



**FROM HIDDEN TO HIGHLIGHTED: TRANSFORMING SCHOLARLY VISIBILITY
THROUGH METADATA PRACTICES IN NIGERIA**

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Abstract

This study explores the relationship between metadata practices and scholarly visibility within Nigerian institutional repositories between 2020 and 2024. Recognizing metadata as the backbone of digital resource discoverability, the research investigates how metadata quality influences citation metrics and overall accessibility of scholarly outputs. Employing a quantitative methodology, data was sourced from the Directory of Open Access Repositories (OpenDOAR) to evaluate 27 functional repositories across Nigeria. Key descriptive metadata elements, including titles, authors, abstracts, and keywords, were assessed for completeness and adherence to international standards. The findings reveal significant gaps in metadata practices, with repositories displaying varying levels of completeness and citation impact. Notably, repositories with comprehensive metadata fields exhibited higher citation levels, highlighting the importance of metadata in enhancing scholarly visibility. The study emphasizes the

urgent need for skilled personnel, adherence to global metadata standards, and institutional support to optimize Nigeria's repository infrastructure. A strategic framework is proposed to address these gaps, focusing on repository functionality, metadata completeness, and user engagement, to improve the discoverability and impact of Nigerian academic outputs.

Keywords: *Scholarly Visibility, Metadata Practices, Institutional Repositories, Citation Impact, Metadata Standards*

Introduction

Being seen in today's fast-paced world has become one of every human's greatest need. This need can be equated to Maslow's esteem needs within the hierarchy of human motivation, which emphasize recognition, status and respect. In the academia this recognition comes as a result of scholarly work and citation which earns visibility. This study endeavours to highlight metadata practices and effect on scholarly visibility in Nigeria repositories. Metadata practices play a pivotal role in ensuring the discoverability of digital items, thereby directly influencing scholarly visibility (Zhu 2023). Scholarly visibility, particularly in the digital age, is a vital determinant of the impact, relevance, and contribution of academic works. Scholarly visibility refers to the extent to which academic work is discoverable, accessible, and recognized within and beyond the academic community. Visibility encompasses the reach of a scholar's research outputs, such as journal articles, conference papers, theses, and datasets. It is closely tied to the accessibility of these outputs in repositories, databases, and platforms, as well as their impact, which is often measured by citations, usage metrics, and altmetrics (Holter, 2020; Phiri, 2018). The advent of open-access initiatives and digital repositories has created new opportunities for enhancing scholarly visibility in Nigeria. Platforms such as institutional repositories and subject-based repositories offer avenues for sharing research outputs widely and freely. However, the success of these platforms in achieving visibility is closely tied to the quality of their metadata. Poorly created metadata can render even the most valuable resources invisible, while high-quality metadata can significantly amplify the reach and impact of scholarly works.

Scholarly Visibility is important to both institution and individual. For universities, the visibility of their scholars' work contributes to institutional prestige. High visibility often translates to higher rankings in global university ranking lists, as metrics like citation counts and research impact are integral to these ranking methodologies (Ezema & Eze, 2024). Universities with a strong academic presence attract better funding, partnerships, and talented students and researchers. For scholars on the other hand visibility is a gateway to academic impact. Research outputs that are easy to discover and access are more likely to be cited by other researchers, thereby enhancing the scholar's academic footprint. Citations are often used as representations for research quality and influence, making visibility essential for career advancement. In the digital era, scholarly visibility has become a central concern for universities and scholars, as it influences academic

reputation, funding opportunities, collaboration potential, and overall impact within the research community.

Metadata, frequently defined as "data about data," refers to indicators that describes, explains, locates, or in any other case makes it simpler to retrieve, use, or manage a resource. Metadata plays a critical role in the organization and discoverability of digital resources, serving as a bridge between the user and the information (American Library Association, 2010; Bsb, 2012; Mosha & Ngulube, 2023). In the context of academia, metadata practices refer to the creation, implementation, and management of metadata for scholarly outputs, digital repositories, and institutional databases. Efficient metadata practices are essential for enhancing the visibility and accessibility of scholarly work, enabling institutions to organize vast amounts of digital content systematically while adhering to global standards for interoperability and discoverability. Metadata is typically categorized into three main types: descriptive metadata which provides information to identify and locate a resource, such as titles, authors, abstracts, and keywords; structural metadata defines how components of a resource are organized, such as the relationships between chapters in an e-book or sections of a digital archive and administrative metadata which offers information to manage a resource, including rights management, preservation data, and technical specifications (American Library Association, 2010; Miller, 2020).

