used an adjusted metric rather than a simple proportion to account for structural imbalances in the dataset (see Table 2). A simple proportion—such as the share of local citations within a specific research area—may conflate actual citation behavior with disparities in the volume of local versus non-local publications. Given that non-local publications are often more numerous, direct comparisons can be misleading. To address this, we normalized the data by dividing the observed local share in a given research area by the expected share across all areas for the same locality type. This adjusted share reflects whether local publications are over- or under-cited relative to their availability, thus enabling fairer comparisons across research areas and locality criteria.

To ensure robustness, we applied a minimum threshold of 10 publications per combination of research area, locality type, and citation status (local vs. non-local). In all cases, the research area refers to that of the cited publication.

The adjusted share of citations was considered in three ways:

- Locality status of citing publications: For each combination of research area and locality status of cited publications, we calculated the adjusted share of citations received from other local publications (Equation 1).
- National origin of citing publications: For each combination of research area and locality status of cited publications, we calculated the adjusted share of citations originating from the same country as the cited publication (Equation 2).
- Geographical citation patterns to South African publications: Restricting the dataset to South African publications (based on journal country), we calculated the share of citations from each country to local South African publications, disaggregated by research area (Equation 3).

For the first calculation, the adjusted share of citations from local literature is calculated as the ratio between the observed share of citations from local publications within a given research area and the expected share of citations from local publications based on the overall distribution of citations across all research areas. Specifically, it is defined as the proportion of citations from local publications in a given area divided by the total citations in that area, normalized by the proportion of all citations from local publications (across areas) within a given locality criterion relative to the total citations under that same criterion. Thus, if a denotes the cited publication research area, the adjusted share of citations is defined by the following equation:

Equation 1. Adjusted share of citations based on locality status of citing publications

$$\begin{array}{c}\text{Adjusted share of citations}\\ \text{from local publications in area } a\end{array} = \frac{\dfrac{\text{Citations from local pubs in area } a}{\text{Total citations in area } a}}{\dfrac{\text{Total citations from local publications in all areas}}{\text{Total citations in all areas}}}$$

Thus, an adjusted share below 1 indicates that citations from local publications are less frequent than expected in a given research area, suggesting an underrepresentation relative to their overall availability. Conversely, an adjusted share above 1 implies that citations from local publications are more frequent than expected, indicating a relative interest from local literature in that area.

For the second calculation, we applied the same normalization procedure to assess the geographical reach of citations—that is, whether citations originate from the same country as the cited publications or from a different country. In this case, the adjusted share compares the observed proportion of same-country citations within each research area to the expected proportion based on the overall distribution of same- and different-country citations within each locality type. This allows us to evaluate whether citations from domestic sources are over- or underrepresented relative to their general occurrence in the dataset. Thus, if a denotes the cited publication research area, the adjusted share of citations is defined by the following equation:

Equation 2. Adjusted share of citations based on same-country status of citing publications

$$\begin{array}{c}\text{Adjusted share of citations}\\ \text{from publications}\\ \text{from the same country in area } a\end{array} = \frac{\dfrac{\text{Citations from same country pubs in area } a}{\text{Total citations in area } a}}{\dfrac{\text{Total citations from same country pubs in all areas}}{\text{Total citations in all areas}}}$$

As in the previous calculation, an adjusted share below 1 indicates that citations from same-country publications are less frequent than expected in a given research area, whereas an adjusted share above 1 implies that citations from same-country publications are more frequent than in the overall dataset.

Lastly, for the third calculation, we calculated the adjusted share of citations to local publications from South Africa by citing country. In contrast to the previous calculation, the focus here is on citations to local publications, rather than citations from local publications. Thus, the adjusted share is calculated as the ratio between the share of citations to local publications from country and area, and the overall share of citations to local publications across all countries and areas. Therefore, if c is a specific country and a represents a specific research area, the adjusted share of citations is defined by the following equation:

Equation 3. Adjusted share of citations based on locality status of cited publications

$$\begin{array}{c}\text{Adjusted share of citations}\\ \text{to local pubs}\\ \text{from country } c \text{ in area } a\end{array} = \frac{\dfrac{\text{Citations to local pubs from country } c \text{ in area } a}{\text{Total citations from country } c \text{ in area } a}}{\dfrac{\text{Total citations to local pubs in all countries and areas}}{\text{Total citations in all countries and areas}}}$$

As before, an adjusted share below 1 indicates that citations to local publications are less frequent than expected within a given research area, suggesting an underrepresentation of local literature. Conversely, an adjusted share above 1 implies that local publications are cited more frequently than expected, reflecting a relatively higher relevance or visibility of local research for a specific area and country.

All the visualizations in the article were created using ggplot2 (Wickham, 2022).

7.4 Results and discussion

7.4.1 Descriptive results

Table 8 presents the distribution of publications by journal country. As shown, a few countries—particularly South Africa and Nigeria—account for a large share of the publication output. South Africa and Nigeria together represent over half of the dataset, with 32.9% and 23.9% of the publications, respectively. In contrast, the next country by volume, Uganda, accounts for only 7.9% of the total. Several countries, including Benin, Sierra Leone, Tunisia, Angola, and Botswana, contribute just 0.1% or less of the publications in the dataset.

Table 8. Number and percentage of AJOL publications per country

Country	n	%	Country	n	%
South Africa	13,844	32.9	Zambia	180	0.4
Nigeria	10,048	23.9	Rwanda	105	0.2
Uganda	3,339	7.9	Eswatini	98	0.2
Egypt	2,812	6.7	Côte d'Ivoire	88	0.2
Algeria	2,697	6.4	Sudan	77	0.2
Ethiopia	2,046	4.9	South Sudan	70	0.2
Kenya	1,547	3.7	Senegal	66	0.2
Cameroon	836	2.0	Burkina Faso	66	0.2
Ghana	693	1.6	Mauritius	65	0.2
Tanzania	480	1.1	Sierra Leone	41	0.1
Togo	425	1.0	Benin	27	0.1
Libya	270	0.6	Tunisia	22	0.1
Zimbabwe	248	0.6	Angola	21	<0.1
Malawi	190	0.5	Botswana	19	<0.1

Table 9 displays the number and percentage of publications by research area. As with the distribution by country, certain fields—most notably Medicine—account for a significantly larger share of the publications, representing 39.6% of the total. In contrast, other areas such as Veterinary Science, Energy, Physics and Astronomy, and Chemical Engineering each contributes less than 1% of the publications.

Table 9. Number and percentage of AJOL publications per research areas

Area	n	%	Area	n	%
Medicine	16,690	39.6	Immunology and Microbiology	1,299	3.1
Social Sciences	9,094	21.6	Pharmacology, Toxicology and Pharmaceutics	798	1.9
Agricultural and Biological Sciences	7,237	17.2	Chemistry	750	1.8
Biochemistry, Genetics and Molecular Biology	4,181	9.9	Decision Sciences	614	1.5
Health Professions	4,039	9.6	Earth and Planetary Sciences	584	1.4
Environmental Science	3,750	8.9	Materials Science	575	1.4

Engineering	2,857	6.8	Neuroscience	596	1.4
Arts and Humanities	2,818	6.7	Mathematics	548	1.3
Psychology	2,341	5.6	Dentistry	420	1.0
Economics, Econometrics and Finance	1,805	4.3	Veterinary	311	0.7
Business, Management and Accounting	1,732	4.1	Energy	275	0.7
Computer Science	1,690	4.0	Physics and Astronomy	166	0.4
Nursing	1,335	3.2	Chemical Engineering	62	0.1

Table 10 shows the percentage of publications classified as local and non-local for each measure of local research for AJOL publications and the publications citing them. Due to missing values in certain fields (e.g., author affiliation), the percentages of local and non-local publications do not always sum to 100%. In such cases, the remaining proportion is classified as Not Applicable (NA) and excluded from the analysis. As a result, each locality criterion may include a different set of publications in the citation analysis, depending on data availability. The table highlights substantial variation in the number of publications identified as local across criteria—for example, only 3% of citing articles are classified as local under the Article title criterion, compared to 20% under the Any author criterion. It also shows that in almost all cases, with a single exception, the number of non-local articles exceeds that of local ones.

Table 10. Percentage of publications classified as local or non-local according to each locality criterion

	J WoS/ Scopus		**J title**		**Art title**		**All authors**		**Any author**	
	Local	Non-local	Local	Non-local	Local	Non-local	Local	Non-local	Local	Non-local
AJOL pubs	34%	66%	28%	71%	12%	87%	31%	36%	37%	29%
Citing pubs	16%	84%	6%	94%	3%	94%	13%	69%	20%	62%

*Publications not included in either local or non-local are due to missing values and therefore classified as NAs

7.4.2 Correlation between locality criteria

Figure 4 presents the correlations between the different criteria of locality. The graph shows that the locality criteria are not strongly correlated with one another. Journal in

WoS/Scopus has a low negative correlation with Journal title and almost zero correlations with the rest of the locality criteria. Although Journal title, Article title, All authors and Any author positively correlate with one another, their correlation coefficients are very low. The exception is the correlation between All authors and Any author, which is expected because the All author publications are a subset of the Any author publications.

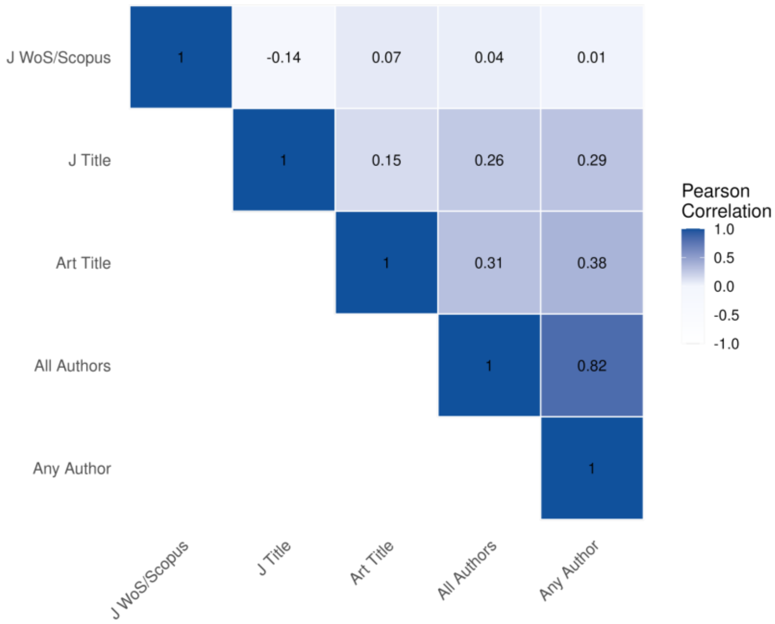


Figure 4. Correlation of locality criteria

The low correlation values are not unexpected, as previous analyses using different locality criteria have yielded similar results. For example, at the journal level, Di Césare and Robinson-García (2024) demonstrated that journals classified as local according to one criterion are often not classified as such by other criteria. While some degree of overlap exists, their study highlights that the interaction between different locality approaches is generally limited.

7.4.3 Citation statistics by research area

Figure 5 shows the percentage of publications with zero citations across the five criteria of local research. It compares each percentage to the corresponding percentage for non-local research, also disaggregating them by research field. The grey horizontal lines indicate OpenAlex's broader domain classification. In order, the first group belongs to the Social Sciences domain, the second group to Health Sciences, the third to Life Sciences and the last one to Physical Sciences. The Journal in WoS/Scopus criterion reveals the largest disparities, with local publications exhibiting a higher proportion of uncited outputs in most fields. For the remaining criteria, the differences between local and non-local publications are more modest. Under both toponym-based criteria, local publications generally show a lower share of uncited papers, particularly in the social sciences and select areas of the physical sciences. In contrast, within the health and life sciences, the proportion of uncited publications is similar for both local and non-local outputs. For the author-based criteria, non-local publications tend to have a slightly lower percentage of uncited articles, especially in the life and health sciences.

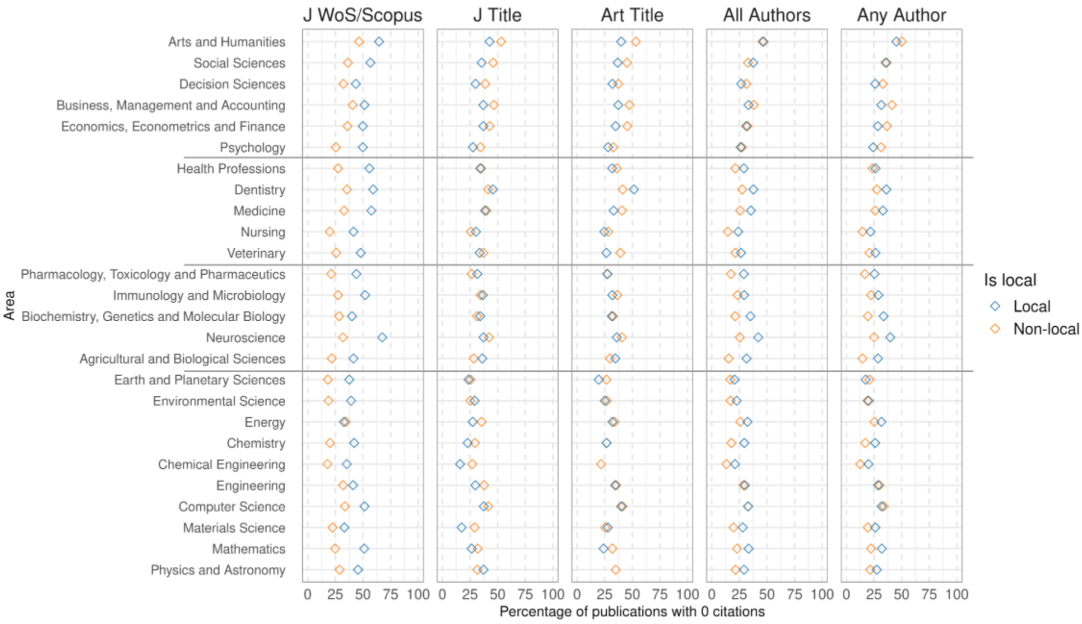


Figure 5. Percentage of publications with zero citations by locality criterion and research area

Figure 6 shows the average number of citations per paper for the five locality criteria, comparing each citation average to the same for non-local research. The plots reveal that the relationship between citation impact and locality varies depending on both the definition of local research and the research area. Under the Journal in WoS/Scopus criterion, non-local research consistently receives more citations on average than local research across all fields. However, this difference is relatively small in certain physical sciences fields, such as energy, engineering, and physics and astronomy. A similar pattern emerges under the All authors criterion, although the average citation gap between local and non-local publications is narrower—particularly in some areas of the social sciences. Notably, in fields such as decision sciences and chemical engineering, local research exhibits higher citation averages than non-local research. Under the Any author criterion, local research shows slightly higher average citations in the social sciences and in some physical science fields, while receiving fewer citations in the health and life sciences. When applying the Journal title criterion, local research generally receives more citations on average than non-local research across all domains, with smaller differences observed in the health sciences. Finally, under the Article title criterion, local research tends to receive more citations in all social science fields and in several areas across other domains—particularly in health professions, medicine, immunology and microbiology, neuroscience, earth and planetary sciences, and mathematics.

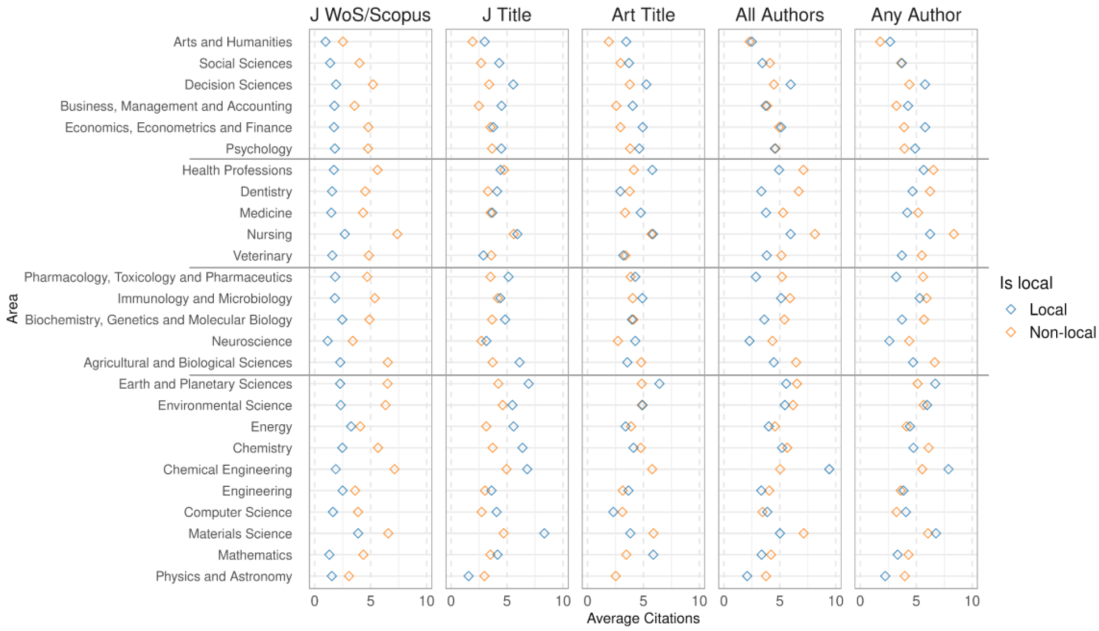


Figure 6. Average citations per paper by locality criterion and research area

Finally, Figure 7 presents the average number of years to the first citation, by locality criterion and research area. The graphs show that for most criteria —Journal title, Article title, All authors, and Any author— there are no significant differences between local and non-local research. However, under the Journal in WoS/Scopus criterion, local publications experience a longer delay, with the average time to first citation being between six months and one year greater than for non-local publications.

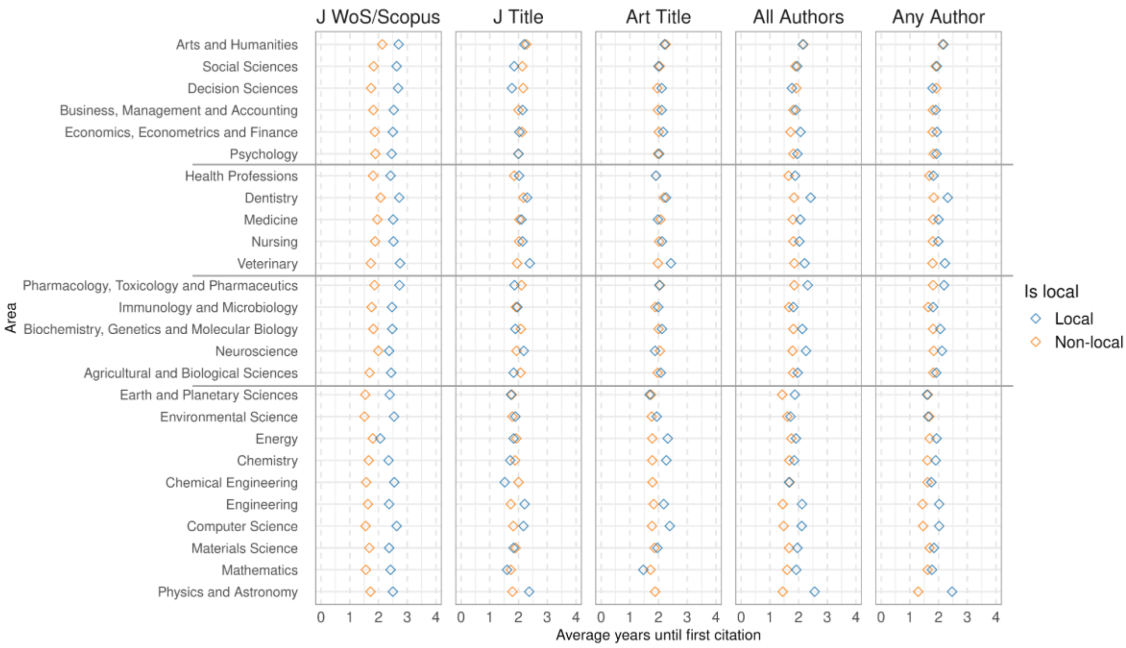


Figure 7. Average years until first citation by locality criterion and research area

The results indicate that local publications—despite often being overlooked in scientometric analyses—are cited and used at levels comparable to non-local publications across most definitions of locality. This highlights the significance of local academic research within the broader scientific landscape. While non-local literature tends to show slightly better performance for most indicators and locality criteria, the most notable differences appear under the Journal in WoS/Scopus criterion. For other locality criteria, the performance gap is smaller and varies depending on the research area. In particular, under the Any author criterion, local research outperforms non-local research in certain fields. However, this outcome is not unexpected, as this criterion includes internationally co-authored publications—requiring only one author to be affiliated with an institution in the journal's country—which may enhance citation impact.

