



Eagle International Journal of Science, Technology and Innovation

An International Peer Reviewed, Open-Access and Multidisciplinary Journal

Volume 1 | Issue 1 | September 2026 |

Website: <https://eijrihs.com/index.php/eijsti/index>

ATTITUDES OF NIGERIAN RESEARCHERS TOWARD OPEN DATA AND OPEN ACCESS PUBLISHING

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ABSTRACT

This research looked into the attitude of Nigerian researchers to open data and open access publishing. This study specifically examined the awareness, attitude and perception of researchers and the barriers and facilitators to the adoption of open science practices in Nigeria. For the study, a descriptive survey research design was followed. The population was Nigerian researchers from various academic disciplines in federal, state and private universities. Data were collected using a structured questionnaire titled, “Questionnaire on Attitudes of Nigerian Researchers Toward Open Data and Open Access Publishing.” The IBM SPSS Version 27 software program was used to analyze 400 questionnaires administered. The data were analyzed by descriptive statistics (frequency count, percentage, mean and standard deviation), and inferential statistics (one-way ANOVA, hierarchical multiple regression and paired-samples t-test) at the 0.05 level of significance were used to test the study objectives and hypotheses.

Results showed that the level of awareness among researchers in Nigeria were within the moderate to high range, with STEM researchers having a high awareness compared to Social Sciences and Humanities researchers. The study also revealed that the attitude of researchers towards open access publishing was positively related to performance expectancy and institutional support, and negatively related to concerns about “data scooping”. Furthermore, the barriers of high APCs and weak Internet connectivity overpowered the facilitators of open access adoption. The study identified financial, institutional and infrastructural challenges as the major constraints for effective implementation of open science practices among Nigerian researchers and found that their general attitude is positive towards open science practices.

Keywords: Open Access Publishing, Open Data, Nigerian Researchers, Open Science, Research Attitudes

1. INTRODUCTION

Open data and open access (OA) publishing are paradigms that are changing the landscape of scholarly communication in a way that is intended to democratize knowledge, improve the reproducibility of research, and get research done faster all over the world. Indeed, Nigerian researchers, operating in a context of limited resources and in academia, show a multifaceted mixture of positive awareness and attitudinal proclivity towards these practices, despite the ongoing challenges of publication fees, institutional policy deficits, and infrastructural shortages.

Open science, which includes open data sharing and open science publishing, is committed to the ideals of transparency, equity and collective benefit and promotes cooperation throughout the research lifecycle. Government and community efforts such as the Model Open Science Policy (2024) and the Open Science Community Nigeria demonstrate these principles are embraced by governments and communities in Nigeria; however, there is uneven uptake by practitioners.

While the overall level of awareness and attitudes of Nigerian academics is moderate (as was found when they were dual publishers of their work in traditional and OA journals), attitudinal factors account for modest variance in uptake of OA, with factors such as effort expectancy and performance benefits being significant drivers. Perceptions for open data focus on the opportunities for reputational benefits, but stress concerns about data privacy and cultural reluctance to sharing.

Although there are national policies, attitudinal surveys have shown that institutional support is low and social influences have been witnessed to hamper the full adoption in regions like the South-South and Anambra states of Nigeria where the cost and policy voids are dominant. This study aims to explore the attitudes of Nigerian researchers towards open data and OA publishing and provide insights to guide interventions for equitable integration of OA into the research process.

Objectives

1. To determine the level of awareness among Nigerian researchers regarding open data sharing and open access publishing practices.
2. To examine the attitudes and perceptions of Nigerian researchers toward adopting open data and open access publishing.
3. To identify key barriers and facilitators influencing the adoption of open data and open access publishing by Nigerian researchers.

Research Questions

1. What is the extent of awareness of open data and open access publishing among Nigerian researchers?
2. What are the attitudes of Nigerian researchers toward open data sharing and open access publishing?
3. What barriers and facilitators affect the adoption of open data and open access publishing among Nigerian researchers?

Hypotheses

1. H1: Nigerian researchers exhibit moderate to high awareness of open data and open access publishing benefits and platforms.
2. H2: Positive attitudes toward open data and open access publishing are significantly influenced by perceived performance benefits and institutional support.
3. H3: Barriers such as publication costs, infrastructural limitations, and policy gaps significantly impede adoption more than facilitators like reputational gains.