With the constant evolution of the academic landscape and digital presence taking a front burner, metadata practices have to be painstakingly undertaken as an essential tool in ensuring that scholarly outputs are both discoverable and accessible. Scholarly visibility is not a reflection of just producing high-quality research. It is also heavily influenced by how such research is presented, indexed, and retrieved in digital systems. Metadata requires precision, consistency, and an understanding of how users search for and interact with information. Metadata practices form the backbone to the visibility of repository items. These practices are all activities which are undertaken in the ingestion process of items into a repository. The practice facilitates identification and indexing of items thereby connecting digital resources to the scholars, practitioners, and policymakers who need them. Nigerian Universities journey toward achieving effective scholarly visibility is fraught with a myriad of challenges ranging from inadequate technological infrastructure to skilled personnel. In recent years tertiary institutions through the tertiary education fund (TETFund) have been able to stem the challenge of technological infrastructure to a large extent. However, the issue of skilled personnel still persists. This is especially troublesome since effective metadata serves multiple purposes, it facilitates search engine optimization, enhances resource discoverability within repositories, and ensures interoperability between digital systems.

Despite the recognized importance of metadata practices, several gaps remain in their implementation within Nigeria. The lack of skilled professionals trained in metadata creation and management is one of the most critical barriers. Without adequate training and capacity building, metadata practices often fall short of achieving their intended

goals. Adopting internationally recognized metadata standards, such as Dublin Core or MARC, has become a best practice for institutions aiming to enhance the visibility of their digital items. Yet, the extent to which these standards are applied in Nigeria varies significantly reflecting disparities in resources, expertise, and institutional priorities. This study therefore aims at emphasizing through data the gaps in metadata practices in Nigeria with a view towards developing a framework for scholarly visibility of Nigerian repositories.

Aim of the study

To identify gaps in the metadata practices of Nigeria based on repository digital items visible on google and further suggest a strategy framework for improving scholarly visibility in Nigerian repositories.

Literature Review

The literature review was discussed under the following headings: metadata practices, metadata practices and repository digital items, Metadata Practices & Scholarly Visibility, Scholarly Visibility & Repositories in Nigeria and Policy and Institutional Frameworks for Metadata Practices in Nigeria.

Metadata Practices

Metadata refers to structured information that describes, explains, locates, or otherwise facilitates the retrieval, use, or management of an information resource (Miller, 2009)It encompasses various forms, from basic bibliographic data to technical, administrative, and preservation-oriented information. Metadata practices play a central role in organizing, sharing, and preserving digital information, especially as digital repositories and information systems advance. Metadata serves as both a process and a product, created through human and computational efforts to improve resource discovery and usability (Leipzig et al., 2021).

The evolution of metadata practices highlights the balance between local needs and global standards. For instance, Shreeves et al (2005) explored metadata quality in federated collections, revealing discrepancies between localized practices and the requirements for interoperable metadata. Similarly, Palmer et al (2007) conducted a longitudinal study of metadata in collection federation, emphasizing the tension between institutional priorities and adherence to standardized schemas. Metadata's utility extends beyond libraries to applications such as consumer photo management (Testic, 2005) and scientific repositories (Greenberg et al., 2009), underscoring its flexibility and impact across disciplines.

Standards like Dublin Core (DC), Learning Object Metadata (LOM), and IEEE have driven metadata development. Hillmann & Westbrook, (2004) traced the historical trajectory of these standards, demonstrating their role in addressing emerging challenges in digital environments. Tailored metadata solutions have also facilitated projects like MIT's OpenCourseWare (Lubas et al., 2004). Furthermore Ma (2009), investigated

metadata practices in ARL libraries, underscoring the importance of ongoing evaluations to align practices with technological advancements.