Regarding the Journal title and Article title criteria, the findings diverge somewhat from the literature that suggests a citation disadvantage for geo-contextualized research. Prior analyses of local academic output have typically relied on WoS or Scopus data, which are known to underrepresent research from the Global South, which might affect the results. Using OpenAlex, Mongeon and colleagues (Mongeon et al., 2022) reported that in certain research areas, geo-contextualized and local research from the Global South received, on average, more citations than non-local or non-geo-contextualized publications. The findings presented here partially support that conclusion. Also, it is worth noting that geo-contextualized publication might appear in the non-local set too, just mentioning a different country than their journal's one. However, a deeper analysis is required to fully assess the citation impact of geo-contextualized research in the Global South.

7.4.4 Profile of publications citing local research

As previous literature has noted, local academic publications often reach different audiences compared to non-local publications. This section examines the profile of publications citing local research in Africa to explore these dynamics further. Specifically, it analyzes citation sources based on two classifications of the citing publications: (1) local and non-local citing publications, using the same criteria applied to the cited publications—citations are considered local if they come from publications classified as local, regardless of whether they originate from the same country or a different one; and (2) same-country versus different-country citations, based on the affiliation of the citing authors. This dual classification enables us to assess whether local academic literature circulates primarily within local or international scholarly networks and to what extent it holds relevance for countries beyond the one in which it was published.

Figure 8 presents the adjusted share of citations from local publications to both local and non-local articles. Overall, the graph indicates that differences in citation patterns are more strongly associated with the research area than with the local or non-local status of the publication. For example, publications in the arts and humanities tend to receive more citations from local sources, whereas those in materials science are more frequently cited by non-local publications.

Among the classification types, the Article title criterion reveals the sharpest contrast between local and non-local citation patterns. Figure 8 highlights the varying citation dynamics of geo-contextualized local research across disciplines. In fields with a more local orientation—such as health and medical sciences—local publications tend to be cited more often by non-local publications. Conversely, in fields that are typically less locally focused, such as mathematics or materials science, local publications are predominantly cited by other local publications.

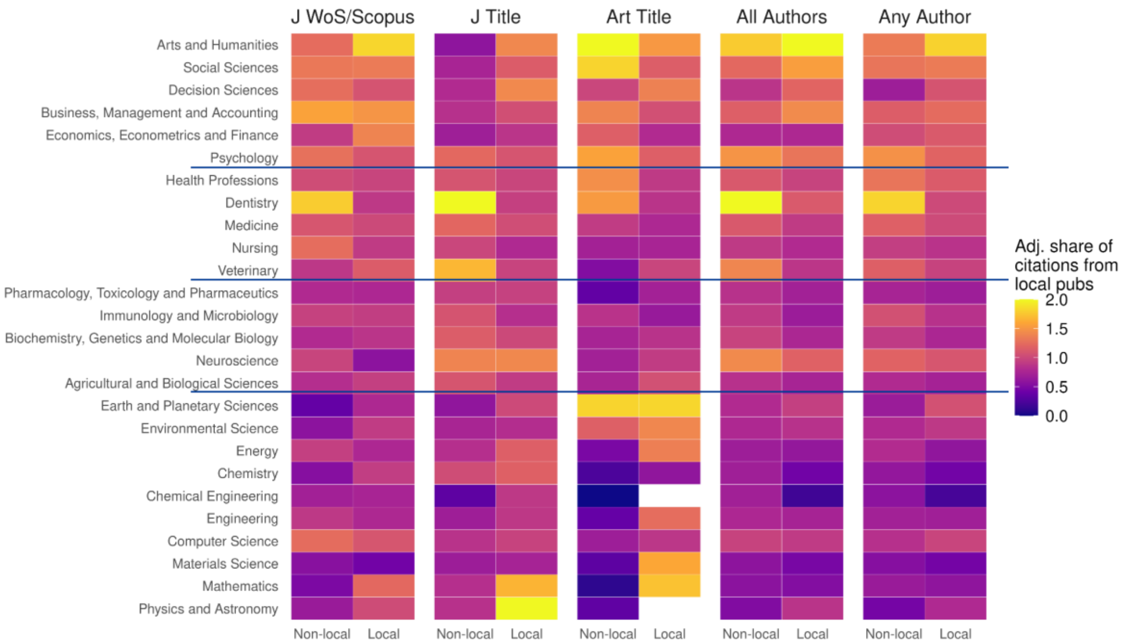


Figure 8. Adjusted share of citations from local publications—reported for five locality criteria (each with two subcategories, local and non-local), broken down by research area

Figure 9 illustrates the adjusted share of citations originating from publications affiliated with the same country as the cited work versus those from other countries. As in the previous figure, the most notable variations are observed across research areas. Fields such as arts and humanities and social sciences exhibit a higher proportion of citations from within the same country, reflecting their stronger local orientation.

When considered alongside the preceding figure, several nuanced patterns emerge. For example, in nursing, citations stem from both local and non-local publications, but primarily from publications affiliated with other countries. This suggests that nursing publications are equally ‘used’ in local and non-local research, but they have a more international reach. In contrast, earth and planetary sciences receive most of their citations from non-local publications, yet these often originate from the same country. This pattern implies that local knowledge is disseminated through publications with a geographical link but an international scope—i.e., studies published in international circuits, studies with a broader international focus, or in research with international collaborations.

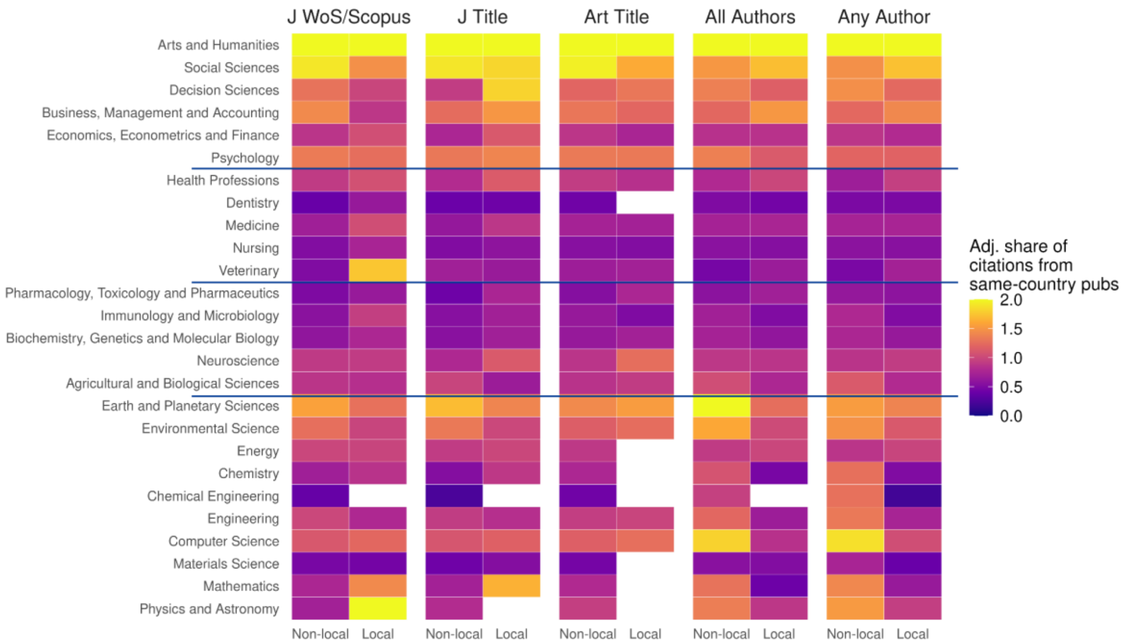


Figure 9. Adjusted share of citations from publications from the same country—reported for five locality criteria (each with two subcategories, local and non-local), broken down by research area

The results above also invite reflection on other alternative definitions of local research. Moed et al. (2021), for instance, proposed a complementary perspective on locality based on the geographical location of the users of scientific publications. In this view, journals can be considered national or international depending on the geographical origin of their citing authors. Although further analysis is needed to explore this new definition, the graphs above suggest that different patterns would likely emerge, offering an alternative perspective on what constitutes local research.

7.4.5 Citations to South African local publications

This section presents a case study focusing on the audience of research from a specific country, aiming to examine differences in how certain countries or regions cite local science. Figure 10 displays the percentage of cited and citing publications classified as local according to various locality criteria. It is important to note that the dataset includes only publications that have been cited—rather than the entire corpus of South African publications—as the analysis centers on the geographical citation patterns to South African research. Figure 10 reveals that the majority of South African cited publications, as well as the majority of citing publications, are not considered local according to the Journal in WoS/Scopus criterion. This result is somewhat expected, given that OpenAlex offers more comprehensive coverage of publications included in mainstream databases (Alonso-Álvarez & van Eck, 2024). Under the other locality criteria, the distribution is more balanced, with the proportion of local publications ranging between 25% and 75%. The citing publications exhibit similar proportions of local share across the different criteria.

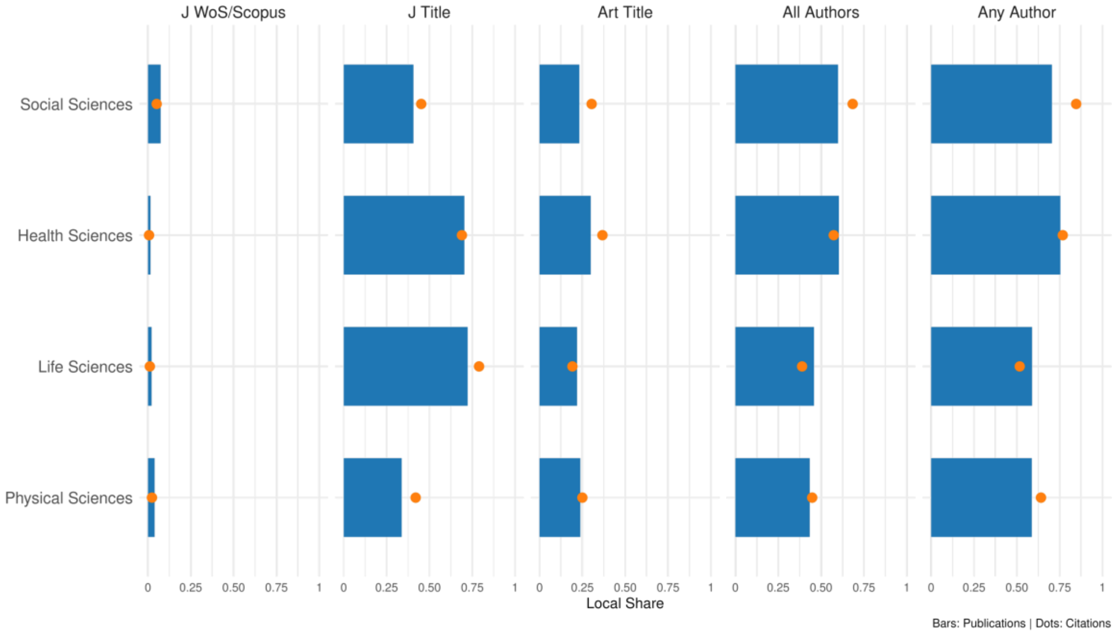


Figure 10. Share of South African local publications (bars) and local citations (dots) by locality criterion and broad research area

Figure 11 presents the adjusted share of citations to local South African publications by broad research area and citing country (the exact scores of the adjusted shares of citations to local publications by country, research area, and locality type are provided in Table S1 in the supplementary materials[15]). The results indicate that, under the Journal in WoS/Scopus criterion, citations to local articles are predominantly found in the social sciences. However, this pattern appears to be largely driven by a data artifact resulting from the low share of local literature in other research areas.

The findings underscore that the visibility of local literature is highly sensitive to how locality is defined. For example, for South Africa, publications defined as local receive more citations under the Journal title criterion than under the All authors criterion. Research area also plays a significant role. In the case of Journal title, life sciences is the area where local literature appears most relevant. This trend does not hold under the All authors or Any author criteria, where local publications in life sciences are cited less frequently than those in the social sciences.

Moreover, the choice of locality criterion strongly shapes the geographical origin of citations. The All authors and Any author criteria tend to attract more citations from within South Africa and other African countries, particularly in the social sciences and health sciences. Under the Journal title criterion, the citing countries vary more by research area: for life sciences, citations predominantly come from the Middle East, South

[15] Available at: https://doi.org/10.5281/zenodo.17865911

Asia, and Eastern Europe, while for health sciences and social sciences, higher citation levels are primarily associated with European countries. In the case of the Article title criterion, local publications are heavily cited by both African and Western countries. Notably, in the social sciences, citations are more geographically diverse, including contributions from the Middle East and various Asian countries.

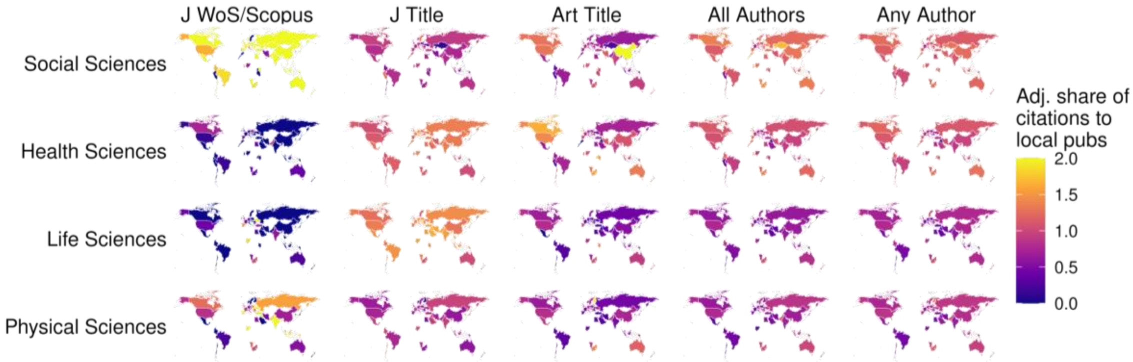


Figure 11. Adjusted share of citations to local South African publications by locality criterion, broad research area and country

The findings shown in Figure 8 indicate that although local literature is generally associated with the social sciences and humanities, certain locality criteria reveal that the life and health sciences also attracted substantial citations. This is particularly evident under the Journal title criterion, suggesting that geo-localized journals—based on the assumption that more citations are indicative of better quality or higher relevance—are not necessarily perceived as lower in quality or lacking international relevance, as some previous studies have implied (Jamali, 2024; Khelfaoui & Gingras, 2025). In the case of South Africa, geo-localized journals in life and health sciences receive considerable attention from the international scholarly community. In contrast, under the Article title criterion, the relevance of local literature appears to depend strongly on the research area. In disciplines with a more universal scope—such as the physical sciences—geo-localized articles may experience a citation disadvantage. However, in areas where geographical contexts are particularly relevant, such as health sciences—for instance, in the case of medical experimental research targeting the characteristics and localization of study populations—the geographical information does not imply any citation disadvantage.

This case study also provides exploratory insights into the specific citation patterns of South African local publications and facilitates a more nuanced analysis of the geographical origin of citations beyond the same-country vs. different-country dichotomy presented above. The maps show that, although there are only few African countries represented in the data, these countries (in particular, South Africa, Nigeria, Ghana, Namibia, Uganda, Kenya, Morocco, depending on the research area) tend to cite South African local research more frequently than other global regions—alongside Western countries, although this may partly reflect the coverage bias of the data source. These patterns underscore the relevance of local research within both national and regional contexts. In the case of South Africa, a same-country citation effect is evident under the author and Article title criteria, pointing to the domestic significance of localized research and the influence of author networks (Pasterkamp et al., 2007; Wang et al., 2024). However, this trend is not observed under the Journal title criterion, suggesting that the thematic or disciplinary scope of a journal is not necessarily constrained by the presence of a country name in its title.

7.5 Conclusion

The analysis first shows that local and non-local citation distributions are highly dependent on the definition of local research employed. For instance, the citation differences between local and non-local articles are more pronounced when using the database indexing criterion, but less so with the other four definitions. It is therefore important to make informed decisions about what is considered local, as well as to reflect on the meaning and implications of each definition.

In terms of citation performance, the results indicate that local publications—often excluded or overlooked in scientometric analyses—are cited at levels comparable to non-local publications across most definitions of locality. The notable exception is the WoS/Scopus indexing criterion, under which publications deemed 'local' show have lower citation rates. These findings partially align with previous research, yet some observed patterns call for deeper investigation in future stages of analysis. Importantly, this study aimed to present a novel approach by combining multiple definitions of local research with data sources that extend beyond mainstream databases. Incorporating publications not indexed in WoS or Scopus is particularly relevant for underrepresented regions such as Africa. However, expanding the dataset may also lead to new findings that diverge from previous academic literature, highlighting the need to revisit and refine existing assumptions about the visibility and impact of local research.

Regarding dissemination scope, the findings suggest that local research holds relevance not only for domestic audiences but also for international scholarly communities. Local publications receive citations from both within and beyond the publishing country, challenging assumptions of their limited reach. The use of different locality definitions—based on author affiliations, journal indexing, or journal and article content—reveals distinct patterns of scholarly communication shaped by disciplinary contexts. These results emphasize the need for nuanced, context-aware approaches in the assessment of local research, especially when designing policies or evaluation frameworks aimed at recognizing the diverse contributions of scholarly work rooted in specific geographical or social settings.

This analysis has several limitations. First, the matching between databases was performed at the journal level, meaning that if a journal was indexed in a given database, all articles published in that journal were considered included. While this approach helps avoid matching errors due to incomplete or incorrect metadata, it may result in the inclusion of articles that are not actually indexed—for example, in the case of WoS or Scopus, although a journal is indexed in the database, it may not cover issues prior to inclusion.

Another limitation concerns the availability of metadata in OpenAlex, particularly reference lists. As the results show (see Table 5), 84% of citing articles are indexed in either WoS or Scopus. This high coverage by mainstream databases is surprising, as OpenAlex is a more comprehensive source (Culbert et al., 2024). This number, along with findings from previous research (Alonso-Álvarez & van Eck, 2024), suggests that the references of non-WoS/Scopus-indexed articles are more likely to be missing and therefore cannot be identified using OpenAlex reference lists. Further research might explore the use of additional data sources, such as the full text of the articles, to address this limitation.

Overall, the study reinforces the idea that local research plays a vital role in addressing region-specific challenges and in contributing to the diversity of global scientific knowledge. However, its dissemination and perceived relevance are often constrained by structural biases in research evaluation systems and database coverage. Recognizing and supporting local research requires both conceptual clarity and methodological sensitivity. In this sense, moving toward more inclusive evaluation frameworks—capable of capturing the value of locally grounded research and its varied audiences—is essential for fostering a more equitable and representative global research ecosystem.

CHAPTER EIGTH

COVERAGE AND METADATA COMPLETENESS AND ACCURACY OF AFRICAN RESEARCH PUBLICATIONS IN OPENALEX: A COMPARATIVE ANALYSIS[16]

8.1 Introduction

Bibliographic data sources are essential for bibliometric research, serving as foundational tools for tracking, analyzing, and evaluating scholarly output. For decades, Scopus and WoS have been the dominant sources of bibliographic data. However, researchers are increasingly exploring new and alternative data sources such as Dimensions, Lens, OpenAIRE, OpenAlex, and Semantic Scholar. These new data sources extend the coverage of traditional data sources by including often overlooked research from diverse regions and languages, thereby enhancing the visibility and use of scientific literature beyond mainstream academic circuits. Moreover, some of these data sources also provide free access and do not impose strict restrictions on the reuse of their bibliographic data. This contributes to increased transparency and reproducibility of bibliometric analyses and is particularly beneficial for researchers in resource-limited settings who may not have access to expensive, proprietary data sources.

Among these new data sources, OpenAlex is regarded by many as particularly promising, due to its extensive coverage and the openness of its data. Launched in January 2022, OpenAlex serves as a free and fully open source of scholarly metadata aimed at enhancing transparency, evaluation, representation, and discovery of research (Priem et al., 2022). OpenAlex data is freely available and can be used and distributed without restrictions. While still in the early stages of its development, OpenAlex has already gained traction

[16] This chapter corresponds to the published article: Alonso-Álvarez, P., & van Eck, N. J. (2025). Coverage and metadata completeness and accuracy of African research publications in OpenAlex: A comparative analysis. *Quantitative Science Studies*, 1-43. https://doi.org/10.1162/QSS.a.396

in the academic community and has proven to be a promising source for open and reproducible bibliometric analyses. For example, in December 2023, Sorbonne University transitioned from WoS to OpenAlex (Sorbonne University, 2023). In January 2024, the Centre for Science and Technology Studies (CWTS) at Leiden University released the new Leiden Ranking Open Edition based on OpenAlex data (Van Eck, et al., 2024; Waltman, et al., 2024).

Given its growing adoption, a critical evaluation of OpenAlex's strengths and limitations is essential. This study contributes to ongoing research assessing OpenAlex’s utility for bibliometric analysis, with a specific focus on its coverage, metadata availability and completeness, and metadata accuracy of scholarly publications. Given that one of OpenAlex's goals is to enhance inclusivity in scholarly indexing by covering works often excluded from mainstream sources, this paper examines its suitability for studies on traditionally underrepresented regions, with Africa as the case study.