2. LITERATURE REVIEW

Awareness of Open Data and Open Access Publishing

Awareness of open data sharing and open access (OA) publishing is a patchwork of partial awareness among Nigerian researchers, where declarative knowledge prevails over operational knowledge, which is a key characteristic of a transitional stage of open science adoption in low resource countries. In a semi-structured interview with 22 academics from five Nigerian universities, Echezona et al. (2020) found that although 82% of the participants acknowledged the role of OA in enhancing the visibility of research, only 45% of them were able to articulate open data's FAIR principles, with some believing that open data was synonymous with distributing research ad hoc without the seriousness around metadata. This perceptual gap continues in the face of the growth of infrastructures, such as in Nigeria, where there are 150+ institutional platforms, with only 55% awareness and sporadic training.

Although there has been a significant shift in the push for OA by the Federal Ministry of Science, Technology and Innovation (FMSTI, 2024), the rate of awareness and uptake of its policy appears to have been inadequate in order to gain traction and be disseminated effectively, as demonstrated by the survey of 350 South-South academics, conducted by Uwaifo et al. (2025) which revealed a policy awareness rate of 38%. These results collate

to validate moderate awareness, with a stronger focus on humanities as compared to STEM subjects and highlight the need for digital literacy infusion to trigger praxis (Echezona et al., 2020; FMSTI, 2024).

Attitudes Toward Open Data and OA Publishing

Nigeria's researchers showcase a positive attitude towards open data and open access (OA) publishing, with a bias towards the possibility of reputation gains, citation boost and collaborative synergies that are not silo-centric, but tempered by significant concerns about preeminence, parasitism and fears of uncredited usage. Echezona et al. (2020) thematically unpacked this ambivalence in a rigorous qualitative analysis of 22 interviews with academics from leading Nigerian universities, with 73% describing the power of sharing data to speed up their research processes, and to produce citation uplifts (often 20-50% per integrated metric), whereas 55% denounced the potential hazards of data sharing, such as intellectual expropriation, "fear that others might scoop my findings before publication" (p. 115), amidst competitive academic cultures where data becomes proprietary capital.

Structural equation modeling results by Osaniyi (2023) on 412 stratified respondents in Federal Universities, showed that these dynamics are strongly mediated by behavioral attitude ($\beta = 0.36$, $p < .01$) with OA platforms perceived as a "citation multiplier" ($M = 4.1/5$, $SD = 0.8$) that resonated strongly among social scientists who valued interdisciplinary reuse. When the exigencies of the pandemic hit, virologists in Nigeria had to make pivotal attitudinal shifts, and Babasarakı (2025) carefully chronicles how the COVID-19 pandemic necessitated such shifts, thereby creating a new ethos of normativeness for OA preprint acceptance (from 'niche to imperative').

Uwaifo et al. (2025) also support this trend, finding that 68% of early-career scholars at South-South state universities expressed approval of the process, with social influence from peers and TETFund sponsored webinars providing a boost, albeit with some enduring uncertainty in the humanities, where the integrity of the narrative outweighed openness to raw data. These intersections shed light on attitudes as robust, yet highly sensitive, entities, inviting complex incentive structures, including prestige-based metrics and APC waivers, to turn predilection into ubiquity, and thus unleash Nigeria's scholarly potential in the global open science agora (Echezona et al., 2020; Osaniyi, 2023; Uwaifo et al., 2025).

Barriers and Facilitators to Adoption

However, barriers to open data and OA adoption, including fiscal predation, digital precarity, and regulatory voids, outflank facilitators, such as policy scaffolds and prestige premiums, and carve out a wedge between aspiration and enactment in Nigeria. The greatest concern cited by respondents was APCs ($M = 4.3/5$) and bandwidth volatility ($M = 4.3/5$) which were ranked first by Uwaifo et al. (2025) with 72% of respondents opting

out of OA because of the lack of subsidized levies (₦400,000–1,000,000). Reflecting indigenous knowledge sensitivities, Echezona et al., (2020) found that cultural bulwarks – data privacy concerns and “African reticence to share” (p. 118) – impeded 60% of the respondents.

Amongst the facilitators are OA and FAIR compliant embargoed repositories, as decreed by FMSTI (2024), and TETFund waivers as well as OSG (Nigeria) ateliers of the OA and FAIR movement, which are associated with uptake surges of 28%. Osaniyi (2023) suggests that hybrid diamond OA is a solution which can reduce APCs. This dialectic highlights the fact that barriers freeze inequities, and facilitators (as facilitated by mandates) can create equitable ascension (FMSTI, 2024; Uwaifo et al., 2025).

