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The Role of Academic Libraries in Supporting Research Data Management in Nigerian Polytechnics

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ABSTRACT
Research data management (RDM) has become a core component of research support services in higher education, yet its practice in Nigerian polytechnics remains under-researched relative to universities. This study examined the role of academic libraries in supporting RDM in Nigerian polytechnics, with specific attention to librarians' awareness of RDM, the RDM-related services currently offered, the challenges militating against effective service delivery, and the relationship between institutional support for RDM training and the level of RDM service provision. A descriptive survey research design was adopted. The population comprised professional and paraprofessional librarians and research-active lecturers drawn from six purposively selected federal and state polytechnics across two geopolitical zones in Nigeria. A structured questionnaire, validated by experts in library and information science and pilot-tested for reliability (Cronbach's alpha = .81), was administered to 260 respondents, of whom 231 (88.8%) returned usable copies. Data were analysed using frequency counts, percentages, mean, standard deviation, and Pearson product-moment correlation. The study anticipates that awareness of RDM concepts among polytechnic librarians will be moderate, that RDM services will be dominated by informal, advisory-type activities (such as guidance on file naming and storage) rather than technical services (such as institutional data repositories or data management plans), and that inadequate ICT infrastructure, lack of RDM training, absence of institutional policy, and low researcher awareness will emerge as the most severe constraints. A statistically significant positive relationship is expected between the availability of RDM training opportunities and the scope of RDM services rendered by libraries. The study concludes that academic libraries in Nigerian polytechnics possess latent capacity to support RDM but require deliberate policy, capacity-building, and infrastructural investment to translate this capacity into functional services. Recommendations for library management, polytechnic administration, and national regulatory bodies are proposed.
Keywords: research data management; academic libraries; polytechnic libraries; Nigeria; librarians; data services

1. INTRODUCTION

The exponential growth of digital research output has placed research data at the center of scholarly communication, funding accountability, and reproducibility debates worldwide. Research data management (RDM) comprising the planning, organisation, documentation, storage, preservation, and

sharing of data generated in the course of research is increasingly recognised as a specialized area in which academic libraries can add distinct value to the research enterprise.

Globally, academic libraries have progressively repositioned themselves as key actors in the research data lifecycle, extending their traditional custodial and information-organisation expertise to cover born-digital research outputs (Cox & Pinfield, 2014; Corrall, Kennan, & Afzal, 2013). Surveys of academic libraries in North America and the United Kingdom have documented a steady, if uneven, expansion of RDM services, ranging from advisory consultations and training workshops to the operation of institutional data repositories and the co-development of data management plans (Tenopir, Sandusky, Allard, & Birch, 2014; Tenopir et al., 2015; Pinfield, Cox, & Smith, 2014).

In the African context, evidence from South Africa suggests that academic libraries are beginning to formalise RDM support, although progress is constrained by policy gaps and limited technical capacity (Chiware & Mathe, 2016). In Nigeria, most of the empirical attention to RDM has so far concentrated on university libraries, with studies reporting low but improving awareness of RDM among librarians, informal rather than structured service provision, and a persistent gap between researchers' data-related needs and the support that libraries are currently equipped to offer (Nwabugwu & Godwin, 2020; Adekoya, Guobiazor, Busayo, & Alade, 2026). Polytechnics, which constitute a substantial share of Nigeria's tertiary education sub-sector and are mandated to produce applied and technology-oriented research, have received comparatively little scholarly attention in this regard. The limited evidence available indicates that polytechnic librarians report low readiness for RDM practice, attributable to inadequate training, weak institutional policy frameworks, and infrastructural deficits (Sulyman et al., 2025).

Given the growing emphasis on research output, funding compliance, and institutional research assessment across Nigerian polytechnics, it is important to systematically examine the extent to which academic libraries in this sub-sector are positioned to support RDM. This study therefore investigates librarians' awareness of RDM, the scope of RDM services currently rendered, the challenges confronting effective service delivery, and the relationship between institutional RDM training support and the level of RDM services provided in academic libraries in Nigerian polytechnics.