For this analysis, OpenAlex is compared with two major proprietary bibliographic data sources, Scopus and WoS, as well as with African Journals Online, a specialized platform that indexes African-based journals to enhance their visibility and impact. While it is worth noting that Scopus and WoS, unlike OpenAlex, aim to be selective rather than comprehensive, comparing OpenAlex against these sources is essential for understanding the opportunities and challenges of using it for bibliometric purposes. Similarly, although AJOL is not a full-fledged bibliographic database like Scopus or WoS, its specific focus on African research makes it a valuable benchmark for assessing OpenAlex’s inclusivity and regional representativeness.

This paper has the following three core objectives:

1. To assess the coverage of African research publications in OpenAlex compared to Scopus, WoS, and AJOL.
2. To assess the availability and completeness of metadata in OpenAlex compared to Scopus and WoS.
3. To evaluate the accuracy of OpenAlex metadata compared to Scopus and WoS.

The remainder of this paper is structured as follows. Section 8.2 presents related work. Section 8.3 describes the data and methods used to assess the coverage and metadata completeness and accuracy of African research publications in OpenAlex, Scopus, WoS, and AJOL. Section 8.4 presents the results of the comparative analysis, highlighting key patterns and differences across data sources. Finally, Section 8.5 concludes the study by summarizing the main findings and discussing their implications, including the relevance for bibliometric research and the further development data sources.

8.2. Related work

8.2.1 Traditional bibliographic data sources: limitations and alternatives

Traditional bibliographic data sources such as Scopus and WoS have long been regarded as the authoritative sources for identifying relevant publications and journals. They also serve as the primary sources for obtaining data for bibliometric studies and the calculation of bibliometric indicators. However, a growing number of studies have pointed out the biases in these traditional data sources related to the coverage of research fields (Archambault et al., 2006; Larivière & Macaluso, 2011; Lariviérere, et al., 2015), regions or countries (Chavarro, 2018; Asubiaro, et al., 2024), and languages (van Leeuwen et al., 2001; Lillis & Curry, 2010; Mongeon & Paul-Hus, 2016; Vera-Baceta, et al., 2019). Focusing specifically on Africa, Asubiaro et al. (2024) found that journals published in sub-Saharan Africa were the most underrepresented in Scopus and WoS compared to other regions. In a prior study, Asubiaro and Onaolapo (2023) confirmed the limited coverage of traditional bibliographic data sources and highlighted the potential of alternative sources such as Crossref for increased representation.

The impact of these biases ranges from challenges faced by individual authors, such as linguistic exclusion, to broader systemic effects, wherein research from entire regions is marginalized. The exclusion from bibliographic data sources hinders access to relevant local knowledge and affects those who could benefit from it. For example, Moscona and Sastry (2021), in a study on agricultural research, found that Asia and Africa experience a greater productivity loss than other regions due to the adoption of inappropriate technologies. They argue that much of the research in agriculture is tailored to the priorities of high-income countries and is therefore poorly suited to the conditions of other regions. Similar disparities have been observed in other fields, including medicine (Ciarli & Ràfols, 2019; Kumar et al., 2023). Addressing these biases requires not only the production of research that reflects local contexts but also its inclusion and visibility within bibliographic data sources.

The academic community has also highlighted the importance of equitable access to research information. In this regard, the Barcelona Declaration on Open Research Information (2024) recently emphasized the importance of openness of research information (e.g., the metadata of research articles) and the critical role of open scholarly infrastructures. However, scholars advocating for a more diverse scientific system emphasize that openness alone is insufficient and must be combined with a decentralized approach that ensures the richness and diversity of bibliometric data sources (Bambini et al., 2024). This decentralized approach relies on interconnecting global and regional open data sources to promote a federated perspective on research information. An example of the implementation of this approach has successfully connected multiple data sources, such as OpenAlex, SciELO, and PATSTAT, providing public access to the resulting sources, which can then be linked to other open datasets, offering a unique opportunity to access and analyze research information from multiple perspectives (Mazzoni & Costas, 2024).

8.2.2 OpenAlex as an alternative bibliographic data source

Unlike traditional proprietary bibliographic data sources like Scopus and WoS, OpenAlex emphasizes comprehensiveness over selectivity of its content, claiming to offer enhanced coverage of humanities, non-English languages, and the Global South . Moreover, its non-profit nature and the openness of its data provide an opportunity to conduct bibliometric analysis without the restrictions imposed by proprietary data sources. The unrestricted accessibility is particularly significant for researchers in lower-income countries, where accessing proprietary data sources may entail a higher economic burden. Furthermore, OpenAlex's unrestricted data reuse enhances the transparency and replicability of bibliometric analyses.

As a result of its growing popularity, academic research using or examining OpenAlex has increased in recent years. Scholars have used it for a range of studies, including bibliometric analyses (Perianes-Rodríguez, et al., 2024), altmetric research (Mongeon, et al., 2023; Arroyo-Machado & Costas, 2023), and collaboration analyses (Bratt, et al., 2023; Okamura, 2024). It has also been used to study open access publishing models, particularly diamond access (Simard et al., 2024), and, due to its extensive regional coverage, North-South inequalities in science production and publishing (Klebel & Ross-Hellauer, 2023; Castro-Torres, 2024).

Another line of research examines the suitability of OpenAlex as a data source for scientometric analysis. Studies focusing on OpenAlex metadata reveal both strengths and limitations. For example, Velez-Estevez et al. (2023) found that the metadata fields included in OpenAlex are generally the same as those in Scopus and WoS. They also highlight the presence of publication and organization identifiers that are absent in Scopus and WoS, such as PMCID, GRID, and ROR ID, which support greater interoperability with other data sources.

However, studies analyzing the completeness and accuracy of OpenAlex's data have identified several limitations. Culbert et al. (2025) found that OpenAlex's reference coverage is comparable to that of Scopus and WoS for the 2015-2022 period, although they raised concerns about the reference computation process. They also found that OpenAlex has better coverage for certain metadata fields, such as ORCIDs, but has lower coverage for others, such as abstracts. Alperin et al. (2024) pointed to limitations in specific fields like language, document type, and citations. In examining the institution field, Zhang et al. (2024) found that missing institutions occur in over 60% of OpenAlex's records, which is particularly problematic in the social sciences and humanities. In a smaller-scale analysis, Delgado-Quirós and Ortega (2024) showed that, although OpenAlex has robust coverage in some fields, primarily those retrieved from Crossref, it inherited some limitations from Microsoft Academic Graph (MAG), resulting in a significant proportion of missing values for certain fields like volume, issue, and pages. Other studies have documented additional errors, inaccuracies, or missing data for specific fields, including document type (Haupka et al., 2024), language (Céspedes et al., 2025), open access (OA) status (Jahn, et al., 2023), funding acknowledgments (Schares, 2024), and OpenAlex's concepts (Haunschild & Bornmann, 2024).

Given that one of OpenAlex's main strengths is its comprehensiveness, researcher have also investigated its journal and publication coverage in comparison to other bibliographic data sources. An early study revealed that OpenAlex indexes 63.8% of the journals using Open Journal Systems (OJS), compared to only 7.2% in Scopus and only 1.2% in WoS (Khanna et al., 2022). Scholars have also observed that OpenAlex offers better coverage of specific publishing communities, such as gold and diamond OA journals, compared to proprietary data sources, thereby providing valuable insights into its distinctive characteristics (Simard et al., 2024). Research examining OpenAlex's coverage at the publication level further highlights its comprehensiveness. For example, Culbert et al. (2025) confirmed that OpenAlex provides the most extensive coverage of journal articles compared to Scopus and WoS.

8.2.3. Opportunities of inclusive sources: the case of African research

The development and use of comprehensive bibliographic data sources are particularly relevant for regions that have historically been underrepresented in traditional data sources. Previous research has demonstrated that traditional data sources such as Scopus and WoS do not accurately reflect the global scholarly publication landscape (Khanna et al., 2022). This lack of representativeness disproportionally affects certain regions, most notably the Global South. African research, in particular, remains significantly underrepresented in these traditional data sources. Utilizing publication data from WoS, Tijssen (2007) discovered that African-authored articles accounted for less than 1.5% of all indexed publications between 1980 and 2004 (Tijssen, 2007). More recently, Asubiaro and colleagues (2024) reported that sub-Saharan Africa continues to be the most underrepresented region in both Scopus and WoS.

Although the 1960s marked a period of academic and publishing growth in parts of Africa (Mills et al., 2023), subsequent institutional shifts, particularly the prioritization of publication in so-called 'international' journals, gradually undermined the status of long-established national journals. Commercial publishers, primarily based in the Global North, began to promote global journal indexes and bibliographic databases as markers of quality and legitimacy (Hountondji, 1990). This reinforced a knowledge production model in which inclusion in these sources became synonymous with scholarly value, systematically marginalizing journals from Africa and other regions in the Global South.

In response to the limitations of mainstream bibliographic databases, alternative sources such as African Journals Online (AJOL) have become valuable tools for studying scholarly production in Africa. Established in 1998, AJOL now hosts over 700 journals from 39 African countries, providing a unique view into regional research output. Despite its potential, AJOL remains underutilized due to limited search functionality and a lack of structured metadata. Nonetheless, recent studies have drawn on AJOL to examine the visibility of African journals (Amboka et al., 2024), their representation in global indexes (Alonso-Álvarez, 2024), and patterns of scientific production across countries and disciplines (Boshoff et al., 2024; Asubiaro & Onaolapo, 2023; Ogunfolaji et al., 2022). Still, AJOL and similar sources face their own limitations, including uneven country coverage and the underrepresentation of journals in local languages (Alonso-Álvarez, 2024).

Although recent studies suggest that OpenAlex's journal coverage across countries is relatively balanced, journals located in African countries remain underrepresented compared to their counterparts in the Global North (Chavarro & Alperin, 2024). This underrepresentation may be partly due to factors such as OpenAlex's reliance on Crossref indexing and prioritization of research outputs with a DOI (Chavarro & Alperin, 2024).

To date, most studies examining OpenAlex have focused on its overall coverage and metadata quality, or on specific subsets of publications, without applying a regional lens (Alperin et al., 2024; Culbert et al., 2025; Delgado-Quirós & Ortega, 2024). However, in addition to differences in publication coverage, metadata availability and accuracy may also vary by region, likely following similar patterns of imbalance. Therefore, this paper aims to evaluate both the representation of African research in OpenAlex and the suitability of its metadata for bibliometric analyses, understanding African research as the output of journals located in African countries.

8.3 Data and methods

8.3.1 Data sources

Our analysis focuses on all publications in African-based academic journals from 1996 to 2022 that are available in OpenAlex, Scopus, WoS, and AJOL. We use only publications in scholarly journals and limit the period to ensure a fair comparison while avoiding biases in the coverage analysis resulting from the specific selection criteria of each data source. For instance, AJOL exclusively indexes journal publications, and Scopus only includes publications from 1996 onward. The versions of the data sources used in the analysis are as follows:

- OpenAlex: We used the OpenAlex snapshot released in November 2023.
- WoS: We used the CWTS in-house version of WoS, updated until September 2023. Our analysis considers the Science Citation Index Expanded (SCIE), the Social

Sciences Citation Index (SSCI), the Arts & Humanities Citation Index (AHCI), and the Emerging Sources Citation Index (ESCI).

- Scopus: We used the CWTS in-house version of Scopus, updated in April 2023.
- AJOL: We used data retrieved from the AJOL website in February 2024 using the R libraries ojsr (Becerra, 2022) and rvest (Wickham, 2022).

To identify African-based journals, we selected from each of the above-mentioned data sources all journals associated with an African country and retrieved the ISSNs of those journals. In OpenAlex, we used the country code field available for each source. For Scopus and Web of Science, we relied on the country field of the publisher, as this is the basis on which these databases classify journals geographically. We then constructed a merged journal master list by combining all the retrieved ISSNs to prevent inconsistencies between the geographical classification criteria used by the different data sources. Next, we collected all the publications belonging to the journals in the master list from all four data sources. Table 11 shows the original set of journals retrieved from each data source, along with the number of journals identified when the master list was applied. The substantial increase in journal counts for OpenAlex, Scopus, and WoS when applying the master list confirms that these data sources differ in how they define and classify the geographic origin of journals.

Table 11. African-based journals as reported by each data source and the final set of journals after using a merged master list

	OpenAlex	Scopus	WoS	AJOL
# African-based journals	3,115	391	276	739
# journals from master list	3,511	589	434	739

Table 12 presents the number of publications retrieved from each data source after limiting the publication venue to journals and the publication year to the period from 1996 to 2022. Compared to Table 1, the final number of publications in both Scopus and WoS is higher than in AJOL, despite the smaller number of journals. This suggests that journals indexed in Scopus and WoS tend to have higher publication volumes than those indexed in AJOL.

Table 12. Number of African publications included in each data source

	OpenAlex	Scopus	WoS	AJOL
# publications	1,055,096	392,625	357,879	205,029

8.3.2 Analysis

The analysis was divided into three steps, examining OpenAlex's coverage of African publications as well as the completeness and accuracy of its metadata:

- Publication coverage analysis: To assess OpenAlex's coverage of African publications, we performed an exact match on DOI across the data sources. OpenAlex was compared with AJOL, Scopus, and WoS to determine its coverage of both indexed and non-indexed African publications.
- Metadata completeness analysis: To assess OpenAlex's metadata completeness, we compared the population of the metadata fields across the three bibliographic data sources: OpenAlex, Scopus, and WoS. AJOL was excluded from this part of the analysis because it is not a bibliographic data source in the sense that it provides access to the metadata of the indexed publications. While some metadata for AJOL publications can be obtained by scraping the website of AJOL, the platform lacks export features comparable to those available in OpenAlex, Scopus, or WoS.
- In the second part of the metadata completeness analysis, we compared the availability of metadata for two subsets of OpenAlex publications: those available in both OpenAlex and either Scopus or WoS (Subset 1), and those exclusively available in OpenAlex (Subset 2). This comparison aimed to assess whether metadata completeness differs between OpenAlex-exclusive publications and those also found in proprietary data sources.
- Metadata accuracy analysis: To evaluate OpenAlex's metadata accuracy, we conducted a manual validation of 60 randomly selected publications. The sample included 30 publications from Subset 1 and 30 publications from Subset 2. This sample size was chosen to allow for meaningful insights while keeping the analysis feasible. For each publication, we compared the metadata in OpenAlex against the information found in the online or PDF version of the publication.

8.4 Results

8.4.1 Publication coverage

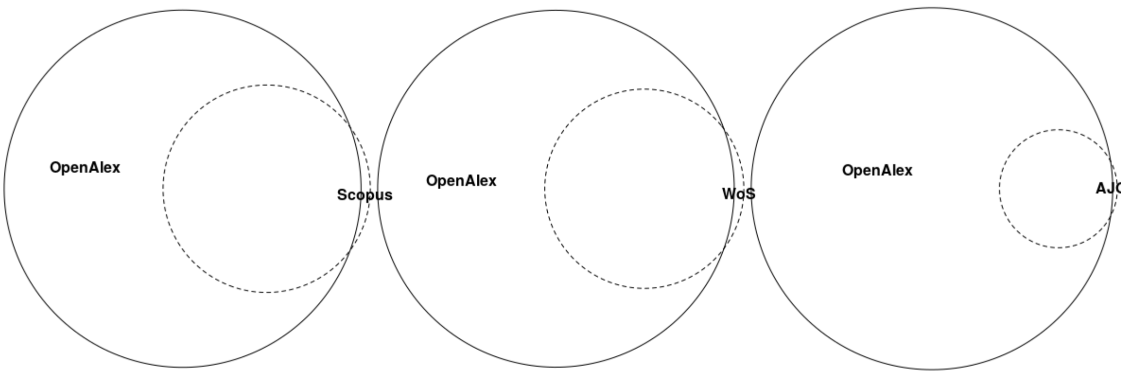
The analysis of OpenAlex's coverage of African publications was carried out using an exact match on DOI. We compared OpenAlex with Scopus, WoS, and AJOL to evaluate its coverage of both indexed and non-indexed African publications. To ensure the reliability of the comparison, we performed DOI deduplication, as some publications in each data source were linked to the same DOI. We excluded these publications from the analysis because it was impossible to determine the correct publication record for each DOI. Table 13 reports the number of African publications without a DOI, with a non-unique DOI, and with a unique DOI for each data source.

Table 13. Number and percentage of African publications without a DOI, with a non-unique DOI, and with a unique DOI

	OpenAlex	**Scopus**	**WoS**	**AJOL**

	#	%	#	%	#	%	#	%
Publications without a DOI	163,903	16	91,181	23	79,973	22	109,781	54
Publications with a non-unique DOI	212	0	952	0	270	0	540	0
Publications with a unique DOI	890,981	84	300,492	77	277,636	78	94,708	46

Figure 12 illustrates the differences in the coverage of African publications between OpenAlex, on the one hand, and Scopus, WoS, and AJOL, on the other hand. As noted, this comparison is limited to publications with a unique DOI in each data source. With 890,981 publications, OpenAlex is unsurprisingly the most extensive data source, followed by Scopus with 300,492 publications, and WoS with 277,636 articles. AJOL has a smaller coverage due to its high percentage of publications without DOIs (Table 3). Overall, Figure 1 indicates that OpenAlex captures 97% of the publications indexed by Scopus and WoS and nearly all of those by the regional data source AJOL (98%), while also including a significant number of additional publications not covered by the other three sources. These findings suggest that OpenAlex serves as a comprehensive resource for African scholarly publications, particularly those not indexed by traditional proprietary databases. Since all data sources contain publications without DOIs, the accuracy of the comparison could be enhanced by including publications without DOIs, particularly in the case of AJOL.



OpenAlex: 890,981	OpenAlex: 890,981	OpenAlex: 890,981
Overlap: 293,436	Overlap: 270,570	Overlap: 93,225
Scopus: 300,492	WoS: 277,636	AJOL: 94,708

Figure 12. Overlap of African publications with a DOI between OpenAlex and Scopus, WoS, and AJOL

8.4.2 Metadata completeness: OpenAlex, Scopus and WoS

To assess metadata completeness of African publications, we examined all publications as reported in Table 12, regardless of whether they had a DOI.

Table 14 presents the percentage of publications for which each metadata field is populated in OpenAlex, Scopus, and WoS. To facilitate readability, the following color-coding scheme is applied: green indicates coverage above 75%, yellow indicates coverage between 50% and 75%, orange indicates coverage between 25% and 50%, and red indicates coverage below 25%. In line with prior research on this topic (Velez-Estevez et al., 2023; Singh & Singh, 2023), metadata fields are grouped into several dimensions (i.e., publication information, author information, affiliation and institution information, funding information, reference information) to enable a structured comparison across data sources.

Table 14. Metadata completeness of African research publications in OpenAlex, Scopus, and WoS

Metadata field	**OpenAlex**		**Scopus**		**WoS**	
	#	%	#	%	#	%
Publications	1,055,096	-	392,625	-	357,879	-
Publication information						
Identifiers						
DOI	891,193	85	301,444	77	277,906	78
Bibliographic data						
Date	1,055,096	100	157,851	40	240,530	67
Year	1,055,096	100	392,625	100	357,879	100
Volume	923,477	88	387,230	99	323,301	90
Issue	776,954	74	257,196	66	214,443	60
Article number	-	-	143,664	37	142,216	40
First page	786,080	75	247,126	63	211,341	59
Last page	776,995	74	234,064	60	211,341	59
OA status						
OA status	1,055,096	100	292,673	75	357,879	100
Content						
Title	1,047,394	99	392,623	100	357,879	100
Abstract	763,341	72	353,930	90	311,889	87

Author keywords	-	-	193,651	49	176,619	49
Generated keywords	876,803	83	-	-	233,819	65
Other						
Type	1,055,096	100	392,625	100	357,879	100
Language	1,032,565	98	392,621	100	357,879	100
Author information						
Author names	1,009,860	96	388,584	99	354,973	99
ORCIDs	463,846	44	85,168	22	35,765	10
Affiliation and institution information						
Affiliations	639,027	61	374,451	95	339,386	95
Unified institutions	509,518	49	371,892	95	309,265	86
ROR IDs	509,518	49	-	-	-	-
Reference information						
References	474,385	45	348,936	89	338,662	95
Funding information						
Funding text	-	-	65,207	17	117,218	33
Funders	65,795	6	63,079	16	118,224	33
ROR IDs	58,264	6	-	-	-	-

Publication information

All three data sources demonstrate good DOI coverage, with OpenAlex displaying a slightly higher percentage of publications with DOIs. Other identifiers were not included in the comparison due to their limited use across disciplines (e.g., PMID, PMCID, arXiv ID) or because they are specific to certain data sources (e.g., MAG ID, which appears only in OpenAlex as a result of its use of MAG data). OpenAlex demonstrates the highest overall coverage of bibliographic data. WoS has the lowest coverage for the issue field, while Scopus shows notably low coverage for the date field. For the page and article number fields, it is important to note that they are complementary. This is because Scopus and WoS provide either page numbers or article numbers, depending on the publication format. When both fields are considered together, coverage increases to nearly 100% for Scopus and 99% for WoS. In contrast, OpenAlex typically reports article numbers in the page fields.

Regarding OA information, OpenAlex and WoS include the OA status for all their publications. Scopus, however, provides this information for slightly less than 75% of its publications.

