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Strategies for Enhancing Research Data Management Adoption in Academic Libraries in Jigawa State, Nigeria

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ABSTRACT

This study therefore examined strategies for enhancing Research Data Management adoption in academic libraries in Jigawa State, Nigeria. The study aimed to explore strategies for enhancing Research Data Management adoption in academic libraries in Jigawa State, Nigeria. The study adopted a qualitative research design using a phenomenological approach. A population of ten (10) respondents, comprising librarians, heads of e-library units, and heads of Research Data Management units from four Universities were used. Data were collected using a structured interview guide. The responses were coded and analysed using thematic analysis based on five major themes. The findings revealed that two universities have established Research Data Management units. The study identified policy development, continuous staff training, adequate funding, management commitment, technological infrastructure, institutional repositories, and collaboration between libraries and ICT departments as critical strategies for enhancing RDM adoption. Major challenges included inadequate funding, lack of institutional policies, insufficient staff training, poor technological infrastructure, and limited management support. The study concludes that successful adoption of Research Data Management in academic libraries requires coordinated institutional commitment through comprehensive policies, continuous capacity building, sustainable funding, technological investment, and strengthened collaboration. The study recommends that universities should develop and implement comprehensive Research Data Management policies, establish functional RDM units, and provide regular professional training for librarians.

Keywords: Academic Libraries; Jigawa; Nigeria; Research Data Management; Strategies

1. Introduction

The rapid growth of digital technologies, open science initiatives, and data-intensive research has transformed the manner in which research is conducted, disseminated, and preserved across higher education institutions worldwide. Universities now generate enormous volumes of digital research data from scientific experiments, surveys, simulations, observations, interviews, administrative records, and collaborative research projects. These research data constitute valuable scholarly assets that support transparency, reproducibility, innovation, and future scientific discoveries. Consequently, the effective management of research data has become a strategic priority for universities, research institutions, funding agencies, and academic libraries.

Globally, Research Data Management has emerged as a fundamental component of modern research ecosystems due to increasing demands for transparency, accountability, reproducibility, and open access to publicly funded research. Governments, research funding organizations, and scholarly publishers increasingly require researchers to prepare Data Management Plans (DMPs), preserve research datasets, and make data openly available where ethical and legal considerations permit. These developments have significantly expanded the responsibilities of academic libraries beyond their traditional functions of acquiring, organizing, and providing access to published information resources. Academic libraries are now expected to provide comprehensive research support services that include research data curation, metadata creation, digital preservation, repository management, data literacy training, and advisory services on research data management (Chiware, 2020; Adekoya et al., 2026; Sheikh, Malik, & Adnan, 2025).

Consequently, many universities across Europe, North America, Asia, and Australia have established dedicated Research Data Management services coordinated by their academic libraries to support institutional research productivity and compliance with funder requirements (Chiware, 2020). Despite these global advances, the adoption of Research Data Management remains uneven, particularly in many developing countries. African universities continue to face numerous challenges, including inadequate technological infrastructure, insufficient funding, limited institutional policies, inadequate staff competencies, weak digital preservation systems, and low awareness of research data management among researchers. Although many African academic libraries recognize the importance of Research Data Management, implementation remains at an early stage, with many institutions still developing the policies, infrastructure, and human capacity required for sustainable RDM services. The limited availability of institutional repositories and formal research data policies has further constrained the development of comprehensive Research Data Management programmes across many universities on the continent (Chiware, 2020).

Several African universities have initiated efforts to establish institutional repositories and research data services as mechanisms for preserving and disseminating research outputs. Institutional repositories have become central platforms for storing theses, dissertations, journal articles, datasets, conference papers, and other scholarly materials. Within the Nigerian context, the development of Research Data Management services has gained increasing attention in recent years. Nigerian universities have significantly expanded their research activities, yet institutional mechanisms for managing research data remain underdeveloped in many institutions. However, many Nigerian universities continue to experience inadequate ICT infrastructure, unreliable internet services, insufficient storage facilities, and limited investment in digital technologies. This gap justifies the present study, which seeks to examine strategies for enhancing Research Data Management adoption in selected academic libraries in Jigawa State, Nigeria.

Research data services also require deliberate planning rather than isolated technical interventions. Hackett and Kim (2024) note that conceptual models can help academic libraries plan, develop and evaluate research data services. Systematic reviews similarly show that academic libraries can contribute to RDM across the research data lifecycle and to the development of institutional research support capacity. Within Nigeria, however, the evidence base on how RDM is developing at the level of individual states and institutions remains limited. This is particularly important in Jigawa State, where the selected universities differ in institutional structures and reported levels of

RDM development. The present study therefore focuses on four universities in Jigawa State and examines the strategies that can strengthen RDM adoption in their academic libraries.

Although research data are increasingly important to research quality, transparency, preservation and reuse, academic libraries may lack the policy frameworks, professional competencies, financial resources and technological infrastructure required to provide mature RDM services. Previous Nigerian evidence indicates that librarians' involvement in RDM remains limited and that institutional capacity is an important concern (Adekoya et al., 2026). The situation may be particularly challenging where libraries are expected to provide data services without dedicated RDM units, comprehensive policies, adequate storage infrastructure or sufficient staff development. The preliminary evidence available for the four universities in this study suggests differences in institutional readiness. Two universities reported RDM units, while the participant records indicate more limited policy coverage.