Meta-data Practices & Repository Items

Metadata practices underpin the organization and reuse of data in repositories, enhancing resource discoverability and preservation. A key challenge lies in adhering to metadata standards, which differ across disciplines and repositories. Dietrich (2010) highlighted the importance of minimal metadata requirements for interoperability and effective data staging. Quality control mechanisms are critical in light of this Park & Tosaka (2010) stressed the need for aligning metadata with organizational goals. Similarly, Thompson et al (2019) advocated for librarian-manager collaboration to streamline metadata workflows. The integration of standards such as DC, MARC, and BIBFRAME remains vital to repository design. Haynes (2018) explored their applications in digital repositories, noting ongoing debates on adapting standards to emerging needs. Research has also focused on metadata's role in facilitating data reuse, with Kim (2021) highlighting its importance for STEM researchers. In Nigeria, Kari & Baro (2016) revealed limited adoption of comprehensive digital preservation policies in university repositories. While methods like digitization and cloud computing have been advocated to preserve theses (Ifijeh, 2014), challenges such as inadequate infrastructure and funding persist.

Metadata Practices & Scholarly Visibility

Metadata significantly enhances scholarly visibility by facilitating resource discoverability and indexing. Alhuay-quispe et al (2017) demonstrated a positive correlation between metadata quality and visibility on platforms like Google Scholar. Institutional repositories (IRs) play a pivotal role in promoting scholarly outputs, though limited adoption and metadata coverage in regions like the global South hinder discoverability (Phiri, 2018). Tmava & Alemneh, (2013) highlighted metadata compliance as critical to maximizing digital resource visibility. Structured data integration and metadata optimization further improve research discoverability. Kasakliev et al (2020) linked adherence to metadata standards with higher citation rates, while Schilhan et al (2021) introduced academic search engine optimization (ASEO) to enhance indexing efficiency. Open-access repositories have also proven transformative in their role in author visibility through transparent metadata standards. Moshia & Ngulube (2023) discussed metadata standards for discovery and use and advocated for more training for major stakeholders to boost content exposure.

Scholarly Visibility & Repositories in Nigeria

Institutional repositories (IRs) in Nigeria are crucial for enhancing scholarly visibility, though their implementation faces challenges. Ezema, (2011) highlighted the transformative potential of IRs in addressing the underutilization of Nigerian research outputs. However, poor infrastructure, low awareness, and insufficient training limit their effectiveness (Chukwueke et al., 2020). Adeyemo & Jamogha (2021) noted that a lack of institutional prioritization affects visibility and university rankings. Limited IR

adoption in Nigerian universities exacerbates these challenges. Orsu, (2019) found that South-East Nigerian universities lack adequate repository training. Ezema & Onyancha, (2017) observed that while IRs can bridge the digital divide, few repositories are operational. Abba & Anene (2022) advocated for online platforms to complement IRs in boosting researcher visibility, while Ezema & Eze (2024) stressed improving metadata quality to enhance global academic standing.

Policy and Institutional Frameworks for Metadata Practices in Nigeria

Robust policies and institutional frameworks are vital for advancing metadata practices in Nigeria. Oberhiri-Orumah & Baro (2022) highlighted the need for access, content, and submission policies to enhance IR functionality. Posigha & Idjai (2022) identified inconsistent policies across Nigerian universities as a barrier to effective metadata management, further hindered by inadequate funding and expertise (Alex-Nmecha & Onifade, 2023). A lack of national frameworks also has greatly affected metadata adoption. Ola (2016) advocated for centralized frameworks to promote open access and interoperability. Salau et al (2020) highlighted the absence of policies for electronic theses and dissertations (ETDs), which restrict long-term access. National policy gaps also hinder global metadata standardization, as fragmented frameworks prevent harmonization (Adam & Kaur, 2021). Based on the reviews there is still an obvious need for institutional policies on digital preservation as highlighted by Gbaje & Mohammed (2017), these will be centred and ensure metadata-driven accessibility.