In terms of content-related information, a title is available for nearly all publications across the data sources, with OpenAlex missing a title for 1% of its publications. Scopus and WoS also have substantial coverage of abstracts, while OpenAlex has a lower coverage of 72%. Unlike Scopus and WoS, OpenAlex does not include author keywords. However, OpenAlex generates keywords for over 80% of its publications. In contrast, WoS provides database generated keywords for only 65% of its publications, and Scopus does not include such keywords at all.

Nearly all publications in the three data sources include information about their type and language. By ‘type’ we mean the category or classification of the publication—such as article, review, editorial, or conference paper—that describes the nature of the publication. It is important to note that the publication type information in Scopus and WoS is more detailed than in OpenAlex.

Author information

Most publications in all three data sources include author names, with coverage consistently above 95%. OpenAlex shows a slightly lower coverage (96%) compared to Scopus and WoS (both 99%). In terms of author identifiers (ORCID), coverage remains below 50% across all data sources. Interestingly, the availability of ORCIDs is significantly higher in OpenAlex (44%) than in Scopus (22%) and WoS (10%).

Affiliation and institution information

All three data sources aim to make the (raw) affiliation strings provided in publications available and link them to standardized, unified institutions using their own internal registry. Scopus uses Affiliation IDs, WoS employs Organization-Enhanced, and OpenAlex relies on a list of institutions that is largely based on the Research Organization Registry (ROR).

Most publications in Scopus and WoS include affiliation and institution data. OpenAlex includes affiliation data for 61% of its publications and institution data for 49%. Importantly, OpenAlex is the only source that provides standardized institution identifiers (ROR IDs) for publications with affiliations, something Scopus and WoS currently lack.

Reference information

The coverage of references is highest in Scopus and WoS, with 89% and 95% of publications including references, respectively. OpenAlex lags significantly behind with only 45% of its publications containing reference data. This lower coverage is partly due to OpenAlex including only linked references (i.e., those that point to publications also included in OpenAlex). Furthermore, many publications in OpenAlex are missing complete reference lists, which further contributes to the lower coverage. It is also important to note that while Scopus and WoS provide detailed reference information, OpenAlex does not. Instead, OpenAlex only indicates the existence of references to other indexed publications, without including any additional reference details.

Funding information

Funding information is limited in all three data sources. WoS offers the highest number of publications with funding organizations and, like Scopus, provides the full text of acknowledgements. OpenAlex, however, does not contain acknowledgement texts. While

OpenAlex does offer ROR IDs for funding organizations, its coverage remains low at just 6% of its publications.

8.4.3 Metadata completeness: OpenAlex subsets

To further assess the availability and completeness of OpenAlex metadata, we compared two subsets of publications: those indexed in both OpenAlex and either Scopus or WoS (Subset 1), and those found exclusively in OpenAlex (Subset 2). As shown in Table 15, Subset 1 consistently exhibits higher metadata availability across all fields compared to Subset 2. This suggests that publications also included in proprietary databases tend to have more complete metadata in OpenAlex. When comparing the results of Subset 1 in Table 15 to those in Table 4, we observe that OpenAlex's metadata availability is comparable to that of Scopus and WoS. It is important to note, however, that Table 14 includes all publications regardless of DOI presence, while Table 5 only includes publications with DOIs.

Table 15. Metadata completeness of African research publications in OpenAlex subsets

Metadata field	***Subset 1:*** **Publications in OpenAlex and Scopus or WoS**		***Subset 2:*** **Publications only in OpenAlex**	
	#	%	#	%
Publications	306,216	-	584,977	-
Publication information				
Identifiers				
DOI	306,216	-	584,977	-
Bibliographic data				
Date	306,216	100	584,977	100
Year	306,216	100	584,977	100
Volume	286,055	93	490,645	84
Issue	166,085	54	475,787	81
Article number	-	-	-	-
First page	233,743	76	417,335	71
Last page	233,685	76	415,161	71
OA status				
OA status	306,216	100	584,977	100
Content				
Title	306,210	100	577,283	99
Abstract	285,668	93	360,395	62
Author keywords	-	-	-	-

Generated key-words	302,027	99	425,415	73
Other				
Type	306,216	100	584,977	100
Language	304,610	100	565,343	97
Author information				
Author names	303,891	99	542,083	93
ORCIDs	237,952	78	171,407	30
Affiliation and institution information				
Affiliations	258,323	84	320,852	55
Unified institutions	250,981	82	214,332	37
ROR IDs	250,981	82	214,332	37
Reference information				
References	259,487	85	178,987	31
Funding information				
Funding text	-	-	-	-
Funders	60,443	20	5,933	1
ROR IDs	53,125	17	5,686	1

Publication information

The date and year fields show complete coverage across both subsets of OpenAlex publications. The volume field is more complete in Subset 1 (93%) than in Subset 2 (84%). Interestingly, the issue field shows notably higher coverage in Subset 2 (81%) compared to Subset 1 (54%). The first page and last page fields show comparable levels of completeness across both subsets, at 76% and 71%, respectively. The OA status has full coverage at 100% in both subsets.

Regarding content information, title coverage is high in both subsets (99-100%). However, abstract availability is notably higher in Subset 1 (93%) than in Subset 2 (62%). Similarly, database generated keywords are available for 99% of publications in Subset 1, compared to 73% in subset 2.

Author information

Author name information is nearly complete in Subset 1 (99%) but less so in Subset 2 (93%). This discrepancy is particularly concerning, as author names are a core component of bibliographic metadata. There are also significant differences in ORCID coverage, with 78% coverage in Subset 1 compared to just 30% in Subset 2.

Affiliation and institution information

The availability of affiliations is significantly higher in Subset 1 (84%) compared to Subset 2 (55%). Unified institutions and ROR IDs follow a similar pattern, with 82% coverage in Subset 1 and only 37% in Subset 2.

Reference information

The reference field shows one of the most significant differences between the subsets, with 85% coverage in Subset 1 compared to just 31% in Subset 2.

Funding information

The availability of funding organizations is limited in both subsets. In Subset 1, funder coverage reaches 20%, while in Subset 2 it is especially low at only 1%.

8.4.4 Metadata accuracy: publications in OpenAlex, Scopus, and WoS

This section presents the results of a manual analysis of 30 randomly selected African publications indexed in OpenAlex, Scopus, and WoS (from Subset 1) to evaluate the accuracy of OpenAlex metadata and compare it with the other two data sources. Following the framework of Zhang et al. (2024), publications are classified into four categories based on the availability and accuracy of information in the metadata fields:

- Complete missing information (CMI): All the information in the field is missing. For example, none of the publication's references are provided.
- Partially missing information (PMI): Some, but not all, of the expected values in a multi-valued metadata field are missing. For example, a publication lists three institutions, but only two are reported.
- Non-matching information (NMI): Information in the field differs from what is available in the online or PDF version of the publication. For example, discrepancies in author names, non-matching page numbers, or fields with extra or incomplete information.
- Full information (FI): All information in the field is available and matches exactly with the information in the online or PDF version of the publication.

Table 16 presents the results of this accuracy analysis for OpenAlex (for clarity, the results for Scopus and WoS are not included in the table but are discussed in the text). In the table, the number of missing or non-matching elements is indicated in parentheses. For example, under NMI for authors, seven authors from five publications are misspelled.

Table 16. Accuracy of metadata of African publications indexed in OpenAlex, Scopus, and WoS based on a sample (n = 30) of publications

Metadata field	CMI		PMI		NMI		FI	
	#	%	#	%	#	%	#	%
Publication information								
DOI	0	0	-	-	0	0	30	100
Publication year	0	0	-	-	0	0	30	100
Volume	3	10	-	-	0	0	27	90
Issue	18	60	-	-	1	3	11	37
Article number	-	-	-	-	-	-	-	-
First page	1	3	-	-	15	50	14	46
Last page	1	3	-	-	15	50	14	46
OA status	0	0	-	-	2	6	28	92
Title	0	0	-	-	0	0	30	100
Abstract	1	3	-	-	1	3	28	94
Type	0	0	-	-	2	6	28	94
Language	0	0	-	-	0	0	30	100
Author information								
Author names	0	0	0	0	5 (7)	23	25	83
Author order	0	0	0	0	0	0	30	100
Corresponding author	0	0	0	0	6 (6)	20	24	83
Affiliation and institution information								
Raw affiliation strings	0	0	0	0	0	0	30	100
Institutions	0	0	6 (7)	20	0	0	24	80
Reference information								
References	1	3	25 (283)	83	0	0	4	13
Funding information								
Funders	4	13	2 (2)	6	0	0	24	80
Source information								
Journal title	-	-	-	-	0	0	30	100
e-ISSN	0	0	0	0	0	0	30	100
p-ISSN	0	0	0	0	0	0	30	100

Publication information

Most metadata fields related to publication information in OpenAlex are accurate and consistent with the online or PDF version of the publication. The DOI, publication year, and title fields are correct for all 30 publications. The volume, OA status, and abstract fields also show high accuracy rates (90%, 92%, and 94%, respectively), with only a few missing or non-matching values. However, the issue and page fields present some notable discrepancies.

In the case of the issue field, the high NMI percentage (60%) is entirely due to journals that publish only one issue per year. In such cases, OpenAlex often omits the issue number and leaves it blank, while journals typically label the single issue as 'Issue 1'.

Regarding the page fields, 50% of the publications present NMI. This is mainly due to OpenAlex assigning page numbers to articles in journals that use article numbers instead. Unlike other data sources such as WoS and Scopus, OpenAlex does not include an article number field. When journals use article numbers instead of page numbers, they may still paginate their articles internally from 1 to the total number of pages, pagination that is not related to the order within a journal issue. This kind of pagination is useful for locating information within the article itself but lacks bibliometric value. OpenAlex typically includes this internal pagination in the page fields. Consequently, although the page fields show high coverage, they provide different information than traditional page metadata or article numbers and cannot be used to adequately identify publications.

Scopus and WoS similarly tend to omit the issue number when journals have only one issue per year. The other fields are mostly accurate, with minor exceptions. For instance, in both data source three publications show NMI in the OA status field (two of them belonging to the green OA route), and one publication has NMI in the document type field.

Author information

OpenAlex shows a high degree of accuracy. It correctly lists all authors for the 30 publications in the sample. However, the names of seven authors, mostly Chinese, are misspelled.

ORCIDs are not included in Table 6 because OpenAlex does not retrieve them from the publication itself but from its internal author entities, which rely heavily on information from ORCID. As a result, the availability and content may differ from what is found in the online or PDF version of the publication. However, all ORCIDs recorded by OpenAlex have been compared with the information in the publications and verified using the ORCID website. OpenAlex includes ORCID data for 62% of the authors in the publication sample. In only four cases does OpenAlex omit an ORCID that is found in the online or PDF version of the publication. Over half of the ORCIDs reported by OpenAlex are not found in the publication itself. As noted, this discrepancy is due to OpenAlex's internal structure and retrieval process. All but one of the ORCIDs recorded in OpenAlex are accurate and correspond to the publication's author. Two ORCIDs relate to OpenAlex author profiles with the same name as the author but do not match the ORCID in the publication. Since those author profiles display no additional information beyond the name on the ORCID website, it remains unclear whether they represent duplicate profiles for the same person or entirely different individuals with the same name.

We also reviewed the order of authors and the corresponding author field. The order of authors is accurate in all cases. However, six publications lack corresponding author information.

In Scopus and WoS, names are mostly correct, with one exception in WoS where there is a mix-up between first and last names. ORCID coverage is more limited in these data sources. However, Scopus includes all ORCIDs listed in the online or PDF version of the publications, while WoS omits some. The ORCIDs that are present in both data sources are accurate and correspond to the correct persons. The order of the authors is also correct in all cases.

Affiliation and institution information

The results show differences between the raw affiliation and institution fields. All but one publication have correct and complete raw affiliation strings. However, six publications have at least one missing institution in the institution field. OpenAlex also disaggregates some institutions. For example, recording a hospital and its parent university separately.

As with ORCIDs, ROR IDs are not retrieved from the publication itself but, like authors, from OpenAlex's institution entities and then assigned to publications. All ROR IDs assigned by OpenAlex were verified using the ROR registry. They are correct and correspond to the institutions to which they are assigned.

In Scopus and WoS, the affiliation text (or 'address' in WoS) is complete and accurate in all cases. However, differences emerge in how each source processes and presents affiliation and institution information. OpenAlex and Scopus report affiliation strings exactly as they appear in publications, while WoS processes them to maintain a consistent structure. This structure starts with the main institution (e.g., university, hospital) and continues hierarchically with internal divisions of the institution (e.g., departments, centers). The names of institutions and divisions are also often abbreviated. The following example illustrates the differences between OpenAlex and Scopus on the one hand and WoS on the other hand:

> OpenAlex and Scopus: Department of Mathematics, Faculty of Science and Technology, Women University of Azad Jammu and Kashmir, Bagh Pakistan
>
> WoS: Women Univ Azad Jammu & Kashmir, Fac Sci & Technol, Dept Math, Bagh, Pakistan

In the institution field, unified institutions are also missing in WoS for nine institutions across six publications, similar to OpenAlex. In Scopus, all institutions are recorded, with only minimal errors (e.g., a city listed as part of the institution, or an institution split into two records). However, Scopus generally records more institutions per publication because it includes all hierarchical levels (department, faculty, university) as separate entries.

Reference information

As shown in Table 6, most publications (25 out of 30) in the sample are missing some references. One publication lacks a reference list entirely, while the others have incomplete ones. This is expected, as OpenAlex includes only linked references (i.e., those that refer to works also indexed in OpenAlex), rather than full bibliographies. Of the four publications without missing references, one is an editorial with no references. The remaining three have complete reference lists in OpenAlex.

On average, publications miss 30% of their references, considering those to both indexed and non-indexed works in OpenAlex. Most missing references are references to journal articles (45%), followed by references to books (20%), book chapters (9%), proceedings papers (7%), and reports (5.5%). Others include references to blogs, news articles, theses, datasets, and software. Following OpenAlex's approach to references, the works absent from reference lists should not be indexed in OpenAlex. However, manual checks indicate that 44% of the missing references are actually indexed in OpenAlex and are thus inaccurately absent in OpenAlex's reference lists. For references to journal articles, this percentage is even higher at 64%.

In Scopus and WoS, all publications have complete reference lists except for one missing reference to an R package in WoS. However, in some cases, reference information is incomplete (e.g., a missing title), but the cited work can in most cases be identified through other elements such as journal name, volume, issue, and page or article number.

Funding information

Nearly half of the publications (14 out of 30) contain funding acknowledgments. Of these, only seven list their complete list of funders in OpenAlex. Of the publications missing funders, four had no funders at all, and two had an incomplete list in which one of the funders was missing. Furthermore, all ROR IDs reported by OpenAlex were verified using the ROR registry and correspond correctly to the assigned institutions.

Scopus and WoS both record funding acknowledgment texts and identify funders mentioned in the texts. WoS provides two funder fields: funding agency and unified funding agency. The first provides the agency name as it appears in the acknowledgments text, while the second provides a standardized version. Out of 14 publications with funding acknowledgments, Scopus is missing funding texts in five cases, and WoS in two. Regarding funders, Scopus is missing funders in six publications, and WoS in one case for the funding agency, and seven for the unified field.

Source information

Because journals were used to select the publications included in the analysis, the source field is not assessed for coverage, but only for accuracy. For all 30 publications, source information falls within the FI category. In some cases, discrepancies arise when comparing the information to that on the publication's landing page. However, these differences result from changes in the journals, such as title or ISSN changes. rather than errors in OpenAlex. All such cases are verified using the article PDFs and the ISSN Portal website.

Scopus and WoS also provide accurate source information for all publications, though Scopus omits four eISSNs and WoS omits one. All other information aligns with that available on the landing pages of the publications.

8.4.5 Metadata accuracy: publications only in OpenAlex

As in the previous section, this section presents the results of a manual analysis of 30 randomly selected African publications indexed exclusively in OpenAlex (Subset 2), i.e., not indexed in Scopus or WoS. Table 17 summarizes the results of the metadata accuracy analysis, which are discussed in detail below.

Table 17. Accuracy of metadata of African publications indexed only in OpenAlex based on a sample (n = 30) of publications

Metadata field	CMI		PMI		NMI		FI	
	#	%	#	%	#	%	#	%
Publication information								
DOI	0	0	-	-	2	7	28	93
Publication year	0	0	-	-	4	12	26	88
Volume	7	23	-	-	1	3	22	73
Issue	6	20	-	-	2	7	22	73
Article number	-	-	-	-	-	-	-	-
First page	13	43	-	-	1	3	16	53
Last page	13	43	-	-	4	12	13	43
OA status	0	0	-	-	5	15	25	85
Title	0	0	-	-	0	0	30	100
Abstract	12	40	-	-	6	18	12	40
Type	0	0	-	-	1	3	29	97
Language	1	3	-	-	1	3	28	93
Author information								
Author names	1	3	0	0	0	0	29	97
Author order	1	3	0	0	1 (2)	3	29	97
Corresponding author	1	3	0	0	13 (13)	43	16	53
Affiliation and institution information								

Raw affiliation strings	17	57	0	0	6 (9)	18	7	21
Institutions	23	80	1 (1)	3	2 (2)	7	4	12
Reference information								
References	18	60	12 (249)	40	3 (4)	10	1	3
Funding information								
Funders	3	10	0	0	0	0	27	90
Source information								
Journal title	0	0	0	0	0	0	30	100
e-ISSN	0	0	0	0	0	0	30	100
p-ISSN	0	0	0	0	0	0	30	100

Publication information

Most fields related to publication information in OpenAlex are highly accurate in absolute terms. However, the DOI (93%) and publication year (88%) fields show lower FI values compared to Subset 1 (Table 16). These fields are particularly important, as they provide key information for bibliometric analyses and other uses.

Fields such as volume, issue, first page, and last page also exhibit discrepancies. In the case of the issue field, the FI percentage is higher than in Subset 1, largely because Subset 2 includes fewer journals that publish a single annual issue.

Accuracy for other fields is generally lower than in Subset 1. The abstract field, in particular, shows greater variability. 40% of publications are missing abstracts. Among the publications marked as NMI, three types of cases emerge. First, for most NMI cases, OpenAlex includes additional information in the abstract field, such as author names, journal titles, and keywords. Although the abstract text itself is otherwise complete and correct, this added content prompts classification as NMI because it may affect analyses based on abstracts. Second, in one case, the abstract is incomplete. Lastly, in one case, the abstract field contains a passage from the publication's full text instead of the abstract text itself.

Author information

OpenAlex accurately records the author names for 97% of the sample, a slight improvement over Subset 1. However, this result may reflect the characteristics of this specific sample and should not be generalized.

For ORCIDs, only one publication includes this identifier on its landing page or in the PDF, and OpenAlex correctly captures it. All other ORCIDs reported in OpenAlex were verified against the ORCID website and are accurate.

Author order is accurate in 97% of cases, with only a minor discrepancy noted. However, OpenAlex fails to identify the corresponding author for any multi-authored publications (43% of the sample), a notable difference compared to Subset 1.

Affiliation and institution information

Most publications in the sample lack complete affiliation and institution information, a striking difference compared to Subset 1. Specifically, 57% of publications are missing raw affiliation strings, and 80% are missing assigned institutions.

No cases of PMI are observed for raw affiliation strings, but six cases are classified as NMI. There are three reasons for NMI related to raw affiliation strings. First, in one case, OpenAlex reports an affiliation unrelated to the publication. Second, in another case, OpenAlex combines two affiliations into a single string, preserving the data but introducing a formatting issue that could affect downstream analyses. Lastly, in several cases, OpenAlex reports incomplete raw affiliation strings, omitting details such as the university, country, or department/unit. These cases are also categorized as NMI, as they could affect analyses that rely on this data.

Regarding institutions, one case of PMI occurs, where one institution is omitted. In the two NMI cases, OpenAlex incorrectly lists institutions unrelated to the publication. All ROR IDs assigned by OpenAlex were verified against the ROR registry and match the institutions to which they are assigned.

Reference information

The accuracy of reference information in Subset 2 is also notably lower compared to Subset 1. Due to overlapping issues of missing and erroneous information, some publications are classified into multiple categories. The majority of publications in the sample (60%) lack complete reference lists. Of the remaining publications, all but one (which has no references at all) include partial reference lists, missing between 6% and 95% of their references. The average share of missing references is 57%. Two NMI cases arise from references that are unrelated to the publications, and another involves a reporting error, where OpenAlex lists a book instead of a chapter from that book. Lastly, only one publication is classified as FI, and that publication is an index and introduction of a journal issue that includes no references.

An analysis of the missing references reveals that most refer to journal articles (34%), followed by books (30%), websites (11%, mostly from a single publication), and reports (5%). Other missing references include references to conference papers, chapters, datasets, software packages, theses, manuals, and surveys.

As noted in the previous section, following OpenAlex's approach to references, only references that refer to indexed works are expected to appear in the reference lists in OpenAlex. However, manual checks show that 39% of the missing references are actually indexed in OpenAlex and thus inaccurately absent.