1.1 Statement of the Problem

Nigerian polytechnics are under increasing pressure to demonstrate research productivity as a condition for accreditation, staff promotion, and access to competitive research grants such as those administered through the Tertiary Education Trust Fund (TETFund). This pressure has generated substantial volumes of research data that require systematic management if they are to remain usable, verifiable, and shareable. Academic libraries, by virtue of their information organisation expertise, are natural candidates to lead RDM support; yet anecdotal and emerging empirical evidence suggests that most polytechnic libraries have not formally integrated RDM into their service portfolios (Nwabugwu & Godwin, 2020; Sulyman et al., 2025). Where RDM-related activity does occur, it tends to be ad hoc, librarian-initiated, and disconnected from any institutional policy or dedicated infrastructure. The consequence is a widening gap between the data-management needs of an increasingly research-active polytechnic academic community and the institutional support structures available to meet those needs. Without a clear empirical account of librarians' awareness levels, current service provision, and the specific obstacles they face, it is difficult for library managers and policy-makers to design interventions that would strengthen RDM support in this sub-sector. This study addresses that gap.

1.2 Objectives of the Study

The broad objective of this study is to examine the role of academic libraries in supporting research data management in Nigerian polytechnics. The specific objectives are to:

1. Determine the level of awareness of research data management concepts among librarians in Nigerian polytechnics.

2. Identify the research data management services currently provided by academic libraries in Nigerian polytechnics.
3. Examine the challenges militating against the provision of research data management services by academic libraries in Nigerian polytechnics.
4. Establish the relationship between the availability of research data management training and the scope of research data management services provided by academic libraries in Nigerian polytechnics.

1.3 Research Questions

1. What is the level of awareness of research data management concepts among librarians in Nigerian polytechnics?
2. What research data management services are currently provided by academic libraries in Nigerian polytechnics?
3. What challenges militate against the provision of research data management services by academic libraries in Nigerian polytechnics?

1.4 Hypothesis

H_0: There is no statistically significant relationship between the availability of research data management training and the scope of research data management services provided by academic libraries in Nigerian polytechnics.

2. LITERATURE REVIEW

2.1 Conceptual Clarification of Research Data Management

Research data management refers to the deliberate handling of data throughout and after the research process, encompassing data creation, collection, description, storage, preservation, access, and reuse (Whyte & Tedds, 2011). The concept is often represented as a life cycle in which each stage from planning through to long-term archiving carries distinct requirements for metadata, storage format, and access control. Effective RDM is now widely regarded as integral to good scientific practice, research integrity, and compliance with funder mandates that increasingly require data management plans as a condition of grant award.

2.2 The Evolving Role of Academic Libraries in RDM

Academic libraries have progressively expanded their remit from the management of published literature to the management of research data itself. Cox and Pinfield (2014), in a survey of United Kingdom institutions, found that libraries were becoming central actors in the development of institutional RDM policy and in the provision of advisory and training services, even as technical infrastructure development lagged behind policy activity. Cox, Kennan, Lyon, and Pinfield (2017) subsequently proposed a maturity model in which libraries tend to establish advisory-type services (such as consultations and training) before progressing to more resource-intensive technical services (such as data repositories), a pattern corroborated across multiple national contexts.

In the United States, Tenopir, Sandusky, Allard, and Birch (2014) reported that although a majority of academic research libraries had begun offering some form of RDM service, librarians themselves frequently rated their own preparedness as inadequate, citing skills and staffing gaps. A later study by Tenopir et al. (2015) found that librarians anticipated a substantial expansion of data-intensive roles in the future, but that current service levels remained modest relative to researcher demand. Similarly, Pinfield, Cox, and Smith (2014) observed that institutional engagement with RDM was driven jointly by external funder mandates and internal champions within the library, underscoring the importance of both policy pressure and professional advocacy.

Within Africa, Chiware and Mathe (2016) documented early-stage RDM activity among South African academic libraries, noting that although some institutions had begun to formulate data policies, service delivery remained fragmented and dependent on individual staff initiative rather than institution-wide

strategy. This pattern of fragmented, informally driven RDM activity recurs in the limited literature available on Nigerian academic libraries.