Methodology

The study adapted a similar methodology as Mosha & Ngulube, (2023), this study used a quantitative research approach to examine metadata practices in Nigerian institutional repositories (IRs) and propose a framework for enhancing their scholarly visibility. Data was sourced from the Directory of Open Access Repositories (OpenDOAR) to compile a comprehensive list of operational repositories in Nigeria, covering federal, state, and private universities, as well as governmental institutions. The collected data underwent a cleaning process to remove duplicate entries, ensuring the uniqueness of each repository. The accessibility of repositories was verified through a functional analysis of their Uniform Resource Locators (URLs), categorizing them as live or inactive. Live URL's and the captured data were cross referenced on Google Scholar for Metadata records which had been indexed from 2020 to 2024. The cross referencing focused on key descriptive fields such as titles, authors, abstracts, subject, keywords, publication dates and citation count. To establish the visibility the researchers used a citation metric of high, average and low. High meant that digital items of the repository for any scholar within the period of 2020- 2024 had a citation of 61 and above. While average was measured as between 31-60, low meant the citation count for the years observed was less than or equal to 30.

This evaluation assessed the completeness and adherence of metadata to international standards, emphasizing the presence and consistency of elements like titles, creators, subjects, and dates. Descriptive statistical methods were used to summarize metadata

quality. Ethical considerations data privacy, were upheld throughout the study. Through the systematic analysis of metadata practices, the methodology provides insights to guide the development of a framework for improving metadata quality and enhancing the discoverability of scholarly works in Nigerian IRs.

Data analysis and discussion

Within the OpenDoar repository database, there are a total of thirty-five (35) repositories indexed and listed from Nigeria. An analysis of the 35 repositories indexed in OpenDoar showed that of a total of 35 indexed repositories only 27 were germane. Which meant that eight (8) of the listed repositories were duplicates and therefore removed from the list. Table 1 is a representation of this list and their functionality on the World Wide Web (WWW).

Name of Institution Repository	Functionality	Institution type
Ajayi Crowther University Repository	no	Private
African Digital Health Library- University of Ibadan	yes	Federal
Ahmadu Bello University Institutional Digital Repository	yes	Federal
Ambrose Alli University Ekpoma Institutional Repository	no	State
American University of Nigeria (AUN) Digital Repository	yes	Private
Benue State University Institutional Repository	no	State
Bingham University Digital Repository	no	Private
Elizade University Space	yes	Private
Ebonyi State University Institutional Digital Repository	yes	State
Federal University Ndufu-Alike Ikwo Repository Archive	no	Federal
Federal University of Technology Owerri Repository	yes	Federal
Federal University Dutsin-ma Institutional Repository	no	Federal
Federal University Lokoja Institutional Repository	no	Federal
Federal University Oye-Ekiti Institutional Repository	no	Federal
Federal University of Technology, Minna Institutional Repository	yes	Federal
Federal University of Technology, Akure	no	Federal
Nasarawa State University Keffi Repository	yes	State
National Repository of Nigeria	yes	Government
Repository of the Central Bank of Nigeria	no	Government
Usman Danfodio University Open Educational Resources	yes	Federal
University of Ibadan Repository	no	Federal
University of Ilorin Institutional Repository	no	Federal
University of Jos Institutional Repository	yes	Federal

University of Lagos Institutional Repository	yes	Federal
Afe Babalola University Repository	yes	Private
Covenant University Repository	yes	Private
Landmark University Repository	yes	Private

Table 1: List of repositories in Nigeria and their functionality

The table 1 is a representation of all repositories within Nigeria belonging to government bodies, alongside federal, state and private universities. The Figure 1 is a pictorial depiction of the Indexed institution on OpenDoar.