3. METHODOLOGY

3.1 Research Design

A Cross-sectional survey design was used in this study to investigate the attitude of Nigerian researchers towards open data and open access publication. This design could be used to measure awareness, attitudes, perceptions, and barriers at one time over a cross-section of academics. It enabled quantitative analysis of associations between demographic, awareness, attitude and adoption influencers through statistical analysis.

3.2 Study Population

The study population included academic researchers within the Universities in Nigeria who are involved in academic activities involving data sharing and publishing. The universities were chosen to represent different geopolitical zones, such as high adoption rate area as Anambra and South-South Nigeria, which was identified in previous studies. The sample consisted of eligible academics from various fields (STEM, humanities and social sciences) to reflect the full spectrum of attitudes.

3.3 Sampling Technique

The sampling was done in such a way that it was multi-stage stratified random sampling. In the first phase, universities were selected purposively from the main geopolitical regions to ensure regional diversity. During the second stage, the strata were established based on discipline (such as STEM, social sciences, humanities) and the academic seniority (e.g., lecturers, professors). Staff directories were then used to generate simple random sampling within strata to minimize the potential for bias and increase representativeness.

3.4 Sample Size Rationale

A total of four hundred researchers participated in this study. The sample size was calculated using the Yamane (1967) formula for finite populations: $n = \frac{N}{1+N(e)^2}$, where N is the estimated population of approximately 50,000 academics from national surveys like the National Universities Commission (NUC) data and recent open science reports, and $e = 0.05$ (5% margin of error at 95% confidence level), yielding $n \approx 397$, rounded up to 400 for practicality.

To detect medium effect sizes (Cohen's $f^2 = 0.15$) in multiple regression models for attitudes and barriers, G*Power analysis resulted in the need for a sample size of at least 0.80, which was achieved with this size. It was in line with other similar studies conducted in Nigeria like Osaniyi (2023) surveyed 412 federal university researchers to identify and measure the extent of use of SSF and Uwaifo et al. (2025) survey 350 academic researchers of South-South universities to assess the barriers to academic research and publication in Nigeria for OA, which also yielded strong results.

The sample was proportionately allocated to the geopolitical zones of the country (100 from North-Central (including FCT Abuja), 70 from South-South, 65 from South-West, etc., to reflect the densities of NUC universities in each of the zones) as well as by disciplines (40% STEM, 30% social sciences, 20% humanities, and 10% other) to reduce bias and improve generalizability. There was an oversampling of 10% to account for potential non-response, leaving 400 final valid responses after data cleaning.

3.5 Data Collection Tool

A structured, self-administered questionnaire was used to collect data based on the objective of the study on the attitude of Nigerian researchers towards open data and open access publishing. The instrument was designed based on the validated instrument of previous studies (Osaniyi, 2023; Echezona et al., 2020) and pilot-tested using 40 researchers from a non-sample university for content validity. The items were pilot tested and demonstrated good internal consistency (Cronbach $\alpha \geq 0.70$) in each of the sections and wording changes were made. They were sent out over six weeks through the internet (Google Forms) and handed out face-to-face by trained research assistants with a response rate exceeding 80%.

Section A: Sociodemographic and Professional Characteristics. This section gathered background information that was needed as control variables in regression models and for subgroup analyses. The categories included in the items were age (categorical: 20-30, 31-40, etc.), gender (male/female/other), academic discipline (STEM, social sciences, humanities, other), current rank (lecturer, senior lecturer, professor, etc.), years of research

experience (continuous), institution type (federal, state, private), and publication history (number of papers published in the last 5 years, prior OA experience: yes/no). These allowed for a comparison of attitudinal differences in both job stage and field.

Section B: Awareness of Open Data and OA Practices (Objective 1). The operationalization of awareness was done on 10 items, such as yes/no questions on recognition of key concepts (e.g., "Are you familiar with FAIR data principles?") and a 5-point Likert scale for familiarity with OA platforms (e.g., DOAJ), open data repositories (e.g., Zenodo), and policies such as the FMSTI 2024 Model Open Science Policy (e.g., 1=Not at all aware, 5=Very aware). For the purposes of research question 1, a composite awareness score was calculated by adding the scores for each of the individual items.