Funding information

Most of the publications in the sample (90%) do not contain funding acknowledgements and therefore funding information is correctly absent in OpenAlex. However, for the three publications that do include funding acknowledgements, OpenAlex fails to report the mentioned funders. Since no funders are reported, ROR IDs for the funders are also missing.

Source information

OpenAlex provides complete and accurate source information for all 30 publications in the sample. In one instance, the journal title reported in OpenAlex differs from the version on the landing page of the publication due to a title change (similar to what was observed for some publications in Subset 1). All ISSNs, both print and electronic, match those on the landing pages and the ISSN Portal website.

8.5 Conclusions

This study shows that OpenAlex offers the most comprehensive coverage of the African publishing system among the four bibliographic data sources examined. It includes the majority of African research publications with a DOI indexed in Scopus, WoS, and AJOL, while also incorporating numerous publications that are not found in any of the other three data sources. In doing so, OpenAlex helps addressing the longstanding exclusion of African scholarship from mainstream bibliographic data sources, an issue widely recognized in the literature (Asubiaro, et al., 2024; Khana et al., 2022; Tijssen, 2007). Its broader coverage enhances the visibility of research outputs published outside dominant global publication outlets, thereby improving scientific diversity and reducing the disciplinary, linguistic, and regional gaps often found in traditional bibliometric sources (Alonso-Álvarez, 2024; Asubiaro & Onaolapo, 2023), ultimately offering a more complete perspective of the global scientific landscape.

When examining the metadata completeness of African research publications, OpenAlex demonstrates strong coverage in certain fields. It provides extensive coverage of publication and author information, especially for metadata fields such as issues, pages, generated keywords, and ORCIDs, where its coverage surpasses that of proprietary data sources. However, coverage of affiliations, references, and funder information is relatively lower. For publications also indexed in Scopus or WoS (Subset 1), metadata availability in OpenAlex is comparable to that of these proprietary data sources in most fields, including the majority of publication information, author, affiliation, reference, and funding fields. Conversely, for publications only indexed in OpenAlex (Subset 2), metadata coverage is generally more limited, particularly in critical fields such as affiliations, references, and funding.

In terms of metadata accuracy, the findings closely align with the patterns observed for completeness. Publications indexed in both OpenAlex and Scopus or WoS tend to exhibit higher accuracy across metadata fields. Publication information is generally accurate in both subsets, with pages and issues being the primary exceptions. The quality of OpenAlex metadata concerning abstracts, authors, institutions, references, and funding is lower than that of Scopus and WoS, particularly for publications exclusively indexed in OpenAlex. The results indicate that OpenAlex rarely records non-matching information, which is the most problematic type of error, as it leads to both omissions and false attributions. However, there are instances of partially missing information, and many publications in Subset 2 show completely missing metadata in several fields. Regarding references, it is important to note that while OpenAlex does not aim to provide complete reference lists, many references to indexed publications are also absent. Although prior studies have highlighted incomplete reference lists in OpenAlex (Alperin et al., 2024), the issue of missing citation links has received less attention. This limitation is critical, as it restricts the ability to trace citation patterns, particularly for publications not indexed in Scopus or WoS. Therefore, when aiming to conduct more inclusive citation analyses, it is important to acknowledge that results based on OpenAlex may still largely reflect citations from mainstream publication outlets, thereby potentially reproducing the biases inherent in traditional bibliographic data sources. Further research could investigate this issue more closely to better understand its causes and implications.

Several limitations should be considered when interpreting the results of this study. First, due to the process used to retrieve publications, which relies on a master list of sources, it was not possible to assess the coverage of metadata fields related to journal information. For instance, publications without ISSNs are excluded from the sample. Additionally, as OpenAlex is a resource that is rapidly evolving, the results of this study may not reflect its current state. This is due to both internal developments and improvements made by the OpenAlex team, as well as external decisions by other organizations. For example, in November 2024, Elsevier took steps to have abstracts of non-open access articles removed from OpenAlex, leading to the exclusion of approximately 11.5 million abstracts that were previously included in the database (Kramer, 2024).

When assessing the broader implications of the findings, several key conclusions emerge. First, OpenAlex shows significant potential as a replacement for traditional proprietary bibliographic data sources like Scopus and WoS, particularly for specific subsets of data. Notably, for publications also indexed in Scopus and WoS, the completeness and accuracy of metadata in OpenAlex are largely comparable, making it a viable option for many types of bibliometric studies. Moreover, its open nature, accessibility, and broad research coverage, including publications from underrepresented regions and disciplines, make it a valuable alternative, especially for researchers working in contexts where access to paid data sources is limited. However, while OpenAlex's efforts to enhance diversity and inclusion in scholarly coverage are commendable, the completeness and accuracy of its metadata still pose challenges in fields such as affiliations, references, and funding, which are essential for certain bibliometric studies. These limitations could impact analyses that rely on these fields, especially small-scale analyses or studies that depend on highly detailed information. This is particularly relevant for historically marginalized scientific communities, such as African journals and researchers, for whom the availability of robust, inclusive, and open bibliographic data sources is essential to improve both scholarly visibility and analytical representation.

Finally, the higher rates of missing data in some metadata fields compared to proprietary databases indicate that more work is needed. In this context, the scientific community must further engage with OpenAlex to better understand its limitations, identify areas for improvement, and expand its applicability for bibliometric and scientometric research. By systematically examining its current gaps, such as incomplete metadata fields or disparities in coverage across disciplines and regions, researchers can offer valuable feedback to enhance its coverage and metadata quality

CHAPTER NINE

A SMALL STEP TOWARDS THE EPISTEMIC DECENTRALIZATION OF SCIENCE: A DATASET OF JOURNALS AND PUBLICATIONS INDEXED IN AFRICAN JOURNALS ONLINE[17]

9.1 Introduction

Although critics of hegemonic models of science are not new, the academic interest in decolonial discourses has increased in recent years. If science was once defined as an objective and universal practice, decolonial scholars have challenged this assumption, emphasizing that science, as any other human endeavor, is traversed by the cultural and sociological contexts where it is developed. Historians of science have shown that knowledge has tended to be concentrated in a few places whose theories and methods have been spread to all other countries and regions. To reverse this tendency, both the material and symbolic dimensions of the concentration processes have to be addressed. Rodríguez-Medina (2014) distinguishes decentring—which challenges the symbolic dimension of the concentration of power and resources— from decentralizing—which addresses its material dimension. He argues then that the decolonization of ideas—i.e. decentring— needs a corresponding epistemic decentralization that creates the material conditions for peripheries to challenge mainstream discourses.

Although it also has effects in other areas of the scientific knowledge production process, one of the most striking examples of the concentration of symbolic and material resources is the academic publishing system. Focusing on the material dimension, this means that most publishers, journals, and articles are concentrated in the Global North, especially in the United States and Europe—for a theoretical argumentation see Alatas (2003)—, or that English has become the lingua franca of the academic world (Lillis & Curry, 2010; Canagarajah, 1996). This concentration is also reflected in the location and the journals indexed in international journal indexing systems—namely, Web of Science

[17] This chapter corresponds to the published article: Alonso-Álvarez, P. (2025). A small step towards the epistemic decentralization of science: A dataset of journals and publications indexed in African Journals Online. *Journal of Data and Information Science*, *10*(3), 1–18. https://doi.org/10.2478/jdis-2025-0034

(WoS) and Scopus—, which are the main sources of data for scientific evaluation, including research and funding assessments, and bibliometric analyses worldwide. However, although largely acknowledged as the only authorities in the identification of high-quality research, the status of WoS and Scopus is currently being challenged due to their various biases, including limitations in their coverage of research disciplines (Archambault et al., 2006; Larivière & Macaluso, 2011; Larivière, et al., 2015), geographical regions (Chavarro, et al., 2018; Asubiaro, et al., 2024), and languages (van Leeuwen et al., 2001; Lillis & Curry, 2010; Mongeon & Paul-Hus, 2016; Vera-Baceta, Thelwall & Kousha, 2019).

The need for more inclusive and comprehensive bibliographic data sources is especially pressing in areas that have historically been marginalized in these traditional systems. Several studies have shown that Scopus and WoS fail to provide an accurate picture of global scholarly publishing (Khanna et al., 2022), with the Global South—particularly Africa—being most affected. For example, analysis of WoS data by Tijssen (2007) revealed that African authors contributed fewer than 1.5% of indexed publications between 1980 and 2004. More recent research by Asubiaro et al. (2024) found that journals from sub-Saharan Africa were the least represented in both Scopus and WoS. In an earlier study, Asubiaro & Onaolapo (2023) not only confirmed this limited representation but also emphasized the potential of alternative databases like Crossref to address these gaps. Other studies have highlighted the potential of alternative source types, such as academic networks, to study publication and collaboration patterns in sub-Saharan Africa (Harsh et al., 2021). Scholars have also highlighted the importance of using field-specific or national citation indexes—over multidisciplinary and international databases—for certain types of analyses (Mongeon & Paul-Hus, 2016). This recognition aligns with broader efforts reflected in the development of alternative journal indexing systems and repositories, which aim to mitigate coverage biases and promote the international recognition of regional and local research.

One of the first examples of regional journal repositories is African Journals Online, which was launched in 1998 by the International Network for the Availability of Scientific Publications (INASP) in collaboration with the Public Knowledge Project (PKP). When it was initiated, AJOL only covered 50 African journals. In March 2024, the number of covered journals increased to 739 from 39 African countries. However, despite its extensive coverage, AJOL remains an understudied source of bibliometric data from African countries. One of the reasons for its absence from bibliometric studies is the difficulty of accessing AJOL's data. As AJOL is not a full-fledged academic database, it does not provide metadata for its articles, and it does not have an advanced search tool that allows users to build search strategies. The website is, therefore, a journal directory that allows users to browse journals' issues and volumes but prevents them from searching for specific articles or topics. In terms of bibliometric analysis, AJOL does not curate nor provide access to metadata from journals or articles. However, some metadata fields are available in AJOL's website and can be retrieved manually or using web scrapping techniques.

Recent literature has also pointed out to the potential of AJOL as a data source of bibliographic data for the African continent. Alonso-Álvarez (2024) showed that AJOL can counteract the biases in mainstream databases towards African science. However, the data source also presents its limitations, especially in in terms of regions, and languages, presenting missing countries and important imbalances between countries, and mostly publications written in English. Despite these limitations, this article regards AJOL as a valuable source of information on African journals and publications and seeks to facilitate its accessibility and usability. Accordingly, the main objective of the paper is to present a publication and journal database derived from AJOL content, designed to support its use as a bibliometric data source for the study of African scholarly production. The database introduced herein provides researchers and other users with a structured, downloadable version of AJOL data that can be readily explored and analyzed. The paper also presents a comprehensive picture of AJOL data regarding journals and academic papers, and provides information about the limitations of the data. The database aims to contribute to the idea of a decentralized and federated system of sources (e.g., Babini et al., 2024). Therefore, to facilitate the interoperability of AJOL articles' data with other academic databases, the database also includes a table that matches AJOL and OpenAlex documents using the unique identifiers of each data source. The matching AJOL-OpenAlex aims to contribute towards the idea of a federation of open research information sources.

9.2 Data and methods

9.2.1 Data collection

The journal list and publications indexed in AJOL were retrieved using web scraping techniques. The metadata of the publications was retrieved using the R package ojsr (Becerra, 2024), which scrapes the metadata of the articles indexed in Open Journal Systems (OJS) pages from their head tag in html. For the journals' information, the data was downloaded from various pages of the AJOL's website using rvest R package (Wickham et al., 2024). Both publications' and journals' metadata were retrieved in February 2024.

9.2.1.1 Journal metadata

Information was retrieved from 739 journals using the rvest package. The metadata fields were merged together using journals titles and urls. A unique identificatory was created for each journal to join them with the publications database.

As AJOL does not provide the metadata by journal, it was retrieved from different pages within the website. This process led to some incongruencies in journals coverage.

For instance, a journal might appear in the country classification but not in the research area classification. Journals that did not appear in one of the classifications were assigned NAs (Not Available information) for that field. In the case of the open access field, AJOL only reports the journals that have a Diamond access. The rest of the journals were classified as non-Diamond.

ISSNs were retrieved from each journal's AJOL site using web scraping. Eleven journals were missing both print ISSN and eISSN. Of these, three were found in the ISSN Portal, and their ISSN fields were manually added. All retrieved ISSNs were cross-checked against the ISSN Portal and were recognized by it, although some were at different stages of the validation process (e.g., awaiting validation).

As a way to increase the credibility of the journals it indexes, AJOL employs the Journal Publishing Practices and Standards (JPPS) framework, developed conjunctly by AJOL and the International Network for Advancing Science and Policy (INASP). JPPS classifies journals into six categories depending on the JPPS criteria they meet: inactive title, no stars, new title, one star, two stars, and three stars. All criteria are retrieved from JPPS website. New title, one star, two stars, and three stars work hierarchically in which a higher category includes all criteria from the previous one and other additional requirements. Finally, the inactive category includes journals that are not up to date in the Journals Online System (JOL). It is worth noting that journals that do not meet JPPS criteria to belong to one of the higher levels can still appear in AJOL under the no-stars category.

Table 18 shows the number and percentage of NAs per metadata field, and the final population of journal metadata fields in the database (Final N).

Table 18. Population of journal metadata fields

Field	NAs	% NAs	Final N
Title	0	0	739
eISSN	84	11.4	655
ISSN print	334	45.2	405
country	0	0	739
JPPS status	5	0.7	734
OA	0	0	739
Research area	3	0.4	736

9.2.1.2 Publications metadata

In total, metadata fields from 237,263 articles were downloaded. Finally, only 223,981 articles were kept after removing publications with no metadata and duplicates.

Regarding metadata, 11,767 publications had missing values (NAs) in almost every metadata field, including title, doi, and journal. In some cases, data from the 11,767 articles with missing values appears at the front end of the AJOL page. However, it has not been recorded in the html tag, therefore not being included in the database. After removing publications with no metadata, 1,515 duplicated records were found and therefore removed from the database.

The quality of the data was assessed to spot errors and clean the data. In the cases where erroneous data could be identified following an aggregate process—for instance, erroneous format (e.g., alphabetical values in pages field), non-reported missing values (e.g., instances of 'abstract' being the content of the field abstract, or 'keywords' being the content of the keywords field), etc.—, invalid data was removed. The process and all modifications are reported in the read me file of the database, along with the manual checks made in all fields.

Table 19 presents all the fields in the articles' head tag, the missing observations for each field, and the final population (Final N column) of the fields included in the database after removing NAs, duplicates, and erroneous data as described in the paragraph above. In the case of repeated fields (ex. DC.Identifier.DOI and citation_doi), only one of them was selected as the content was identical.

Language and type were not added to the table due to the high number of errors found in the metadata.

Multiparty fields, such as keywords and authors, were split and recorded in new tables.

All source fields were removed. To link the publications table with the journal's table, and identifier was created. To link the articles' table with the journals' table, the common sections of the URLs of the articles and the journal pages were used. Then journal identifiers were created and added to the articles' table.

Table 19. Population of publication metadata fields

Field	NAs	% NAs	Selected	Final N
input_url	0	0	1	223,981
DC.Creator.PersonalName	11,866	5.00	0	-
DC.Date.created	76,341	32.18	0	-
DC.Date.dateSubmitted	11,767	4.96	0	-
DC.Date.issued	11,872	5.00	1	223,876
DC.Date.modified	11,767	4.96	0	-
DC.Description	11,770	4.96	1	192,933
DC.Format	17,566	7.40	0	-
DC.Identifier	11,767	4.96	1	223,981

DC.Identifier.pageNumber	69,133	29.14	0	-
DC.Identifier.URI	11,767	4.96	0	-
DC.Language	11,767	4.96	0	-
DC.Rights	11,767	4.96	0	-
DC.Source	11,767	4.96	1	223,981
DC.Source.ISSN	13,498	5.70	0	-
DC.Source.Issue	28,964	12.21	1	206,866
DC.Source.Volume	12,298	5.18	1	223,450
DC.Source.URI	11,767	4.96	0	-
DC.Title	11,767	4.96	1	223,981
DC.Type	11,767	4.96	0	-
DC.Type.articleType	11,767	4.96	0	-
gs_meta_revision	11,767	4.96	0	-
citation_journal_title	11,767	4.96	0	-
citation_journal_abbrev	11,767	4.96	0	-
citation_issn	13,498	5.70	0	-
citation_author	11,767	4.97	0	-
citation_title	11,785	4.96	0	-
citation_language	11,767	4.96	0	-
citation_date	11,767	4.96	0	-
citation_volume	12,298	45.18	0	-
citation_issue	28,964	12.21	0	-
citation_firstpage	69,177	29.14	1	166,217
citation_lastpage	69,137	29.16	1	166,056
citation_abstract_html_url	11,767	4.96	0	-
citation_pdf_url	18,314	7.72	0	-
DC.Subject	114,973	48.46	1	121,399
citation_keywords	114,973	48.46	0	-

DC.Identifier.DOI	137,180	57.82	1	99,073
citation_doi	137,180	57.82	0	-
citation_author_institution	212,079	89.40	0	-
DC.Coverage	237,263	100	0	-
citation_reference	237,232	99.99	0	-
DC.Title.Alternative	237,263	100	0	-

9.2.2 Matching with OpenAlex

Articles were matched against the OpenAlex (Priem et al., 2022) data dump using journal names, DOIs, and other article metadata. The process was conducted in several steps, prioritizing accuracy at each stage. Rather than maximizing the number of matches, the approach focused on ensuring accuracy. After each step, checks were performed to remove any duplicate rows from the resulting table. Matched articles were removed from the initial AJOL table so that the remaining steps were applied only to non-matched articles. In cases of duplicate matches, duplicates were removed from the matched articles table and added back to the non-matched table for inclusion in subsequent steps.

- Exact match by DOI: A total of 80,667 matches were identified.
- Exact match by journal and title: 67,191 matches were found after excluding common titles (e.g., “introduction”, “review”) to avoid false positives.
- Exact match by journal and fuzzy title match: 7,265 matches were identified. To account for inconsistencies between databases, all titles were transformed to lowercase, and punctuation was removed. A Levenshtein distance threshold of less than 20 characters and a distance-to-title length proportion of less than 0.25 were applied to minimize errors. A sample of 100 matches was manually verified, and no errors were detected.
- Exact match by journal, year, issue, volume, and pages: 435 matches were identified in this step. Since the pages field can be inconsistent in both OpenAlex and AJOL, this step was performed last to reduce potential errors. All matches were manually checked, and 10 erroneous matches were removed.

In total, 155,558 articles were successfully matched out of 223,981 articles in AJOL. This aligns with recent studies on OpenAlex coverage. For example, Chavarro and Alperin (2024) reported that OpenAlex covers 70% of journals using the Open Journal System (OJS). Since AJOL does not record some metadata fields, matching AJOL with OpenAlex provides additional insights into the data, such as affiliation and institution analysis or collaboration patterns at different levels.

However, several important limitations related to the matching process must be acknowledged. The following three figures illustrate the percentage of articles indexed in OpenAlex based on the matching procedure described above, disaggregated by year, research field, and country. Figure 13 reveals that coverage rates for articles published before 1995 are significantly lower compared to those published thereafter. It is important to contextualize this finding by noting that the volume of publications in AJOL prior to 1995 is itself quite limited, typically ranging from 20 to 40 articles per year, with a few exceptions—for instance, AJOL recorded 83, 80, and 103 publications in 1987, 1988, and 1991, respectively. The number of indexed publications begins to increase in 1997 (198 publications), exceeds 1,000 in the year 2000, and consistently ranges between 10,000 and 15,000 annually from 2010 onward.

Figure 13. Percentage of publications not matched in OpenAlex by year

Figure 14 presents the proportion of non-matched publications by research area, bearing in mind that journals—and consequently their articles—can be assigned to up to three subject areas in AJOL. The figure indicates that certain fields, such as History and Communication and Library Science, exhibit relatively low coverage in OpenAlex, with over 50% of their publications not indexed. Most research areas, however, show coverage rates between 60% and 80%. Religion is the only field with a coverage rate exceeding 80%, with just 15% of its publications not included in OpenAlex.