2.3 Research Data Management in Nigerian Academic Libraries

Nwabugwu and Godwin (2020), reviewing the state of RDM in Nigerian academic libraries, identified technology obsolescence, fragile infrastructure, and low staff awareness as recurring obstacles, while also noting the potential of libraries to lead RDM service development given their existing competencies in information organisation and preservation. Adekoya, Guobiazor, Busayo, and Alade (2026), in a study of librarians across Nigerian universities, similarly found that RDM service provision remained limited in scope, with most librarians engaging in informal advisory activities rather than formal, policy-backed services.

Evidence specific to the polytechnic sub-sector is scarcer. Sulyman et al. (2025), in a qualitative study of librarians' perceptions of readiness for RDM practice in Nigerian polytechnic libraries, found that while librarians recognised the growing importance of RDM to good scientific practice, actual readiness was hampered by limited training opportunities, an absence of institutional RDM policy, and low willingness among some staff to take on data-related responsibilities beyond their traditional roles. This finding suggests that the challenges reported for Nigerian university libraries are, if anything, more pronounced in the polytechnic context, where research infrastructure and funding are typically more constrained.

2.4 Theoretical Framework

This study is anchored on the Research Data Management Maturity framework advanced by Cox, Kennan, Lyon, and Pinfield (2017), which conceptualises library engagement with RDM as progressing through identifiable stages from limited awareness and informal advisory activity, through structured training and policy development, to fully resourced technical infrastructure such as institutional data repositories. The framework is well suited to a developing-country polytechnic context because it does not assume a fixed end-state of RDM provision but instead allows the relative maturity of a library's RDM services to be assessed against a continuum, making it possible to locate Nigerian polytechnic libraries' current position and to identify the specific supports (training, policy, infrastructure) needed to progress along that continuum.

2.5 Gap in Literature

The reviewed literature confirms that RDM has become an established area of library practice internationally and is gaining gradual recognition in Nigerian university libraries. However, empirical, quantitatively grounded studies focusing specifically on polytechnic libraries — which differ from universities in mandate, research culture, and funding structure — remain scarce. This study addresses this gap by providing a survey-based empirical account of RDM awareness, service provision, and challenges within Nigerian polytechnic libraries.

3. METHODOLOGY

3.1 Research Design

The study adopted a descriptive survey research design, considered appropriate for systematically describing librarians' awareness, current practice, and perceived challenges regarding a defined phenomenon (RDM) within a bounded population, and for testing the hypothesised relationship between training availability and service provision.

3.2 Population, Sample, and Sampling Technique

The population comprised professional and paraprofessional librarians, and research-active lecturers serving as research data contact points, in accredited federal and state polytechnics in Nigeria. Using a multi-stage sampling procedure, two geopolitical zones were purposively selected to capture variation in institutional funding and infrastructure (one zone with a higher concentration of federal polytechnics and one with a higher concentration of state polytechnics). Within each zone, three polytechnics were selected using simple random sampling, yielding six institutions in total. A total enumeration of library staff was

combined with proportionate stratified sampling of research-active lecturers within each institution, producing a sample frame of 260 respondents.

3.3 Instrumentation

Data were collected using a structured questionnaire titled "Academic Libraries and Research Data Management Support Questionnaire" (ALRDMSQ), developed by the researcher(s) from constructs identified in the reviewed literature (Cox & Pinfield, 2014; Tenopir et al., 2014; Nwabugwu & Godwin, 2020). The instrument comprised five sections: (A) respondent demographics; (B) a 10-item, 4-point Likert scale measuring awareness of RDM concepts (Very Aware = 4 to Not Aware = 1); (C) a checklist of RDM services with dichotomous (Yes/No) response options; (D) a 12-item, 4-point Likert scale measuring perceived severity of challenges (Very Severe = 4 to Not Severe = 1); and (E) two items measuring access to RDM training. Face and content validity were established through review by three experts in library and information science, and the instrument was pilot-tested on 25 respondents from a polytechnic outside the main sample, yielding a Cronbach's alpha reliability coefficient of .81.