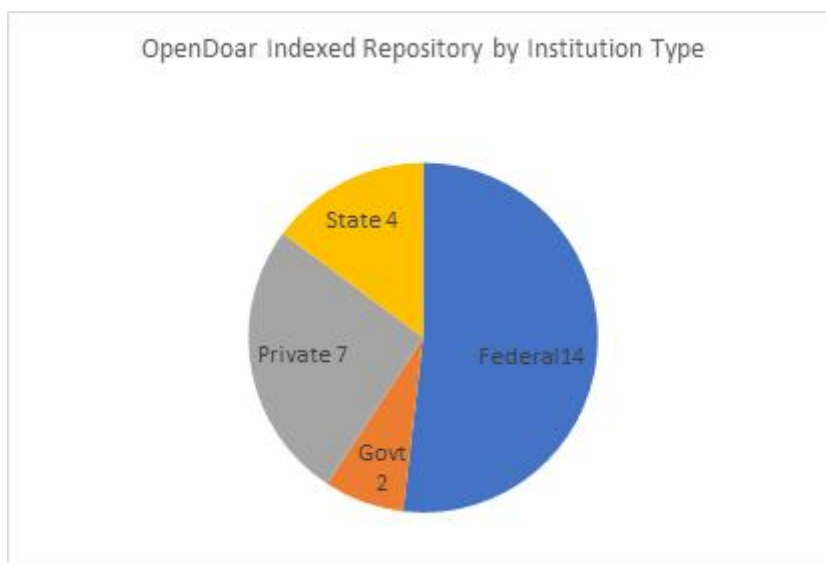


Fig 1: Indexed repositories by Institution type

To establish the metadata practices of these institutions, the researchers looked at each functional repository and their ingested digital items for descriptive metadata. Table 2 shows the repositories, the repository URL and descriptive metadata which was indexed on Google Scholar as at December 2024.

Name of Institution Repository	URL	Title	Author	Keyword	Abstract	Publication date	Subject	Item type	Citation count
African Digital Health Library-University of Ibadan	http://adhliui.com.ui.edu.ng/	Present	Present	Absent	Present	Present	Present	Present	Average

Ahmadu Bello University Institutional Digital Repository	https://kubanni.abu.edu.ng/home	Present	Present	Absent	Present	Present	Absent	Absent	Low
American University of Nigeria (AUN) Digital Repository	http://digitallibrary.aun.edu.ng:8080/xmlui/	Present	Present	Absent	Present	Present	Absent	Present	Low
Elizade University Space	https://repository.elizadeuniversity.edu.ng/	Present	Present	Absent	Present	Present	Present	Present	Average
Ebonyi State University Institutional Digital Repository	https://ebsu-ir.dspacedirect.org/	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Non
Federal University of Technology Owerri Repository	https://repository.futo.edu.ng/	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Non
Federal University of Technology, Minna Institutional Repository	http://repository.futminna.edu.ng:4000/home	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Non
Nasarawa State University Keffi Repository	https://keffi.nsu.edu.ng/home	Present	Present	Absent	Present	Absent	Absent	Present	Low
National Repository of Nigeria	https://nigeriarepository.nln.gov.ng/	Present	Present	Absent	Present	Absent	Absent	Present	Low
Usman Danfodio University Open Educational Resources	http://oer.udusok.edu.ng:8080/xmlui/	Present	Present	Absent	Present	Present	Absent	Present	Low
University of Jos Institutional Repository	https://irepos.unijos.edu.ng/jspui/	Present	Present	Absent	Present	Present	Absent	Present	Low
University of Lagos Institutional Repository	https://ir.unilag.edu.ng/home	Present	Present	Absent	Present	Present	Present	Present	Average
Afe Babalola University Repository	http://eprints.abuad.edu.ng/	Present	Present	Present	Present	Present	Present	Present	High
Covenant University Repository	https://eprints.covenantuniversity.edu.ng/	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Low
Landmark University Repository	https://eprints.lmu.edu.ng/	Present	Present	Absent	Present	Present	Present	Present	Average

Table 2: Metadata practices from Nigeria

Scholarly visibility is measured by the number of times a scholar's work has been seen and cited. From the table three repositories has no visible citation for the period under review though their repositories were seen to be online. A closer inspection of these repositories showed that they had been recently installed and populated. As such citation records were unavailable or had been lost. This is in line with Ezema and Onyanha (2017) and Orsu (2019) who related visibility to poor training on repositories and few repositories being fully operational.

Certain metadata fields more frequently included across repositories (e.g., title, author, abstract), while others (e.g., keywords, subject) are less common and not properly captured. These are indicative of a lack of focus on categorization of digital items which is relevant for discovery. Analysis of subject categorization and citation of the repositories showed a relationship. The relationship indicated a clear link between the completeness of a repository's metadata fields (e.g., title, author, keywords, abstract, publication date, subject, and item type) and its citation level. Which meant that repositories with more metadata elements (like the Afe Babalola University Repository) had higher citation levels, while repositories with missing metadata elements had lower citation levels.