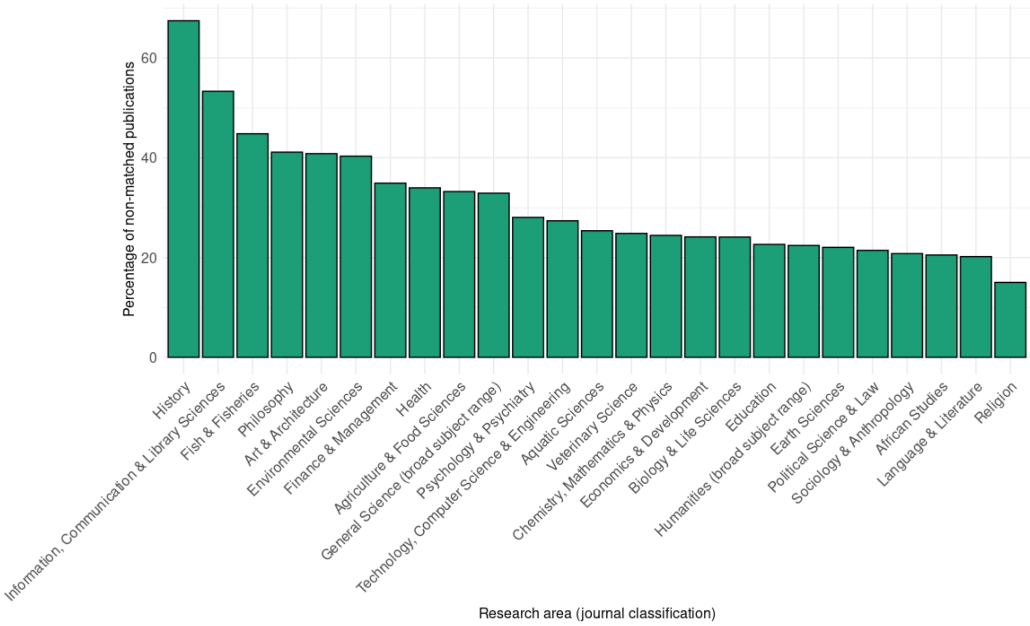


Figure 14. Percentage of publications not matched in OpenAlex by research area (AJOL journal classification)

Regarding countries, Figure 15 shows that those with the highest number of journals indexed in AJOL—namely Nigeria and South Africa, with 78,918 and 60,091 publications respectively, compared to 21,904 from the next most productive country, Kenya—also exhibit the lowest levels of coverage in OpenAlex. In contrast, the percentage of unmatched publications for all other countries remains below 5%.

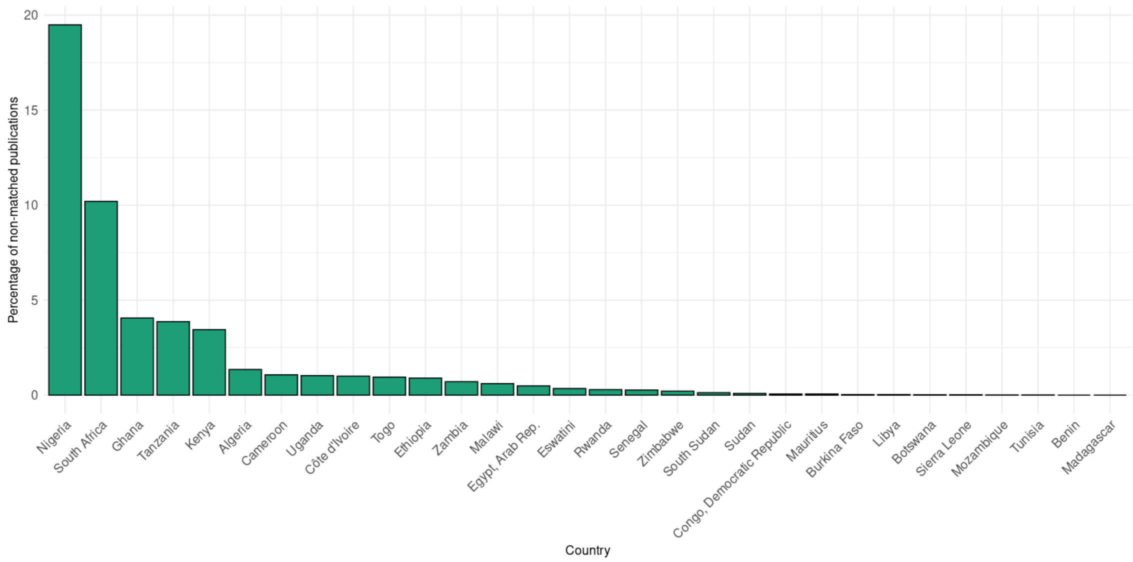


Figure 15. Percentage of publications not matched in OpenAlex by journal country

9.2.3 Data structure

The final database is divided in six tables, linking publications, journals, and related metadata. Figure 16 shows the database diagram- Table pub stores publication-level information, including DOIs, titles, and bibliographic data, and connects to supporting tables for abstracts, keywords, authors, and external identifiers (e.g., OpenAlex). The source table contains journal-level metadata, such as ISSNs, country, and quality classification (e.g., JPPS status), while the source_area table associates journals with research areas.

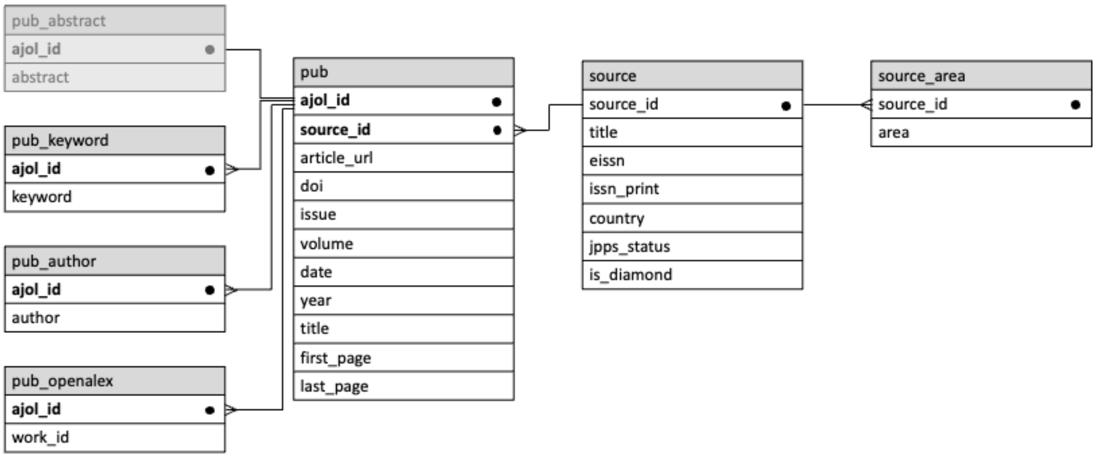


Figure 16. Database diagram

*pub_abstract table is hidden to avoid possible copyright issues.

9.3 Results

This section presents descriptive statistics of selected fields of the database.

9.3.1 Journals

Figure 17 shows the distribution of journals across African countries, with each country shaded based on the total number of journals it hosts. The color scale on the right indicates the number of journals per country, ranging from light green (low journal count) to dark green (high journal count).

The countries with the highest numbers of journals are Nigeria (298 journals) and South Africa (105 journals). Other countries with relatively high numbers of journals include

Ethiopia (53 journals), Kenya (48 journals), and Ghana (38 journals), and Tanzania (36 journals). In contrast, many countries, especially in Central and Northern Africa, are home to only a few journals. For example, countries like Libya, Botswana, Namibia host only from 1 to 3 journals. Some countries show moderate levels of academic journals, with countries such as Algeria (19 journals), Zimbabwe (14 journals), and Cameroon and Uganda (13 journals) occupying the middle range. Countries such as Chad, Central African Republic, Guinea, Guinea-Bissau, Liberia, Mauritania, Mali, Namibia, Niger, Somalia, or Western Sahara do not appear in the map as they do not have any journals indexed in AJOL.

This map highlights significant disparities in the distribution of academic journals across Africa, with a concentration of journals in just a few countries. While countries like Nigeria and South Africa are major hubs for academic publishing, many other African nations have very limited journal output, or none at all, which reflects the disparities between countries even in a specialized source.

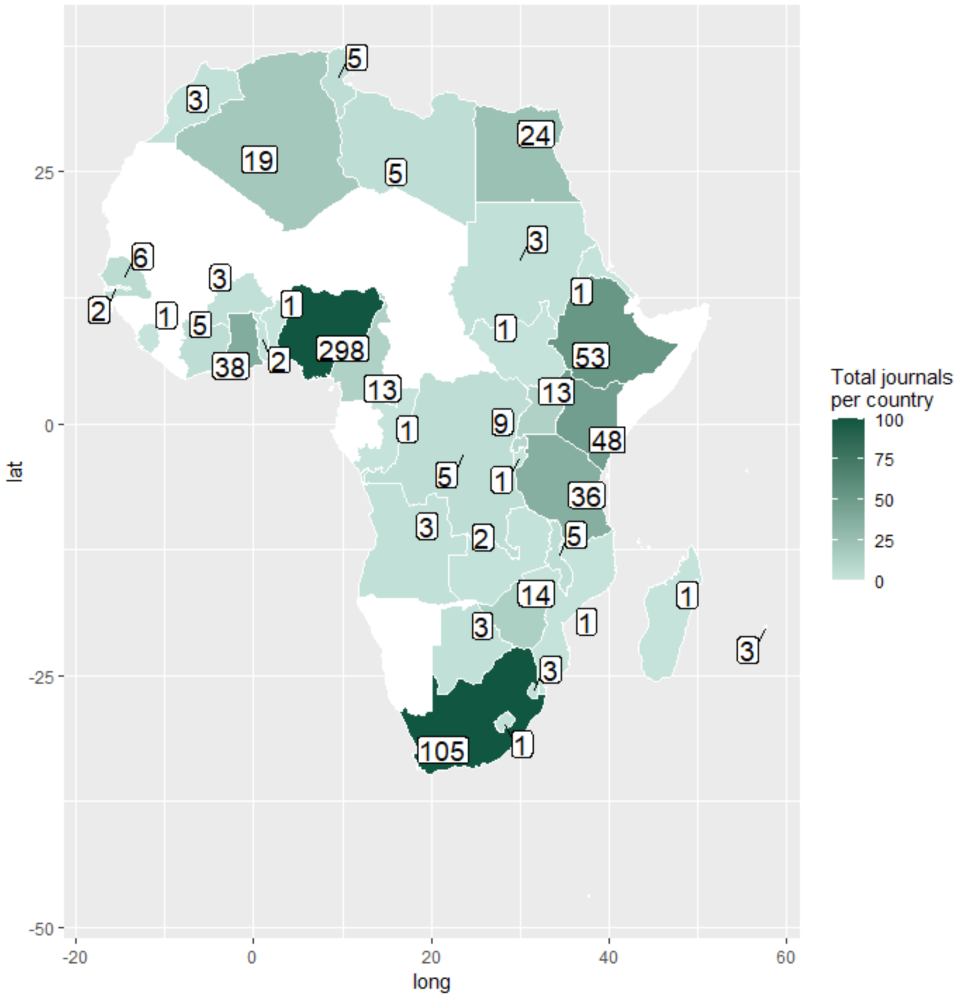


Figure 17. Number of journals by country

Figure 18 shows the distribution of journals across JPPS quality categories and type of access. The graph on the left highlights a concentration of journals in the 1 Star, 2 Stars, and No Stars categories. This suggests that while many journals meet basic standards, fewer journals reach the highest thresholds (3 Stars), and a significant portion of journals either fail to meet star rating criteria or are inactive.

The substantial number of Inactive Titles suggests that there are numerous journals that have ceased publishing but are still considered part of the AJOL, which highlights the role of the platform as an archive of African journals to improve its access and visibility regardless of them being active or not, differentiating it from traditional indexes, whose main objective is to index and rank active journals.

The graph on the right side of the Figure shows a higher number of diamond access journals than journals with other access types. This distribution is in line with AJOL policy of supporting open access and free-fee publication models.

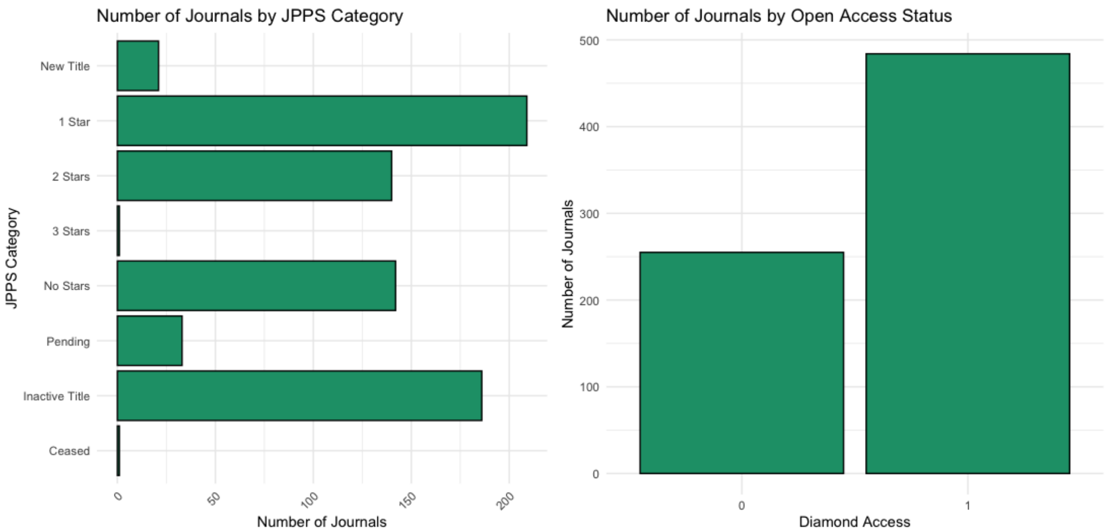


Figure 18. Number of journals by JPPS category (left) and number of journals by access type (right)

9.3.2 Publications

Figure 19 presents the total number of publications by year (green bars) and the relative share of publications with Digital Object Identifiers (DOI) (orange line) over time. From the 1990s onwards, there is a significant increase in publications, reaching a peak between 2010 and 2020. The apparent decrease in 2024 is attributed to the data collection date (February 2024) meaning that publications released after this point were not yet included in the dataset.

The number of publications with DOIs follow a similar pattern to total publications, indicating the increasing adoption of DOIs as a standard identifier in scholarly publishing.

The line remains aligned with the overall trend after 2000, suggesting that a significant proportion of publications since then have been assigned DOIs. However, despite the growth in publications continues until 2015, there is a slight decline in the number of DOIs. To better assess the causes of this decline, the metadata in AJOL was compared with the metadata available in OpenAlex, which revealed that the drop is a cause of changes in AJOL's reporting practices rather than a decline in the adoption of DOIs.

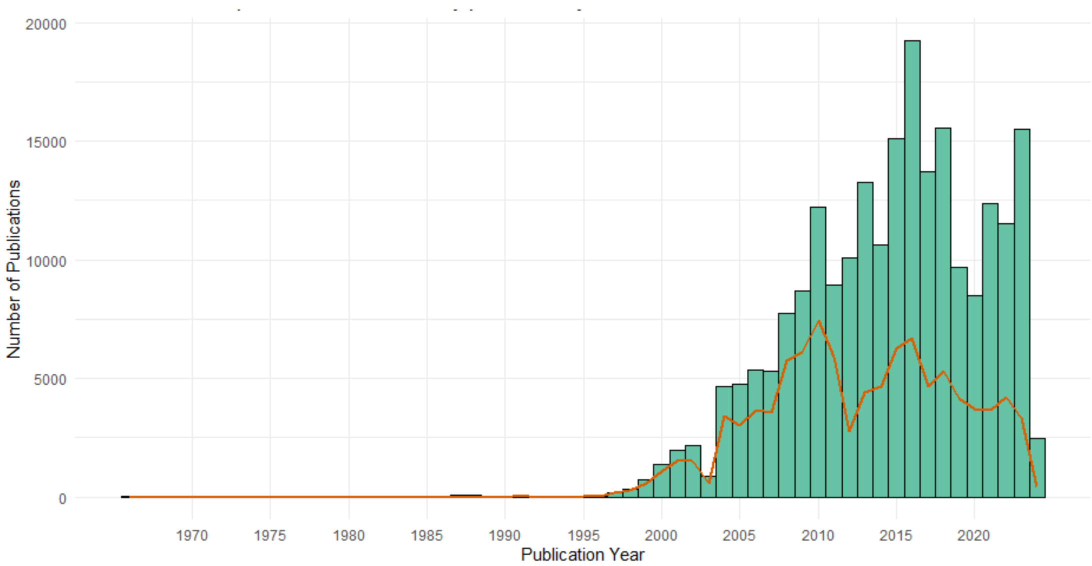


Figure 19. Publications (bar plot) and publications with DOI (orange line) by publication year

Figure 20 presents the distribution of publications across different research areas, illustrating the total number of publications per area. In AJOL, research areas are assigned at the journal level, meaning that the research areas of the publications correspond to the fields of the journals. As the publications' areas depend on the journals' classification, they are both plot together for comparison. The x-axis lists the research areas, while the y-axis represents the number of journals (green bars) of publications (orange line).

Health dominates the distribution, with over 80,000 publications and 200 journals, making it by far the largest field in terms of output. Following Health, Biology and Life Sciences and Agriculture and Food Sciences also have significant publication numbers, though at considerably lower levels than health, each with between 30,000 to 40,000 publications. In the case of journals, Biology and Life Sciences and Humanities present the highest numbers after Health, followed by African Studies and Economics and Development. In both publications and journals, History, Philosophy, and Earth Sciences have the lowest representation, with fewer than 1,000 publications each.

The relationship between the number of journals and the number of publications is generally proportional, although fields like Agriculture & Food Science or Veterinary Science show higher publication output compared to their journal count. Other fields like Finance & Management show a lower publication output than the number of journals.

Differences in the trends of journals and publications might be due to different publication patterns between journals. For instance, some journals in AJOL publish only one issue per year, while others publish one every few months. The number of papers per issue can also influence the relationship between the numbers of journals and papers.

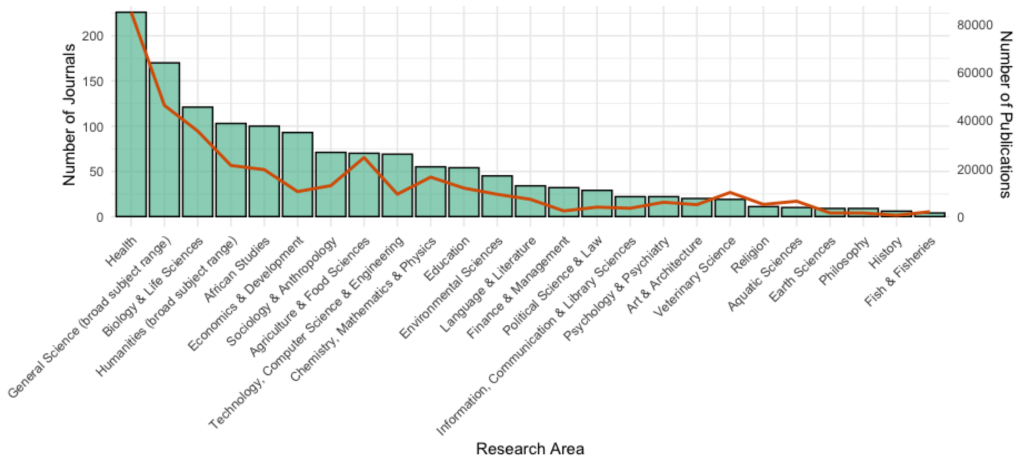


Figure 20. Publications by research area (journal classification)

Table 20 shows the number of publications in AJOL depending on the authors' country. For this analysis the matching between OpenAlex and AJOL was used and then merged with OpenAlex data dump. Author country data was found for 94,168 publications. No normalization was applied for articles with more than one author. The two most productive countries are Nigeria (25,450) and South Africa (24,213), followed by three non-African countries: United States (5,354), China (3,863) and India (3,863). In Africa, other countries with high productivity are Ethiopia (3,132), Ghana (2,723), Kenya (2,461), Tanzania (1,970), Morocco (1,637), Egypt (1,479), Uganda (1,410), Cameroon (1,307), Benin (1,258), Ivory Coast (1,249), and Zimbabwe (1,225). The rest of the continent, particularly Central and Sahel regions show lower publication outputs. Outside Africa, some countries in. Europe and the Middle East show high publication outputs, while South America and the Southeast of Asia present lower values[18].

Table 20. Top 10 countries by number of publications in AJOL

Country	# pubs
Nigeria	25,902
South Africa	24,755
United States	5,528
China	3,919
India	3,615

[18] A visualization of the analysis including all world countries can be found at: https://doi.org/10.5281/zenodo.14900054

Ethiopia	3,132
United Kingdom	2,899
Ghana	2,723
Kenya	2,461
Tanzania	1,970

The results highlight that African journals serve as international venues, attracting contributions from authors both within and outside the African continent. This global authorship pattern demonstrates the broad appeal and relevance of African-based journals in disseminating research across a variety of regions. Many authors from countries in the Global North, including the United States, the United Kingdom, and parts of Europe, contribute to African journals, suggesting that these journals are not only regionally focused but also engaged in the global exchange of knowledge.

9.4 Conclusions

This study highlights the potential of AJOL as a valuable bibliometric source for understanding African academic publishing. By systematically retrieving and structuring AJOL's data, this paper provides researchers with a more accessible and usable version of its metadata, filling a significant gap in bibliometric research focused on the African continent. It is worth mentioning that, while AJOL contains relevant information for identifying and providing insights about African publications and journals, its metadata is limited. This is however expected as AJOL is not an academic database but a journal repository designed to give visibility to African journals. Therefore, the article relies on web scraping techniques to retrieve available metadata and construct an accessible database.