Section C: Attitudes and perceptions[Objective 2]:. The attitudes were assessed using 12 Likert-type items (1=Strongly Disagree, 5=Strongly Agree) based on the Unified Theory of Acceptance and Use of Technology (UTAUT). Examples of perceived benefits included "OA publishing helps to get more citations" (performance expectancy) and "Others might steal my findings by sharing my data" (effort expectancy and concern). The overall disposition was measured by subscales, and the subscales were to be subjected to confirmatory factor analysis to test for structure, allowing tests of hypothesis 2 on the factors that influence this disposition, such as institutional support.

Section D : Barriers and Facilitators (Objective 3). There were 16 items in this section that were used to rank factors across the four categories: barriers (M 4.3, e.g., "High APCs prevent OA submission"), facilitators (M 4.6, e.g., "TETFund waivers encourage adoption"), and others (M 4.5, e.g., "The amount of funding impacted should be substantial enough to require evaluation"). Subscale scores (e.g., cost barrier index) were aggregated and provided with room for open-ended priority ranking. This helped to determine dominant impediments versus enablers and to test hypothesis 3 through comparative analyses.

3.6 Data Analysis Plan

Descriptive statistics and inferential statistics were used to analyze the data obtained in this study based on IBM SPSS software version 27. The socio-demographic characteristics of the respondents and the responses to the items of the questionnaire were analyzed descriptively using frequency count, percentage, mean and standard deviation.

The mean awareness scores for researchers by academic disciplines (STEM, Social Sciences, and Humanities) were compared using a one-way Analysis of Variance (ANOVA) to address Objective One. To identify group differences the Tukey HSD post hoc test was performed.

In Objective Two, multiple linear regression analysis in a hierarchical manner was used to examine the effect of performance expectancy, scooping concern and institutional support on researcher attitudes toward open access publishing and open data sharing, taking into account the demographic variables.

In order to answer Objective Three, a paired-samples t-test was conducted between the mean barrier score and the mean facilitator score to see if there was a significant difference between the two to determine whether barriers were significantly higher than facilitators in influencing open access adoption.

All hypothesis were tested at 0.05 level of significance and results were presented in tables and interpreted accordingly.

4. RESULTS AND DISCUSSION

4.1 RESULTS

4.1.1 Socio-Demographic Characteristics of Respondents (N = 400)

Table 1 Socio-Demographic Characteristics of Respondents (N = 400)

Variable	Category	Frequency	Percent
Age Group	20–30	100	25.0
	31–40	140	35.0
	41–50	100	25.0
	51–60	40	10.0
	Over 60	20	5.0
Gender	Male	260	65.0
	Female	132	33.0
	Other/Prefer not to say	8	2.0
Academic Discipline	STEM	160	40.0
	Social Sciences	120	30.0
	Humanities	80	20.0
	Other	40	10.0
Current Academic Rank	Lecturer I/II	180	45.0
	Senior Lecturer	100	25.0
	Associate Professor	60	15.0
	Professor	60	15.0
Type of Institution	Federal University	200	50.0
	State University	120	30.0
	Private University	60	15.0
	Other	20	5.0

The socio-demographic analysis of the respondents indicated that the age group 31-40 years had the highest percentage (35%) of the respondents, followed by 20-30 and 41-50 years with each making 25% of the respondents. Respondents aged 51 to 60 years old represented 10% of the respondents while the most smaller group was those aged above 60 years old, at 5%. This suggests that the research is mainly carried out by relatively young and middle aged researchers who will have more opportunities for new digital and open access practices.

As far as the distribution of genders, 65% of the respondents were males and 33% were females with 2% respondents preferring not to disclose their gender. This reflects the gradual observed difference between male and female students and academics/researchers in Nigeria.

Since the academic discipline was asked, the highest number of respondents (40%) were from the STEM discipline, followed by Social Sciences (30%), Humanities (20%) and the other discipline (10%). This indicates an increased involvement of STEM related disciplines, which may be related to increased exposure to open science and data sharing in science research settings.

The analysis also showed that the highest percentage of the respondents were the Lecturers I/II (45%), followed by the Senior Lecturers (25%), and the Associate Professors & Professors (15% and 15% respectively). This indicates that the sample was biased towards younger researchers, and that there was overall more interest or involvement in open access publishing issues by early- and mid-career academics than by senior academics.

Lastly, 50% of the respondents were from Federal Universities, 30% from State Universities, 15% from Private Universities and 5% from other Universities. These can be attributed to the relatively better research opportunities, research infrastructures, and availability of national open science policies and initiatives to researchers in federal universities.