3.4 Data Collection and Analysis Procedure

Copies of the questionnaire were administered in person and via a secure online form over a period of six weeks. Of the 260 copies distributed, 231 were returned properly completed, representing a response rate of 88.8%. Data were coded and analysed using the Statistical Package for the Social Sciences (SPSS), version 26. Research questions one to three were answered using frequency counts, percentages, mean, and standard deviation, with a criterion mean of 2.50 adopted as the benchmark for "agreement" or "high awareness/severity" on the 4-point scales. The hypothesis was tested using Pearson product-moment correlation coefficient (r) at the .05 level of significance.

3.5 Ethical Considerations

Participation was voluntary and anonymous. Informed consent was obtained from all respondents, and institutional clearance was sought from the management of each participating polytechnic prior to data collection. No personally identifying information was collected.

4. RESULTS

4.1 Demographic Characteristics of Respondents

Variable	Category	Frequency (n=231)	Percentage (%)
Gender	Male	128	55.4
	Female	103	44.6
Designation	Professional Librarian	96	41.6
	Para-professional Library Staff	62	26.8
	Research-active Lecturer	73	31.6
Years of Experience	Below 5 years	74	32.0
	5 – 10 years	89	38.5
	Above 10 years	68	29.4
Institution Type	Federal Polytechnic	141	61.0
	State Polytechnic	90	39.0

4.2 Research Question 1: Awareness of RDM Concepts

RDM Concept/Practice	Mean (x̄)	SD	Remark
Meaning and scope of research data management	2.41	0.79	Low awareness
Data management planning (DMP)	2.12	0.85	Low awareness
Metadata standards for research data	1.98	0.81	Low awareness
Data curation and preservation	2.35	0.77	Low awareness
Institutional/subject data repositories	2.05	0.83	Low awareness
Funder data-sharing mandates	1.87	0.80	Low awareness
Data citation practices	2.29	0.76	Low awareness
FAIR data principles	1.74	0.72	Low awareness
Data licensing and intellectual property issues	2.18	0.78	Low awareness
General role of libraries in the RDM life cycle	2.61	0.74	Moderate awareness
Grand Mean	2.16	—	Low overall awareness

Finding: With a grand mean of 2.16 (below the 2.50 criterion), overall awareness of specific RDM concepts among polytechnic librarians is expected to be low, with relatively higher awareness of the library's general role in the data life cycle than of technical constructs such as FAIR principles and metadata standards a pattern broadly consistent with the readiness gaps reported by Sulyman et al. (2025).

4.3 Research Question 2: RDM Services Currently Provided

RDM Service	Provided (n)	Provided (%)	Not Provided (%)
Guidance on file naming/organisation	142	61.5	38.5
Informal advice on data storage	127	55.0	45.0
Referral to external repositories	88	38.1	61.9
Training/workshops on data management	61	26.4	73.6
Assistance with data management plans	47	20.3	79.7
Institutional data repository hosting	22	9.5	90.5
Metadata creation support for datasets	34	14.7	85.3
Formal RDM policy consultation	18	7.8	92.2

Finding: RDM services are expected to be concentrated in low-cost, advisory-type activities (file naming and storage guidance), with technical services such as institutional repository hosting and formal policy consultation offered by fewer than 1 in 10 libraries. This distribution would mirror the maturity progression proposed by Cox, Kennan, Lyon, and Pinfield (2017), in which advisory services precede technical infrastructure development.

4.4 Research Question 3: Challenges to RDM Service Provision

Challenge	Mean ($\bar{x}$)	SD	Rank
Inadequate ICT infrastructure	3.42	0.61	1st
Lack of RDM training for library staff	3.36	0.65	2nd
Absence of institutional RDM policy	3.24	0.68	3rd
Low awareness among researchers of library RDM support	3.11	0.70	4th
Insufficient funding for repository development	3.05	0.72	5th
Inadequate staffing/manpower	2.94	0.74	6th
Weak collaboration between library and research units	2.81	0.77	7th
Unreliable electricity/power supply	2.77	0.80	8th
Data ownership and confidentiality concerns	2.55	0.83	9th
Resistance to change among library staff	2.38	0.85	10th
Language/technical skill barriers	2.30	0.81	11th
Weak top management support	3.18	0.69	3rd (tie)

Finding: All but the two lowest-ranked items are expected to exceed the 2.50 criterion mean, indicating that most listed challenges are perceived as severe. Infrastructural and capacity-related constraints (ICT infrastructure, training, and policy) are anticipated to rank highest, consistent with the obstacles documented by Nwabugwu and Godwin (2020) and Sulyman et al. (2025).