The database introduced in this article contributes to the accessibility of African scholarly publications by providing structured, accessible metadata derived from AJOL. It facilitates bibliometric analyses that are more representative of African research activity. This contribution complements ongoing efforts to develop alternative data sources and infrastructures that better reflect the diversity of global knowledge production, including those based on national repositories, regional indexes, and open metadata platforms. Moreover, by leveraging OpenAlex's additional metadata, this study demonstrates that metadata gaps can be partially addressed, enabling more detailed analyses of African research output. By doing so, it aims to contribute to the scientific decentralisation stated by Rodriguez Medina (2014) and offers a new tool for bibliometric analysis that might help to mitigate coverage biases in bibliometric analysis on African scientific production.

The analysis of journals indexed in AJOL reveals significant disparities in their distribution across African countries. Nigeria and South Africa emerge as major hubs. This uneven distribution highlights the concentration of publishing resources in a few key countries, reflecting broader disparities in the African academic publishing landscape. It also shows that further efforts need to be made to expand the coverage of AJOL to the most underrepresented countries. Furthermore, the analysis of journals' quality categories using the JPPS framework shows that most journals fall into the 1 Star, 2 Stars, or No Stars categories, with relatively few reaching the highest (3 Stars) standards. The substantial number of Inactive Titles also underscores AJOL's role as an archival platform, distinguishing it from traditional indexing systems focused solely on active journals. The publication analysis demonstrates a steady growth in the number of publications over time. The analysis also highlights the increasing adoption of Digital Object Identifiers (DOIs), aligning with global trends in scholarly publishing. Biases towards Health sciences, Biology and Life Sciences are also observed in the analysis, while fields like Philosophy, History, and Earth Sciences remain underrepresented.

Finally, the inclusion of matched data with OpenAlex further enhances the utility of the database. The paper presents an example of the possibilities of integrating both sources using author country data from OpenAlex. The analysis of author contributions reveals that African journals serve as both regional and international venues. Further analysis might explore other areas like collaboration patterns, institutional affiliations, and citation networks, which cannot be addressed only with AJOL data. The ability to integrate AJOL with global databases demonstrates its capacity to contribute to a more inclusive and comprehensive representation of global science.

The findings confirm that African journals play a dual role in fostering both regional and global research engagement. As shown by the map of author contributions, African journals attract submissions from both African-based and international researchers. This underscores their importance as venues for disseminating locally relevant research while also participating in the global exchange of knowledge. However, the article also shows the important limitations of such data sources, both in terms of coverage and metadata, highlighting the importance of initiatives and efforts that address these issues, and help to provide a more comprehensive picture of African science. Finally, while this study reinforces AJOL's role in amplifying the visibility of African journals, it also raises broader questions about the role of such regional platforms in the global bibliometric ecosystem. Platforms like AJOL not only document African research but also serve as a counterbalance to the regional, linguistic, and disciplinary biases inherent in traditional data sources. However, their long-term impact will depend on continued investment in their development, stronger interoperability with global data infrastructures, and increased engagement from the scientific community to ensure their data is both comprehensive and widely used.

CHAPTER TEN
DISCUSSION

This discussion chapter brings together the empirical and conceptual contributions of the dissertation to reflect on what they collectively reveal about epistemic injustice in science, the infrastructures that sustain it, and the methodological tools used to study it. The previous chapters demonstrated that injustices arise not only in interpersonal exchanges but, crucially, in the systems that regulate visibility, credibility, access, and recognition within global scholarly communication. Here, the aim is to synthesize those insights, interrogate their methodological and normative implications, and outline the broader lessons they suggest for building epistemically fairer scientific practices.

The first section examines the main findings of the four academic articles and situates them within the literature on epistemic injustice. It shows how publication infrastructures, citation dynamics, and data sources operate as sites where credibility is unevenly distributed, authority is constructed and contested, and epistemic resources become differentially available. The second section then turns to the methodological considerations raised by the dissertation, reflecting on the power and limits of bibliometric methods. While metrics allow the observation of large-scale patterns, they are themselves embedded in the infrastructures that produce epistemic asymmetries; understanding their epistemic value therefore requires acknowledging their partiality, their dependence on available data, and their role within broader evaluation cultures. The final section expands the discussion to the role of epistemic friction in science, engaging with philosophical debates on structural and agentic transformation and considering what forms of institutional, cultural, and epistemic change are necessary to reduce injustice and foster a genuinely plural scientific ecosystem. Taken together, these reflections position epistemic injustice not as a series of isolated shortcomings but as a structural feature of contemporary scholarly systems—one that emerges from the interaction between infrastructures, evaluative norms, cultural imaginaries, and individual dispositions. The chapter thus seeks to articulate how the findings of this dissertation contribute to ongoing conversations about epistemic justice in science and to outline the kinds of transformations, methodological and structural alike, that can support more equitable scientific futures.

10.1 Contributions to the study of epistemic injustice in science

Taken together, the four articles examined in this dissertation illustrate how epistemic injustice permeates multiple stages of the scientific communication cycle—from the constitution and legitimization of scientific communities through publication systems, to the recognition of knowledge via citation, to the infrastructures that mediate access, visibility, and authority. While each article focuses on a different empirical site—mainstream databases, citation practices, open infrastructures such as OpenAlex, and regional platforms such as AJOL—all address a shared theoretical problem: the ways in which structural and infrastructural arrangements shape who is recognized as a knower, whose contributions are rendered legible, and which epistemic resources become available for collective inquiry. By bringing bibliometric evidence into dialogue with the conceptual typology of epistemic injustice (e.g., Fricker, 2007; Medina, 2017; Dotson, 2012; Grasswick, 2017), the section shows how credibility deficits, failures of uptake, and hermeneutical marginalization are embedded not only in interpersonal exchanges but in the very architectures through which scientific knowledge is produced, circulated, and evaluated.

The first two articles examine how exclusion and misrecognition arise in publication and uptake, showing how representation asymmetries, quality discourses, and inherited citation biases generate testimonial and participatory injustices. The third and fourth articles widen the analytical lens to consider the infrastructures through which scientific outputs become visible and usable, revealing both the potential of comprehensive and regional open data sources and the risks of reproducing archival silences when metadata gaps persist. Across these contributions, a central theme emerges: epistemic injustice in science is neither accidental nor incidental but structurally configured by the systems that define legitimacy, confer authority, and regulate access to epistemic resources; it takes shape through the infrastructures and evaluative practices that regulate how knowledge is produced, circulated, and received. The articles show that biases in representation, recognition, and access are embedded in these systems rather than arising from isolated decisions, and that their effects compound across stages of the scientific process. This perspective highlights the need to understand scientific databases and citation practices not as neutral intermediaries but as active sites where epistemic authority is constructed and contested. Recognizing how these infrastructures, and the social imaginaries embedded within them, shape credibility and visibility is essential for diagnosing existing inequities and for imagining practical pathways toward a more epistemically just global scientific ecosystem.

Injustice in publication: lack of representation and considerations about quality

The first article (Chapter Six) examines epistemic injustice expressed through representation asymmetries and biases. Using academic journals as the main unit of analysis, it investigates how mainstream academic databases operate as gatekeepers, determining which journals meet the quality standards required for their legitimization as valid sources of academic knowledge. If journals are understood as constitutive elements of scientific communities (§2.1; Gläser & Aman, 2017; Pita González, 2016), then their exclusion as legitimate sources implicitly delegitimizes the communities they sustain as knowers. Conversely, the journals that are included are endowed with credibility, enabling their communities to accumulate cognitive authority denied to marginal scholars and groups. In other words, included communities accumulate scientific capital (Bourdieu, 2004), while other communities and their scientific production are not recognized as valuable contributions. In this sense, mainstream scholarly databases—such as WoS and Scopus—act as institutionalized sources of authority, conferring recognition on some communities while withholding it from others and dictate the conditions of entry (Bourdieu, 1988) to the international scientific community. According to Wilson (1983), trustworthiness—understood as the perception of fairness and impartiality—is one of the central pillars that supports the attribution of cognitive authority. WoS and Scopus draw much of their legitimacy from their perceived objectivity (Lillis & Curry, 2010). However, this perceived objectivity has been repeatedly questioned, thereby challenging their validity as neutral arbiters of authority. Approaching representation and inclusion in mainstream databases through the lens of epistemic injustice allows the debate on database biases to be connected to conceptual tools such as credibility, prejudice, and authority, offering a richer understanding of the complexity of these practices and helping imagine alternatives that reduce injustice.

The article's empirical findings show clear imbalances in the representation of African journals in WoS and Scopus with respect to geography, language, and discipline. Crucially, these asymmetries cannot be explained solely by reference to objective quality criteria. A comparison of the criteria used by WoS, Scopus, and AJOL reveals that, although they share some basic requirements, Scopus applies the fewest and least clearly specified criteria, many of which are left to the discretionary judgement of the CSAB without clear boundaries or indicators. For instance, while WoS requires that "the language must be clear and comprehensible to a global audience"[19], and JPPS states that "language and copy editing [must] provide clarity for readers"[20], Scopus merely notes that the CSAB will evaluate the clarity and readability of abstracts. Although notions such as "clear", "comprehensible", or "clarity" inevitably require interpretation, they nonetheless provide a shared evaluative baseline that Scopus lacks. This comparison suggests that exclusions—especially in Scopus—cannot be attributed exclusively to quality considerations. Instead, other variables, frequently correlated with social categories, appear to shape patterns of over- and under-representation. Specifically, the results indicate that both WoS and Scopus exhibit strong biases toward South Africa and several Northern

[19] https://clarivate.com/academia-government/scientific-and-academic-research/research-discovery-and-referencing/web-of-science/web-of-science-core-collection/editorial-selection-process/journal-evaluation-process-selection-criteria/

[20] https://www.journalquality.info/en/jpps-criteria/two-stars/

African countries, particularly Libya and Egypt. In disciplinary terms, Scopus shows a marked preference for technical fields such as Natural Sciences, Engineering and Technology, and Medical and Health Sciences. The analysis also shows that AJOL, despite being a regional source, is not free from absences or asymmetries; however, it presents a more balanced distribution than the proprietary databases.

Beyond the technical criteria employed, the article highlights the importance of reflecting on the socio-historical conditions in which notions of 'quality' are defined and assessed, and it advocates for a situated understanding of quality. The research evaluation and quality criteria developed by commercial databases act here as subordinating objects (Rodríguez Medina, 2013) for Southern communities, who remain excluded from the negotiation of what 'quality' means. This dynamic can be interpreted through the lens of Bourdieusian fields. According to Bourdieu, fields are structured through struggles among agents over symbolic and scientific capital, in which dominant actors establish the norms and standards that define legitimate knowledge. Consequently, subordinate groups often have to align with these dominant norms in order to gain recognition and participate in the international scientific community. Power imbalances related to quality frameworks are also closely related to Hountondji's dependence on the media of ideas, as Southern scholars need to rely on foreign quality frameworks and companies to be legitimized. The uncritical privileging of quality criteria developed in the Global North creates hierarchies (Beigel, 2013b, 2014; Beigel & Salatino, 2015) and constitutes a form of cultural imperialism (Hall, 2018). Willfully ignoring interpretative frameworks developed outside dominant paradigms amounts to contributory injustice (Dotson, 2012), placing marginalized communities in the position of having to adapt to external systems that do not align with their cultural and social contexts—or else risk exclusion from scientific communication and relegation to the margins.

Although the article does not aim to, nor is able to, establish causal relationships between sociological variables and inclusion/exclusion outcomes, it nonetheless demonstrates that biases are structured by social conditions. The analysis reveals both overlaps in the quality criteria used by traditional and alternative databases, and the presence of more subjective factors rooted in institutional priorities. This aligns with previous research on the limitations of equating inclusion in mainstream databases with quality (Chavarro et al., 2017). In any case, the evidence of epistemic injustice cannot be ignored. If the results indeed reflect social prejudices that affect the credibility of journals from certain countries, disciplines, or languages, then we are confronted with failures of authority recognition—what McGowan (2009) terms illocutionary silencing (§4.2.2)—and, consequently, testimonial injustice (§3.1.1.1; Fricker, 2007). When such injustices target journals associated with particular topics or fields, they constitute instances of content-focused injustice (§3.1.1.2; Dembroff & Whitcomb, 2022). Because testimonial injustices limit the ability of communities to participate in the collective construction of scientific knowledge, they also function as barriers that generate participatory injustice (Grasswick, 2017). Returning to the question of quality criteria, these patterns reflect the perceived superiority of Northern standards and the corresponding devaluation of subaltern ones. This illustrates Medina's (2017) comparative conception of credibility: marginalized groups are not deemed less credible in isolation, but in comparison to dominant standards constructed as inherently superior. When gatekeepers—here, academic databases—choose to preserve and apply prejudiced infrastructures, contributory injustices can be said to occur. Even if the findings are not sufficient to infer the presence of explicit social prejudice, the mere existence and uncritical adoption of dominant quality canons as the only legitimate hermeneutical tools for evaluation already constitutes, as argued earlier, a form of epistemic injustice.

Injustice in uptake: recognition and inherited biases

The second article (Chapter Seven) examines epistemic injustice through citation practices. The case of local research—precisely because it admits multiple conceptualizations—allows the analysis of different variables that may affect recognition at the uptake stage. As in the previous chapter, the study uses journals to delineate the African scientific community, and from there operationalizes several definitions of local research at the article level to analyze citation patterns. The article understands different communities—of local and non-local research—in a way closely related to Dawson and Topham's (2020) idea of communities of practice, which are not defined by interpersonal interaction but by relations sustained by journals and the norms and practices they shape for coordination, communication and recognition. In this framework, citation is interpreted as a marker of recognition and scientific authority. While publication in a journal or inclusion in an academic database constitutes an initial, conventional form of recognition, it is not the end point of the knowledge-making process. Following Longino (1990) and Latour (1987), scientific outputs become fully integrated into the epistemic landscape only once they are used, tested, or transformed by others. Perlocutionary silencing, in this context, refers to the absence of recognition of a contribution as relevant or scientific, preventing it from producing its intended effects such as engagement, influence, or incorporation into further research. This perspective even allows for the argument that, while publication or indexation in mainstream databases is not an essential step of the scientific process, usage is. A preprint that its authors choose not to publish in a journal but that is nevertheless read, cited, and used by the community would still accumulate recognition through its uptake. For this reason, although the article retains journals for theoretical and practical reasons, it moves away from mainstream databases as gatekeeping infrastructures and employs more open sources of data.

The analysis shows that the citation patterns of local research vary substantially depending on the operational definition used. The clearest differences appear for the *Journal in WoS/Scopus* criterion; for the remaining definitions, differences between local and non-local publications depend strongly on the research field. Building on previous studies suggesting that local research is more frequently cited by local or domestic audiences, the article examines these hypotheses and finds mixed results. While some definitions and areas do show higher citation levels from local or domestic audiences, others receive most of their citations from international sources. Overall, the findings do not indicate systematic biases against most forms of local research included in the dataset. The only consistent difference appears between publications indexed in WoS or Scopus and those not indexed, particularly in citation-impact indicators. This suggests, on one hand, that there is no general bias against local publications or local authorship. On the other hand, it confirms that WoS and Scopus operate as sources of authority and credibility: publications outside these databases accumulate significantly fewer citations.

These dynamics illustrate the interconnected nature of scientific practices, and how epistemic injustices arising at one stage may permeate subsequent phases. Although it is not possible, based on the evidence, to attribute prejudice explicitly to geographic or topic-related factors, the results suggest that credibility is strongly mediated by inclusion in mainstream databases. As shown in Article I, such inclusion is not determined exclusively by quality, but is shaped by geography, discipline, and language. Citation practices thus inherit these structural biases. Moreover, citation dynamics that prioritize WoS- and Scopus-indexed publications can reinforce a cumulative advantage pattern, where highly cited work continues to be cited while less-visible work—often from marginalized communities—remains overlooked. Combined with broader socio-cultural factors (Ma, 2022), this contributes to a vicious cycle that amplifies existing inequalities in visibility and authority. These practices align with Miragoli's (2024) notion of testimonial spurning, whereby the credibility or legitimacy of a contribution is denied based on biased or prejudicial assessments of its worth. They also relate to hermeneutical and inferential injustices (Fairbairn, 2020): work outside WoS and Scopus is less likely to be considered when formulating research questions, methods, or hypotheses, narrowing the interpretative and inferential resources available to the scientific community.

Finally, the article attempts to counteract some of these injustices by moving away from biased sources such as WoS and Scopus and relying primarily on OpenAlex. Although this approach expands the coverage of local research, the analysis also identifies limitations that raise concerns about the suitability of current OpenAlex data for certain bibliometric analyses. In this sense, even inclusive infrastructures can generate new forms of injustice when their gaps disproportionately affect already marginalized communities. These issues, however, will be discussed in greater detail in the following subsection.

Justice in comprehensive sources: de-hierarchization of science and the risks of archival silences

The third article examines OpenAlex as a potential tool for reducing epistemic injustice in science. As presented in Table 1, the expansion of academic infrastructures to include traditionally marginalized knowledges is a practice that can contribute to the improvement of injustice at several stages of the scientific process. The paper begins by assessing its coverage of African scientific publications and then evaluates the completeness and accuracy of its metadata. As OpenAlex is becoming increasingly relevant both as a source of scientific outputs and as an infrastructure for scientometric research, understanding its strengths and limitations is essential. Designed as a comprehensive and openly accessible database with particular attention to the Global South and non-English publications, OpenAlex offers a space where marginalized communities can communicate, access, and make visible scientific work that is frequently excluded from mainstream academic databases. It also disrupts, to some extent, the hierarchical structure of cognitive authority typical of proprietary databases by removing the quality distinctions between included and excluded research.

The analysis shows that OpenAlex's coverage of African publications is substantially larger than that of WoS and Scopus and even surpasses that of AJOL. OpenAlex thus emerges as an interesting alternative for enhancing the visibility of African science, incorporating a greater number of journals and publications. Although a more granular analysis of its coverage by country, language, institution, or discipline remains necessary, this expanded inclusion represents an important first step toward reducing archival silences in scientific repositories and, consequently, mitigating certain forms of epistemic injustice. As discussed in earlier sections—and illustrated in Table 1—broadening the availability of scientific outputs and epistemic resources can help reduce injustice at multiple stages of the scientific process. It expands the epistemic resources available to researchers, facilitating access to topics, methods, theories, and epistemologies outside dominant frameworks; it lowers communication barriers by making the contributions of marginalized communities accessible beyond local repositories; and it improves conditions for uptake by ensuring that these outputs are available for use and citation. More broadly, OpenAlex can contribute to closing gaps in current scientific narratives, supporting more inclusive historical accounts of science and widening the definition of legitimate scientific production to include outputs excluded from traditional sources, enabling more inclusive scientometric analyses and fairer evaluation practices.

However, the mere inclusion of these outputs, while essential, is not sufficient—particularly for scientific practices that require not only access to publications but also reliable metadata. This is especially relevant for research assessment and, more critically, for scientometric analysis, in which article metadata constitutes the primary data source. For this reason, the article evaluates the suitability of OpenAlex for scientometric research by analyzing the completeness and accuracy of its metadata. The findings show that, although OpenAlex includes a wider range of outputs than WoS and Scopus, it also presents more substantial metadata gaps, particularly for publications not indexed in mainstream sources. As discussed in Section 4.1.2, archival silences refer to information that remains unavailable for scholarly use regardless of the cause of its absence (Manoff, 2016). These gaps or silences, as Hathcock (2020) argues, "affect the quality and completeness of scholarly work now and moving forward" (p. 206). Since scientometrics relies directly on the metadata stored in databases, missing or incomplete information compromises the quality and comprehensiveness of the resulting analyses. When these absences correlate with structural power relations—disproportionately affecting outputs from marginalized communities—they risk reproducing epistemic injustice. As Lassen et al. (2024) emphasize, relying on skewed data perpetuates the silencing of marginalized voices. In the case of OpenAlex, metadata gaps are more frequent for outputs produced by marginalized communities, thereby maintaining their absence in scientometric analyses and offering a distorted or restricted picture of the scientific landscape. This thesis acknowledges that complete coverage is unattainable for any database. Nonetheless, it is essential for data sources to be transparent about their strengths and limitations, and for researchers to recognize the constraints of the datasets they employ. Doing so helps prevent the perpetuation of unacknowledged exclusions and the resulting contributory injustices.