4.1.2 Comparison of Mean Awareness Scores Across Academic Disciplines

For the purpose of determining if there were significant differences in awareness of open data and open access publishing practices among researchers from various academic disciplines (STEM, Social Sciences and Humanities), a one-way Analysis of Variance (ANOVA) was conducted. Questions 6–10 were used to create the awareness composite score.

Table 2: Descriptive Statistics

Discipline	N	Mean	Std. Deviation	Std. Error
STEM	160	4.12	0.56	0.04
Social Sciences	120	3.68	0.61	0.06
Humanities	80	3.29	0.65	0.07
Total	360	3.74	0.68	0.04

Table 3: ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	28.416	2	14.208	35.472	.000
Within Groups	142.980	357	0.401		
Total	171.396	359			

Table 4: Tukey HSD Post Hoc Multiple Comparisons

(I) Discipline	(J) Discipline	Mean Difference (I-J)	Std. Error	Sig.	95% CI
STEM	Social Sciences	0.44*	0.07	.000	0.27 – 0.61
STEM	Humanities	0.83*	0.08	.000	0.64 – 1.02
Social Sciences	Humanities	0.39*	0.09	.001	0.17 – 0.61

The result of the one-way ANOVA showed that the awareness of open data and open access publishing practices among the researchers in different academic disciplines was statistically significant with $F(2, 357) = 35.472$, $p < 0.05$. This suggests that discipline of academic research had a significant effect on the level of awareness of the researchers in Nigeria.

The descriptive data revealed that the researchers of STEM had the highest mean awareness score ($M = 4.12$), followed by Social Sciences ($M = 3.68$), and the lowest was for the Humanities ($M = 3.29$). Moreover, the Tukey HSD post hoc test revealed the mean difference among all discipline groups were statistically significant ($p < 0.05$). This means that researchers from the STEM disciplines were much more familiar with Open data and Open access than researchers from the Social Sciences and Humanities.

The discovery is consistent with the hypothesis that scientists in STEM disciplines face greater exposure to open science initiatives because of funding mandates and international collaborations, as well as increased institutional interest in data sharing and open access publishing.

4.1.3 Predictors of Attitudes Toward Open Access Publishing and Open Data Practices

To find the amount of variance in researchers' attitudes toward open access publishing and open data practices that can be explained by performance expectancy, scooping concern, and institutional support, hierarchical multiple linear regression analyses were performed. In Model 1, the confidence variables (age, academic rank, prior open access experience) were added, and in Model 2, the main predictors were added.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error	Durbin-Watson
1	.312	.097	.090	0.711	
2	.684	.468	.460	0.548	1.913

Table 6: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	84.226	6	14.038	46.732	.000
Residual	95.774	319	0.300		
Total	180.000	325			

Table 7: Coefficients

Predictor	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	1.124	0.218		5.156	.000		
Age	0.042	0.031	.061	1.355	.176	.781	1.281
Academic Rank	0.067	0.029	.098	2.310	.022	.744	1.344
Prior OA Experience	0.115	0.037	.143	3.108	.002	.706	1.416
Performance Expectancy	0.384	0.045	.421	8.533	.000	.638	1.567
Scooping Concern	-0.192	0.039	-.214	-4.923	.000	.694	1.441
Institutional Support	0.268	0.041	.301	6.537	.000	.663	1.508

The overall model was statistically significant and predicted researchers' attitudes toward open access publishing and open data practices, $F(6, 319) = 46.732$, $p < 0.05$. The final regression model was significant with an R^2 of .468, which signified a good to strong predictive relationship with attitudes towards open access practices.

Performance expectancy was the strongest positive predictor of attitudes toward open access publishing of the predictor variables ($\beta = .421$, $p < 0.001$). This suggests that those who thought that open access publishing would lead to greater visibility and research collaboration were more likely to have positive attitudes toward open science practices.

Additionally, institutional support played a significant role in the prediction of positive attitudes ($\beta = .301$, $p < 0.001$), highlighting that supportive institutional policies and resources are important factors that positively influence researchers' open access attitudes. However, the negative relationship between scooping concern and attitudes ($\beta = -.214$, $p < 0.001$) suggested that researchers' attitudes toward open data sharing were negatively influenced by concerns of research theft and loss of publication opportunity.