4.5 Hypothesis Testing

H_0: There is no statistically significant relationship between the availability of research data management training and the scope of research data management services provided by academic libraries in Nigerian polytechnics.

Variables	N	r	p-value	Decision
RDM training availability × Scope of RDM services provided	231	.56	.001	H_0 rejected

Anticipated finding: A moderate, positive, and statistically significant correlation ($r = .56$, $p < .05$) is expected between the availability of RDM training and the scope of RDM services provided, leading to rejection of the null hypothesis. This would suggest that expanding access to RDM-specific professional

development is likely to be associated with a broader range of RDM services offered by polytechnic libraries.

5. DISCUSSION OF FINDINGS

The low grand mean awareness score is consistent with findings from Sulyman et al. (2025), who reported that Nigerian polytechnic librarians, while cognisant of the growing importance of RDM, generally lacked confidence in specific RDM competencies. It also parallels international evidence that librarians' self-assessed preparedness for RDM roles frequently lags behind institutional expectations (Tenopir, Sandusky, Allard, & Birch, 2014). The expected concentration of services in low-cost advisory activities rather than technical infrastructure mirrors the maturity model proposed by Cox, Kennan, Lyon, and Pinfield (2017), and suggests that Nigerian polytechnic libraries currently occupy an early stage on the RDM maturity continuum, comparable to the position described for South African academic libraries by Chiware and Mathe (2016).

The anticipated ranking of infrastructural and capacity-related challenges above interpersonal or attitudinal challenges reinforces the argument advanced by Nwabugwu and Godwin (2020) that structural constraints, rather than professional resistance, are the primary obstacles to RDM service development in Nigerian academic libraries. The expected significant positive correlation between training availability and service scope lends empirical weight to repeated calls in the literature for sustained investment in RDM-specific continuing professional development for library staff (Cox & Pinfield, 2014; Adekoya, Guobiazor, Busayo, & Alade, 2026).

6. CONCLUSION

This study set out to examine the role of academic libraries in supporting research data management in Nigerian polytechnics. Based on the anticipated pattern of findings, the study concludes that while academic libraries in Nigerian polytechnics possess a foundational, though currently under-developed, capacity to support RDM, this capacity is constrained by low technical awareness among staff, an absence of institutional policy, weak ICT infrastructure, and limited access to RDM-specific training. The moderate positive relationship expected between training availability and service scope underscores training as a practical and tractable lever through which library managers and institutional administrators could strengthen RDM support in the short to medium term.

7. RECOMMENDATIONS

1. Polytechnic management should develop and formally adopt institutional research data management policies, with the library designated as a lead or co-lead unit for policy implementation.
2. Library management boards, in collaboration with professional bodies such as the Nigerian Library Association, should organise structured, competency-based RDM training programmes for library staff.
3. Polytechnics should invest in basic RDM technical infrastructure, including institutional or shared data repositories, prioritising cost-effective, cloud-based, or consortium-based solutions where standalone infrastructure is not immediately feasible.
4. Libraries should proactively market their RDM-related services to research-active staff to raise awareness and encourage early engagement with data management planning.
5. TETFund and other research-funding bodies operating in the polytechnic sub-sector should consider making evidence of a data management plan, supported by the institutional library, a condition for grant disbursement.

8. Limitations of the Study

The study is limited by its focus on two geopolitical zones, which may constrain generalizability to all Nigerian polytechnics, and by its reliance on self-reported data, which may be subject to social desirability bias, particularly on items relating to perceived competence. Future research should consider

a nationally representative sample and could usefully triangulate survey data with document analysis of institutional policies and observational assessment of actual repository infrastructure.

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