Justice in selective sources: de-centralization of knowledge

The fourth and final article (Chapter Nine) addresses a dual objective. First, it seeks to structure and standardize the information contained in AJOL into an accessible, interoperable format that can be readily used by researchers and integrated with other data sources such as OpenAlex. Second, it provides a comprehensive overview of AJOL's coverage, identifying its main strengths as well as its limitations. While broad and inclusive databases like OpenAlex are essential, more selective sources—focused on particular regions or disciplines—offer curated and context-specific perspectives that contribute to a decentralized ecosystem of scholarly infrastructures. Such decentralization is important for reducing reliance on a single data provider. Even though OpenAlex differs from WoS and Scopus in its openness, inclusivity, and lack of formal entry criteria, relying exclusively on any single source still carries the risk of concentrat-ing authority over what counts as visible scientific output. In Hountondji's (1997) terms, even if the provider is more inclusive than commercial data sources, depending solely on a single—still Northern—actor continues to constitute academic dependency in the means of ideas. A distributed system of sources allows the scientific community to construct federated infrastructures that can be aggregated or queried together without relinquishing control over the underlying data. From a recognition perspective, the ownership of academic infrastructures and the development and application of locally grounded quality criteria can also be understood as a form of liberation. According to Coulthard (2013), recognition granted by the dominant party in a relationship may alter the terms of that relationship but does not fundamentally challenge the dominance itself. Going further, the mere desire for recognition is itself a form of domination. Applied to credibility, the same principle holds: if a knower demands the credibility she is due from another agent, she is already acknowledging that agent's authority over her, even if the credibility is eventually granted (Doan, 2018). While not addressing recognition directly, Hountondji (2002) makes a similar point, urging African scholars to shift their audience by prioritizing Africans as their primary interlocutors. While deeper transformations will be needed to displace the epistemic authority of traditional indexes, diversifying sources and establishing alternative recognition frameworks mark an essential first step.

The article shows that, although AJOL includes only a limited set of metadata fields, it nevertheless enables a range of analyses at both the journal and article level. Integrating AJOL with OpenAlex allows for more complete analyses using OpenAlex metadata, while also requiring attention to the limitations of both platforms: not all AJOL publications are present in OpenAlex, and OpenAlex metadata itself contains gaps. Despite its constraints, AJOL provides access to African research outputs that are not available through other sources, enhancing their visibility and accessibility. This expanded availability contributes to reducing certain forms of epistemic injustice, particularly those associated with restricted access to epistemic resources (see Table 1 and the previous subsection).

The findings also show that journals included in AJOL act as international venues, attracting contributions from authors both within and beyond the African continent. Crawford et al. (2021) argue that drawing participation from researchers in both the Global South and the Global North is an important step toward strengthening the status of African journals, countering asymmetries in scholarly publishing circuits, and reducing existing injustices. While such developments can indeed help address some forms of epistemic injustice—particularly those linked to credibility and first-order recognition—they are insufficient for addressing deeper, structural varieties. For example, while encouraging international authors to publish in African journals may enhance their perceived legitimacy, knowledge decolonization requires that scholarly value not be restricted to African journals that mimic Northern models but extend also to journals that foreground historically marginalized African epistemologies. Although these broader questions fall outside the aims of the article, the structured AJOL database developed here may offer a foundation for future research on these issues.

10.2 Metrics as descriptive tools and power affirmation structures: reflections on the use of bibliometrics

This thesis has employed bibliometric methods to examine epistemic injustice in science. Bibliometrics is, in essence, the quantitative study of academic bibliographic material—in this case, journal articles. These methods make it possible to analyze a country's scientific production, its main research topics, patterns of authorship collaboration, citation dynamics, and other features of scholarly communication. In this sense, bibliometrics helps describe different dimensions of the academic publishing landscape. However, scientific publishing is a complex social phenomenon, and its underlying mechanisms cannot be fully understood or explained through bibliometric data alone. As demonstrated throughout this dissertation, metrics also have intrinsic limitations, one of the most significant being their dependence on the data available to—or chosen by—the researcher.

Metrics, therefore, should neither be treated as exhaustive explanations of academic reality nor interpreted as neutral or objective indicators.

To draw attention to these limitations—particularly in research-evaluation contexts—researchers have promoted principles for the responsible use of metrics, such as those articulated in the Leiden Manifesto (Hicks et al., 2015). Calls for better indicators argue that there is a need for new metrics that can better capture various aspects of the editorial and publication process, and that are constructed and used responsibly, while being adaptable to the identification of bias or abuse in their application (Wouters et al., 2019). Institutions have similarly endorsed statements like DORA or issued their own guidelines on responsible metric use. In evaluation settings, the misuse or unreflective application of metrics can negatively affect both individual researchers and broader research cultures. Irresponsible metric practices may disproportionately harm scholars from specific geographical regions, those publishing in non-English languages, or those whose work focuses on local or regionally relevant topics. Such outputs may not be included in mainstream databases, may attract fewer citations, or may be published in formats—such as books—not prioritized in evaluation systems. At the collective level, metric-driven evaluation fosters competition and exacerbates systemic inequalities (Ma, 2021). Indicators also have profund epistemic effects that affect researchers, valuation frameworks and evaluative infrastrucutes (Müller et al., 2917; Rijcke et al., 2015). In scientometric research, an overreliance on metrics can obscure the social dynamics that underpin scholarly communication, and methodological misuse risks undermining the validity of scientometric analyses.

As acknowledged in Chapter Five and throughout this dissertation, bibliometrics alone cannot capture the full complexity of epistemic injustice in science. Fully understanding these dynamics requires a broader set of methods and approaches. Even in the cases examined here, bibliometric findings represent only partial approximations shaped by multiple assumptions. Nevertheless, bibliometrics enables the analysis of large-scale processes that would be difficult or impossible to examine through interview-based, ethnographic, or document-based approaches, which may be better suited for exploring these issues at the micro level. Although metrics cannot reveal the mechanisms underlying epistemic injustice, when treated as data rather than evaluative tools, they can illuminate disparities between groups or communities. In this way, bibliometric studies provide empirical evidence of asymmetries within the scientific system—evidence that can help identify structural and systemic causes of these disparities and support efforts to reduce injustice in research (Ma, 2022).

10.3 Science as a site of friction: final considerations on epistemic justice in science

Can situations of structural injustice be dismantled? This thesis has identified several instances of epistemic injustice in science and outlined a series of possible remedies. Yet important questions remain: are these remedies sufficient? Can isolated interventions counteract epistemic injustice? And even when multiple changes operate simultaneously, can they transform the structural conditions that sustain injustice across different levels?

This dissertation has argued for the importance of institutional remedies in addressing epistemic injustice. However, a closer look to the literature reveals that institutional reforms alone are not enough: structural changes must also permeate the dispositions, beliefs, and behaviors of the individuals who participate in and reproduce unjust systems. Herr's (2025) critique of Dotson is relevant here. Although Dotson (2012) emphasizes the need for structural change—especially for second- and third-order epistemic injustices—she nevertheless assigns an important role to individual agents. For example, third-order change requires individuals to "shift hermeneutical resources" (Dotson, 2012, p. 30), which presupposes that individuals both recognize the availability of alternative interpretive frameworks and are willing to revise their own hermeneutical habits. For Herr, this places too much responsibility on individuals instead of structures ultimately relying on the individual virtues she critiques. But even if we accept that Dotson's account is fundamentally institutional, it remains undeniable that in her view structural changes must also transform the cognitive and cultural orientations of individuals. Marin's (2024) analysis of structural transformative action can add some light on the role of individuals in structural transformations. She argues that the meaning and effects of structural interventions are not entirely under the control of their creators; they depend on how such actions are interpreted and appropriated by the public. Thus, even when institutions attempt to reduce or eliminate structural epistemic injustices, the ultimate impact depends on how individuals internalize and respond to these changes. For Marin, the relationship between agents and structures is bidirectional: agency is "not only compatible, but also enabled by and constituted by structures" (p. 39). Agents can reinterpret and transform the cultural schemas available to them, but only within the possibilities afforded by existing structures. Structural transformation therefore requires the active participation of agents, just as agentic transformation requires supportive structures.

Herr's (2025) proposal advocates radical transformation of legal, political, and economic systems to secure genuine respect for marginalized communities. However, cultural frameworks themselves, she argues, cannot be fully transformed because dominant and marginalized epistemologies are incommensurable. Instead, transformation should aim at ending the hegemony of any single cultural system and recognizing multiple epistemic orders as equally legitimate. This vision aligns with what decolonial scholars describe as 'pluriversality', "a world composed of multiple worlds, the right to be different because we are all equal" (Mignolo, 2002, p. 263). While I agree with Herr, I contend that a certain degree of individual transformation is not only desirable but necessary for plural epistemic frameworks to coexist on equal terms. Bourdieu's notion of cultural capital is instructive here. According to Bourdieu (1986), cultural capital is partially inherited and partially acquired, never instantly transmitted, and not reducible to economic capital, even though the two are related. Economic resources can change rapidly, but cultural capital transforms more slowly. Likewise, structural reforms that benefit previously marginalized groups do not automatically translate into equivalent transformations of cultural capital. Legal, political, and economic reforms are therefore crucial but insufficient: the cultural hegemony of dominant groups will not disappear unless dominant subjects also revise their cultural dispositions.

In this sense, exposure to alternative epistemologies and cultural frameworks becomes essential. Medina (2013) argues that 'experiential disruptions' arising from encounters with significantly different others create opportunities for recognizing interdependence and cultivating critical self-awarenes. For Medina, democracy and therefore epistemic justice requires dissent and fosters what he calls 'multiperspectivalism', which he defines as "the imperative to renew our perplexities and to reinvigorate out openness to alternative standpoints is the imperative to constantly expand our personal as well as shared perspectives and sensibilities, our individual and collective imaginings" (p. 21). What is defended here is not the integration of different cultural frameworks, but the openness to recognize their existence and value. This pluriversal orientation is central to Medina's endorsement of epistemic friction. Epistemic friction is beneficial when it compels self-critique, exposes justificatory gaps, and reorients one's beliefs. For Medina (2013), dissent has intrinsic epistemic value, not only for marginalized subjects but also for privileged ones and for the collective as a whole. Inequality is "the enemy of knowledge", he argues, because "it handicaps our capacity to know and to learn from each other" (p. 27). Exposure to contested viewpoints is thus both inevitable and necessary, provided it is accompanied by epistemic virtues such as openness and humility.

According to Gutiérrez-Valderrama, diversity in science has too often been reduced to cultural difference, neglecting the structural factors that divide scientific communities and marginalize some of them. Science is frequently portrayed as cosmopolitan and placeless, while place-bound knowledges are framed as non-academic or, in Mignolo's (2018) terms, folklore. In such a model, knowledge can circulate without friction because the only valued knowledge is that which fits dominant, Northern standards. Following Harding (2003), a first step towards fairer scientific practices is to recognize all knowledge systems as local, grounded in particular histories, practices, and material conditions. Acknowledging this requires Northern scientific communities to recognize the intellectual authority of other knowledge systems and move towards genuine scientific pluralism. Yet, as Gutiérrez Valderrama argues, recognizing plural epistemologies is not enough. It is also necessary to account for the material and financial inequalities that shape scientific communities globally. Moreover, valuing non-Western knowledge only when it addresses topics stereotypically associated with 'Southern' or indigenous cultures limits the capacity of non-Western scholars to contribute fully to global scientific conversations. In other words, confining subaltern scholars to ‘exotic’ topics eliminates epistemic friction entirely as if their work never overlaps with mainstream research agendas, there is no opportunity for dissent, critique, or mutual epistemic engagement. This situation produces multiple forms of epistemic injustice and ultimately undermines scientific progress.

Medina (2013) argues that the absence of epistemic friction produces epistemic ignorance, which is inherently detrimental to knowledge. Although science unavoidably produces both knowledge and ignorance (Kourany, 2022), actively producing ignorance is incompatible with scientific progress. For Longino (1990), objectivity requires multiple, dissenting perspectives precisely because they challenge assumptions that dominant groups may not recognize as assumptions at all. Hermeneutically marginalized groups thus hold epistemic advantages, since they are better positioned to perceive gaps in prevailing interpretive frameworks. Applied to science, this underscores the importance of including historically marginalized communities and epistemologies as equal participants. Their contributions expand dominant knowledge systems and reveal hermeneutical limitations within them. This process requires not only structural transformation but also cultural and epistemic shifts within dominant scientific communities—what decolonial scholars describe as ‘rethinking thinking’ or ‘unlearning in order to relearn’ (Ndlovu-Gatsheni, 2018; Tlostanova & Mignolo, 2012). Returning to Herr (2025), it follows that scientific institutions bear responsibility for creating the structural conditions necessary for a pluriversal, pluralist, or multiperspectivalist science. They must also foster the epistemic virtues—openness, humility, and responsiveness—that enable dominant communities to recognize the value of epistemic friction and embrace it as a core component of the scientific process. In other words, remedies for epistemic injustice in science—regardless of their specific focus—must aim to reduce the asymmetries between communities so that friction and contestation between epistemologies can occur on equal terms.

CHAPTER ELEVEN
CONCLUSION

Scientific knowledge is produced, communicated, and evaluated through processes that are neither neutral nor evenly distributed. This dissertation set out to examine how these infrastructures participate in the creation and reproduction of epistemic injustices within the global scientific system, with particular attention to the African scholarly publishing landscape. By bringing the conceptual framework of epistemic injustice into dialogue with bibliometric methods, the thesis has sought not only to diagnose structural inequities but also to explore how alternative, open, and regionally grounded data sources might contribute to a more inclusive and just representation of global scholarship. This concluding chapter synthesizes the main contributions of the dissertation, reflects on its limitations and implications, and outlines directions for future research.

The central aim of this work has been to investigate how epistemic injustices manifest across key stages of the scientific process, and how bibliometric tools can both reveal and inadvertently reinforce these patterns. The dissertation was motivated by a dual observation: first, that the infrastructures used to map and assess science—particularly commercial bibliographic databases—are structured by geographical, linguistic, and disciplinary biases; and second, that the conceptual vocabulary of epistemic injustice offers a powerful yet underutilized lens for analyzing these inequalities. Africa was chosen as the focal empirical context not because it represents a unique case of marginalization but because it offers a particularly revealing vantage point from which to observe how global research hierarchies operate. African scholarly publishing is characterized by a rich ecosystem of local journals, multilingual practices, and diverse epistemic traditions, yet these outputs remain chronically underrepresented in mainstream databases. Studying African journals and publications across both commercial and open infrastructures has therefore provided a concrete way to examine how structural epistemic injustices unfold at the publication and uptake stages.

The overarching purpose of the dissertation has been both analytical and transformative: to understand how the scientific knowledge production process is shaped by epistemic power relations, and to explore whether and how these relations might be reconfigured to support more equitable scientific systems.

11.1 Brief recapitulation

One of the most significant contributions of this dissertation lies in the development of a conceptual and analytical framework that bridges epistemic injustice theory with scientometric practice. While notions such as testimonial injustice, hermeneutical marginalization, contributory injustice, and epistemicide have been widely discussed in social epistemology, their relevance to the study of scientific communication has been underexplored. This dissertation advances the field by articulating how different varieties and orders of epistemic injustice arise across the stages of producing, communicating, transferring, historicizing, and analyzing science. The open taxonomy of epistemic injustices in science developed here provides a flexible structure for understanding how injustices emerge through differential access to material and epistemic resources, agenda-setting asymmetries, selective journal representation, credibility deficits, patterns of recognition and citation, and biases in research evaluation. By connecting philosophical concepts to concrete scientific practices, the taxonomy offers a tool that can be adapted to different contexts. Importantly, the conceptual framework emphasizes the need to complement virtue-based approaches—which focus on individual behaviors—with structural and infrastructural interventions. This reinforces the argument that epistemic injustices in science cannot be adequately addressed without attending to the systems, norms, and technologies that shape scholarly communication at scale.

Methodologically, the dissertation demonstrates that while bibliometric indicators cannot fully capture the complexity of epistemic injustice, they can be mobilized to investigate selected dimensions of these phenomena. By translating aspects of epistemic injustice into bibliometric variables—such as journal inclusion, geographical location, language, citation patterns, and metadata completeness—the thesis shows how structural asymmetries can be made empirically visible. The methodological contributions therefore extend the uses of bibliometrics beyond traditional performance measurement toward more reflexive and critical modes of analysis. A further contribution lies in the critical examination of bibliographic data infrastructures themselves. The thesis provides a systematic assessment of OpenAlex and AJOL, highlighting both their potential as inclusive, open alternatives to commercial databases and their persistent limitations in coverage, metadata accuracy, and reliability. The findings offer concrete evidence that data infrastructures are not neutral mirrors of scientific activity but active participants in shaping what is considered visible, credible, and valuable.

Empirically, the dissertation contributes a multidimensional analysis of epistemic injustice in African scholarly publishing. Chapter Six shows how African journals are represented differently across AJOL, Scopus, and Web of Science, demonstrating how indexing decisions reflect specific understandings of journal quality and legitimacy. This analysis highlights the role of selective inclusion practices in producing credibility deficits and underscores the importance of diverse quality frameworks, such as AJOL's Journal Publishing Practices and Standards (JPPS). Chapter Seven examines citation patterns associated with different conceptualizations of local research, revealing how locality is recognized and valued within African and international scholarly networks. The findings suggest that research more closely grounded in local contexts may face particular barriers to uptake, depending on the conceptualization of locality applied. Chapter Eight evaluates whether OpenAlex improves the representation of African scholarship relative to commercial databases. While OpenAlex offers broader coverage and greater potential for inclusive analyses, the chapter identifies persistent metadata gaps and inaccuracies that limit its effectiveness as a remedy for epistemic injustice. Chapter Nine presents a concrete infrastructural contribution: the creation and dissemination of a relational database of AJOL-indexed journals and publications. This resource enhances reproducibility and supports future research, representing a step toward the epistemic decentralization of bibliometric tools. The chapter also highlights both the potential and the limitations of AJOL as a bibliographic source.

The findings of this dissertation carry important implications for research evaluation, bibliometric practice, and scholarly communication. For bibliometric research, the thesis underscores the importance of data provenance and the need for reflexivity in database selection. Researchers must recognize that infrastructural choices are epistemic and political choices. The work also advocates methodological pluralism and the integration of conceptual tools from the humanities and social sciences into scientometrics. For research evaluation, the dissertation demonstrates the risks of relying exclusively on commercial databases when assessing institutions or researchers in underrepresented regions. Open and regional infrastructures such as AJOL and OpenAlex broaden the evidentiary base, but their limitations must also be acknowledged. Evaluation practices aligned with epistemic justice principles must be contextualized, multifaceted, and attentive to structural inequities. For scholarly communication, the analyses highlight the value of regional publishing ecosystems and the need to support infrastructures that amplify local voices. Recognizing the legitimacy of diverse quality models, publication formats, and linguistic practices is essential for fostering a more global and inclusive scientific system.

11.2 Limitations and future research towards epistemic justice in science

Like any research project, this dissertation faces limitations that should be acknowledged. Several empirical limitations are presented in Chapters Six to Nine; here I highlight those that cut across the project as a whole. First, the analyses rely on existing bibliographic databases—AJOL, OpenAlex, Scopus, and Web of Science—each of which embodies particular biases and constraints. Consequently, the findings reflect not only the structure of African scholarly publishing but also the blind spots of the infrastructures used to study it. Second, while the dissertation operationalizes selected dimensions of epistemic injustice through bibliometric variables, such operationalizations inevitably simplify and abstract from the rich, contextual, and often qualitative nature of these injustices. Complex phenomena such as testimonial injustice or hermeneutical marginalization cannot be fully captured through quantitative indicators alone. Third, the focus on Africa provides a deep and contextually grounded case study, but the findings may not be directly generalizable to other underrepresented regions. Latin America, South and West Asia, for instance, have distinct scholarly ecosystems that warrant independent study. Finally, the researcher's positionality—situated within the Global North and working within the field of scientometrics—inevitably shapes the framing, interpretation, and methodological decisions of the thesis. Reflexivity is essential, but it cannot eliminate the broader positional asymmetries embedded in knowledge production.

The dissertation opens several avenues for future investigation. Conceptually, future work could expand the taxonomy developed here, contributing to a more multifocal, nuanced understanding of epistemic injustice in science. Empirically, further research could examine other dimensions of epistemic injustice using bibliometric, qualitative, or mixed-method approaches. Mixed-method studies—such as interviews with editors, authors, and reviewers; ethnographies of publishing practices; or analyses of peer review dynamics—could offer deeper insights into how epistemic injustices are enacted at the micro-level of scholarly communication. Comparative studies could extend the analysis to other regions with strong regional infrastructures, such as Latin America, South or West Asia, enabling broader insight into how epistemic injustices manifest across different contexts. Future work could also assess additional open infrastructures—such as Crossref, OpenCitations, or LA Referencia—and examine how their coverage and metadata practices shape bibliometric representations of underrepresented regions. Finally, future research could explore the design of alternative indicators aligned with epistemic justice principles, such as measures of community relevance, multilingual dissemination, or forms of recognition beyond citation counts. Building and sustaining open, equitable scientific infrastructures will require continued experimentation, collaboration, and theoretical development.

In sum, this dissertation has argued that scientometric tools and infrastructures are not passive mirrors of scientific activity but active participants in the construction of epistemic realities. They shape what becomes visible, who is recognized as a contributor, and which forms of knowledge are deemed credible—carrying profound ethical and political significance. By bringing epistemic justice into dialogue with bibliometrics, the thesis has sought to open space for more reflexive, inclusive, and responsible approaches to studying and evaluating science. The analyses presented here represent a small step toward the broader goal of epistemic decentralization: reimagining scientific systems that value plurality, contextual relevance, and equitable representation. Transforming how science is represented and assessed will require not only conceptual clarity and methodological innovation but also collective commitment across the scholarly community. With this dissertation, I hope to contribute to that ongoing process and to encourage further reflection on how we can build infrastructures and practices that support a more just and diverse global knowledge system.

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