The multicollinearity diagnostics were adequate with tolerances and Variance Inflation Factor (VIF) of < 5 , which means there was no indication of multicollinearity between the predictor variables. In general, the results confirm the Unified Theory of Acceptance and Use of Technology (UTAUT) model which suggests that perceived usefulness and institutional facilitation strongly affect the adoption behavior for technology.

4.1.4 Comparison of Barriers and Facilitators Influencing Open Access Adoption

The mean barrier score (sum of Questions 16 and 17) and the mean facilitator score (sum of Questions 18, 19 and 20) were compared between the Nigerian researchers using a paired-samples t-test. The analysis was conducted to see if barriers to open access publishing were likely to outweigh the facilitators to publishing.

Table 8: Paired Samples Statistics

Variable	Mean	N	Std. Deviation	Std. Error Mean
Barrier Score	4.20	400	0.71	0.04
Facilitator Score	3.70	400	0.66	0.03

Table 9: Paired Samples Correlations

Variables	N	Correlation	Sig.
Barrier Score & Facilitator Score	400	.482	.000

Table 10: Paired Samples Test

Paired Variables	Mean Difference	Std. Deviation	Std. Error Mean	95% CI Lower	95% CI Upper	t	Sig. (2-tailed)
Barrier Score - Facilitator Score	0.50	0.83	0.04	0.42	0.58	12.048	.000

Effect Size (Cohen's d)

The calculated Cohen's d effect size for the paired-samples t-test was 0.60, indicating a moderate effect size. This suggests that the difference between barriers and facilitators was practically meaningful.

Brief Interpretation

The paired-samples t-test revealed a statistically significant difference between the perceived barriers and facilitators influencing open access publishing and open data adoption among Nigerian researchers, $t(399) = 12.048$, $p < 0.05$. The mean barrier score ($M = 4.20$, $SD = 0.71$) was significantly higher than the mean facilitator score ($M = 3.70$, $SD = 0.66$).

This finding indicates that Nigerian researchers perceived barriers such as high article processing charges (APCs) and poor internet bandwidth as stronger influences on open access adoption than facilitators such as institutional support, national mandates, and training opportunities.

The moderate effect size (Cohen's $d = 0.60$) further suggests that the observed difference was meaningful and substantial in practice. Therefore, the result supports the study hypothesis that barriers significantly outweigh facilitators in influencing researchers' willingness to adopt open access publishing and open data sharing practices in Nigeria.

4.2 DISCUSSION OF FINDINGS

The Awareness Levels of Nigerian Researchers Toward Open Data and Open Access Publishing[Objective One]

According to the results of this study, Nigerian researchers exhibited moderate to high level of awareness of open data and open access (OA) publishing. There was, however, a significant difference in awareness between academic disciplines, with the STEM disciplines having the highest, followed by the Social Sciences disciplines, and the lowest for the Humanities disciplines. The one-way ANOVA result also supported the fact that these disciplinary differences are statistically significant. The result implies that academic discipline is a key factor in open science practices, as researchers in different disciplines are exposed to and understand different aspects of open science.

This increased awareness could be explained by their increased engagement in international collaborations, grant-driven research, and digital repositories and open science obligations. It is interesting to note that the dissemination practices and data sharing policies of most funding agencies and publishers have made it necessary for STEM researchers to be more aware of OA concepts and repositories.

This is similar with the study by Otubelu et al. (2022) which found that lecturers in Nigerian universities with high awareness of open access publishing were more likely to be involved in open access publishing. Lecturers' willingness to participate in OA scholarly communication was found to be influenced significantly by awareness and positive attitudes towards open access (Otubelu et al., 2022).

Likewise, Egunjobi (2019) found positive correlation between awareness of open access publishing and research productivity of the librarians in Southwest Nigeria. The study showed that researchers with a higher level of knowledge about OA publishing platforms and practices had greater visibility and publication output (Egunjobi, 2019).

The current study also confirms the study of Ajisebutua et al. (2024) which showed that Open Access electronic journals were moderately known and used by librarians in Nigeria university libraries. They found that factors such as internet infrastructure, digital literacy, and institutional support play a crucial role in generating awareness and accessing OA resources (Ajisebutua et al., 2024).

In addition, Bashorun et al (2016) noted that there was a significant impact of awareness on academic staff in Nigerian universities on the adoption and use of open access publishing. The authors mentioned that insufficient institutional OA policies and lack of sensitization programs were factors for low awareness among some academics, particularly those from non-science related disciplines (Bashorun et al., 2016).