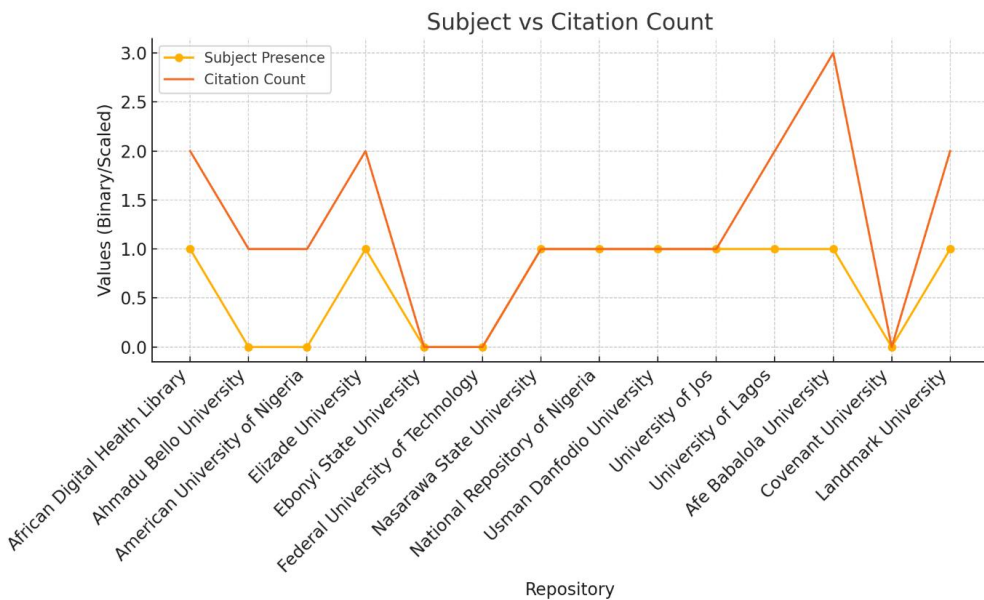


Fig 2: Subject Categorization and Citation Levels of Repositories

Table 3 is a suggested framework for improving scholarly visibility of repository digital items in Nigeria. Based on the data collected and analysed. The framework itemises component category, the priority of the components and an approximate success ratio that should be met for each component to achieve the best results. The component

category is a list that highlights areas that must be looked at like repository functionality, this refers not only to the function of the software but the hardware components like the network infrastructure and power sources. These are essential and should be available to ensure maximum uptime of the repository. Also the metadata completeness of the digital items is a critical area that should be put into consideration. From the data it was established that repositories with full completeness of their metadata showed higher rates of citation. There it is imperative that repository managers ensure the completeness of their metadata. Finally, the user engagement is crucial and this can only be achieved through trainings and user feedback to assess the impact of these trainings.

Component Category	Priority of Components	Approximate Success Ratio
Repository Functionality	System uptime and response time	99.9% uptime
Metadata Completeness	Completeness rate of required fields and compliance with Dublin core standards	≥95% completion rate
Librarian/Faculty Engagement	Training attendance and satisfaction feedback	≥80% participation

Table 3: Framework for improving scholarly visibility in Nigerian repositories.

Conclusion

This study underscores the critical role of metadata practices in shaping scholarly visibility in Nigeria’s institutional repositories. Despite the transformative potential of metadata in enhancing the discoverability of academic outputs, the findings reveal persistent challenges, including inadequate metadata completeness, limited adherence to global standards, and a lack of trained personnel. These challenges contribute to the low citation impact of Nigerian repositories, thereby hindering the global visibility of the nation’s academic contributions.

To address these issues, this research proposes a framework centred on repository functionality, metadata completeness, and librarian/faculty engagement. Enhancing system uptime, ensuring metadata fields are fully populated and aligned with Dublin Core standards, and fostering user training and feedback are identified as essential components of this framework. By implementing these strategies, Nigerian institutions can improve the discoverability and citation of their scholarly outputs, thereby contributing to global academic discourse.

Ultimately, the study highlights the need for sustained investment in repository infrastructure, capacity building for metadata professionals, and the adoption of robust

policies to standardize metadata practices across institutions. These efforts will not only enhance scholarly visibility but also bolster Nigeria's academic reputation and influence in the global research community.

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