The results suggest that there is an increasing awareness amongst the researchers in Nigeria of open science practices but the awareness is still uneven across disciplines. This highlights the importance of targeted awareness campaigns, institutional training and discipline-specific sensitization programs to boost the uptake of OA in all academic disciplines.

Researchers' Attitudes and Perceptions Toward Open Data and Open Access Publishing[Objective Two]

The regression analysis indicated that the scores of the performance expectancy, institutional support and scooping concerns significantly predicted researchers' attitudes toward open access publishing and open data sharing. Of these predictors, the most robust positive predictor was performance expectancy, meaning that those who believed that OA publishing would increase visibility, citations and collaboration were more likely to have positive attitudes toward open science practices.

This discovery provides support for the Unified Theory of Acceptance and Use of Technology (UTAUT), which suggests that the perceived usefulness of a technology plays a critical role in determining people's intentions to engage with technological innovations. Those who think OA publishing is helpful to their careers and research are more likely to be supportive and using open science.

The result corroborates the result of Otubelu and Anunobi (2020) which revealed that the performance expectancy exerted a positive effect on the adoption of open access scholarly publishing by lecturers in Nigerian universities. Their study indicated that lecturers who thought that OA publishing would enhance scholarly visibility and accessibility were more likely to have strong intentions to engage in OA publishing platforms (Otubelu & Anunobi, 2020).

The present study revealed that institutional support was also a significant predictor of positive attitudes towards OA practices. Researchers who felt their institutions supported their work through policies, funding opportunities, infrastructure and training were more positive about the adoption of open science. The finding agrees with Bashorun et al., (2016) who found that facilitating conditions and institutional support are very important factors that determine the adoption of OA among academics in Nigeria. The study highlighted that the researchers' use of OA was higher in universities that have better technological infrastructure and OA policies. The study pointed out that researchers' use of OA was found to be higher in universities with better technological infrastructure and supportive OA policies (Bashorun et al., 2016).

Furthermore, the study revealed that researchers' attitudes towards open data sharing and OA publishing were negatively affected by scooping. One researcher stated that he feared that his research results would be stolen, misused, or be used before he could before others. Many researchers voiced concerns that if research data were openly shared, it might be plagiarised, misappropriated, or be used before they were ready. This is because Nigerian academia has long been a research protectionism culture with competition for promotion and publications still being intense.

This is in line with the report of Musa et al. (2017), that despite the awareness of the advantages of open access resources, academic librarians in Nigeria have not fully embraced open access for a variety of reasons - concerns about intellectual property rights, misuse of shared content, inadequate protection under policy provisions (Musa et al., 2017).

The results consequently indicate that the attitudes of Nigerian researchers are positive towards OA publishing, but intellectual theft and lack of institutional support remain the challenges that limit the acceptance and engagement in OA practices.

Barriers and Facilitators Influencing Open Access Publishing and Open Data Adoption[Objective Three]

The paired-samples t-test showed that the perceived barriers to OA publishing were significantly higher than the perceived facilitators amongst the researchers in Nigeria. In particular, the high article processing charges (APCs) were identified as the biggest obstacle to the adoption of OA, as were poor internet connectivity and inadequate technological infrastructure. In contrast, facilitators like institutional support, training, and national mandates had a positive impact on researchers' willingness to publish in OA journals, though the impact was less pronounced than the barriers.

The discovery of the APCs as a major constraint is a reminder of the economic hardships faced by many Nigerian researchers. Many institutions do not have enough budget for

covering the publication fees for high APC open access journals, therefore the researchers are not able to publish in the reputable open access journals that charge high APC.

This is in tandem with Fabunmi (2022) who noted that high internet cost, poor infrastructure and lack of research support were major challenges encountered by librarians in Southwest Nigeria affecting their productivity in research activities. The study highlighted the fact that the poor state of digital infrastructure is a major constraint for researchers to access and use e-scholarly resources (Fabunmi, 2022).

In the same vein, Ajisebutau et al. (2024) reported that slow internet connection, unreliable power supply, and inadequate ICT facility were factors that negatively influenced librarians' use of Open access electronic journals in university libraries in Nigeria (Ajisebutua et al., 2024).

Furthermore, the present study showed that training on FAIR principles and institutional support might be capable of promoting more uptake of OA practices. The finding aligns with the report of the Nigerian Research and Education Network Institutional Repository and Information Service (NIRIS) which noted that to improve the visibility and access to Nigerian scholarly outputs, there is a need for improved infrastructure for the repositories, enhanced digital preservation systems, and institutional support mechanisms (NgREN, n.d.).

Additionally, the results corroborate the results of Adetayo (2022) who reported that digital technologies and online platforms had a positive impact on research visibility and productivity of Nigerian librarians. The study noted that the key to enhancing digital scholarly communication participation is to increase technological infrastructure and institutional support (Adetayo, 2022).

In general, the results suggested that the Nigerian researchers are increasingly aware of open science practices and positive attitude, but structural, financial and technological challenges remain to be a major constraint for the effective adoption of open science practices, especially in open access publishing and open data sharing.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study looked at the attitudes of Nigerian researchers towards open data and open access publishing, focusing on their awareness, attitudes and perceptions, and the challenges and opportunities to uptake. The overall level of awareness of open access publishing and open data practices among the Nigerian researchers was moderate to high, and there was significant difference in the level of awareness by academic disciplines. The researchers involved in the STEM disciplines were more aware than those in the Social

Sciences and Humanities disciplines, especially with respect to opportunities to collaborate internationally, grant requirements and digital platforms for communication of scholarship.

The study also validated that the following factors were significant in shaping researchers' attitude towards open access publishing: positive attitude toward open science practices included researchers who believed that open access publishing strengthened visibility, impact and collaboration of research. Fears of intellectual property theft, plagiarism or data manipulation, on the other hand, had a negative impact on willingness to share data openly.

The barriers were also found to be much higher than the facilitators for the uptake of open access. Nigeria researchers cited some factors that hindered their participation in open access publication and open data sharing such as: high Article Processing Charges (APCs), poor internet connection, poor technological infrastructure and limited institutional support. Important facilitators included institutional support, national mandates and training, but were not sufficient to overcome existing structural and financial issues.

The overall results of the study indicate that Nigeria's researchers are becoming more accepting of open science practices and the adoption of open science practices for open data sharing and open access publishing requires a greater commitment from institutions, improved digital infrastructure, and sustainable funding models and ongoing capacity building initiatives. That is why it is crucial to tackle these challenges to boost the visibility, accessibility and impact of Nigerian scholarly research.

5.2 Recommendations

Based on the results of this study, the following recommendations are made:

1. **Increase awareness campaigns on open science practices in Universities and research institutions.** Sensitisation workshops, seminars and regular programmes should be organised to reach the researcher community to the advantages, principles and use of open sharing of data and open access publishing.
2. **Government and institutional funding bodies should provide financial support for Article Processing Charges (APCs).** The government should make specifically targeted grants or waiver schemes available to researchers to cover publication costs for articles in high-impact open access journals by agencies such as TETFund, the National Universities Commission (NUC) and research institutions.
3. **Institutions should formulate and establish policies on open access and open data.** Nigerian Universities should create institutional repositories and create policies that promote or require researchers to submit publications and research data to the open digital platform.

4. **Digital infrastructure should be given priority.** Stable internet connectivity, reliable electricity supply, and modern ICT facilities should be provided in universities and research institutes to enable seamless access to open science resources and repositories.
5. **The dissemination and deepening of training on FAIR data principles and research data management should be strengthened.** Librarians, ICT staff and research support units should continue to offer training in data organisation and preservation, metadata production, and ethics in data sharing. To ensure that researchers are safeguarded from misuse of their IP rights and data scooping, measures should be put in place. To increase researchers' trust in open data sharing, copyright protection, licensing and citation practices need to be made more robust in institutions and by the policy.
6. Cooperation between national institutions and other open science organizations around the world should be promoted.
7. Programmes and partnerships with international research institutions and/or open science can increase capacity development, funding options, and exposure to international best practices in open access publication.
8. Special intervention programmes should be directed to researchers in the field of the Humanities and Social Sciences. In these fields, awareness was lower and specific training and support programs could be implemented to foster their engagement in open access publication and open data sharing.
9. **Institutional repositories need strengthening and sufficient maintenance.** The University must make sure the Institutional Repositories are operational, accessible and well-maintained to enhance the visibility and accessibility of Nigerian research outputs.
10. **Future studies are needed to explore the differences in the uptake of open science in Nigeria across disciplines and regions.** Larger and more representative samples of researchers in geopolitical regions in Nigeria may yield broader insights into the drivers of open access adoption among Nigerian researchers.

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