1.1 Objectives of the Study

The main objective of this study is to explore strategies for enhancing Research Data Management adoption in academic libraries in Jigawa State, Nigeria. The specific objectives include: (I) to examine the current state of RDM practices in selected academic libraries in Jigawa State, (II) to examine participants' sources of RDM knowledge, (III) to identify strategies for enhancing RDM adoption in the selected academic libraries and (IV) to identify challenges affecting RDM implementation in the selected academic libraries.

2. Literature Review and Theoretical Framework

2.1 Research Data Management in Academic Libraries

RDM encompasses the organisation, storage, preservation, documentation, sharing and responsible reuse of research data throughout the research lifecycle. Academic libraries increasingly contribute to these activities through research data services, repositories, data literacy, metadata support and research consultation. Cox et al. (2017) demonstrated that RDM service maturity varies across academic libraries, with advocacy, policy development and advisory services often developing ahead of more technically intensive services. Earlier survey evidence from Tenopir, Sandusky, Allard, and Birch (2014) similarly found that academic librarians' preparation and attitudes toward research data services varied considerably even among institutions already engaged in RDM, underscoring that service maturity is uneven rather than uniform. This is important for the present study because the selected universities appear to be at different stages of institutional readiness. Dube (2025) similarly argues, in a South African context, that institutional repositories function as an effective reservoir for research data only once governance arrangements, stakeholder coordination and technical infrastructure are jointly in place, reinforcing that repository presence alone does not indicate mature RDM practice.

In Nigeria, Adekoya et al. (2026) reported that librarians have recognised roles in RDM but that their actual involvement remains low. The authors recommended the creation of RDM centres in university libraries. Igbinovia et al. (2025) similarly identified data literacy and technological infrastructure as central requirements for successful RDM services. These findings suggest that RDM adoption cannot be treated as a single technological intervention; it requires a combination of policy, skills, infrastructure and institutional support.

2.2 Strategies for Strengthening RDM Adoption

Several strategies recur in the literature. First, institutional policy provides the governance basis for determining responsibilities, standards, storage arrangements, access, preservation and data sharing. Without a policy framework, RDM activities may remain dependent on individual staff members or isolated projects. Second, staff capacity building is essential. Badenhorst and Raju (2023) identified competencies in data management, repository management, data curation, ICT and research processes as important for librarians providing RDM services. Training therefore needs to extend beyond general awareness to practical skills that can support researchers throughout the data lifecycle. Francis and Gopakumar (2025) make a related point, arguing that structured curation training and clearly defined data-management competencies are what convert librarians' general awareness of RDM into an operational service capable of supporting researchers directly, rather than training remaining a one-off awareness exercise.

Third, technological infrastructure is necessary for sustainable RDM. Libraries require reliable storage, repositories, backup arrangements, connectivity and systems that support preservation and controlled access. Technology, however, needs to be aligned with institutional policy and staff capability. Comparable infrastructure and skills-related barriers have been documented outside Africa as well, including among university libraries in Pakistan, where unreliable connectivity and limited technical skills were similarly found to constrain RDM service development (Sajjad & Ahmad, 2024), suggesting that the technological and organisational conditions required for sustainable RDM operate similarly across developing-country settings rather than being unique to any single country. Fourth, collaboration is important because RDM extends beyond the traditional boundaries of the library. Effective services may require coordination among libraries, ICT units, research offices, ethics structures, researchers and university management. Hackett and Kim (2024) argue that research data service models can assist institutions in planning and evaluating such services.

2.3 Theoretical Review

This study draws on three complementary theories because RDM adoption in academic libraries is simultaneously an individual acceptance problem, a diffusion process, and an organisational and environmental problem, and no single theory addresses all three dimensions. The Technology Acceptance Model (TAM), developed by Davis (1989), is used because it explains librarians' acceptance of RDM systems and services as a function of perceived usefulness and perceived ease of use, and assumes that actual system use is predicted by behavioural intention, that intention is shaped jointly by these two beliefs, and that perceived ease of use itself influences perceived usefulness. This is relevant because the current state of RDM practice reported under Objective One depends partly on whether librarians regard available RDM tools and repositories as worth using. Diffusion of Innovations (DOI) theory, developed by Rogers (2003), is used because RDM adoption is not a single decision but a social process that unfolds over time through five stages — knowledge, persuasion, decision, implementation and confirmation — with the rate of adoption influenced by an innovation's relative advantage, compatibility, complexity, trialability and observability. This is directly relevant to Objective Two, sources of RDM knowledge, and Objective Three, strategies for enhancing adoption. The Technology–Organization–Environment (TOE) framework, developed by Tornatzky et al. (1990), is used because RDM adoption in a university is shaped by institutional conditions beyond any individual librarian's control: a technological context of available tools and infrastructure, an organisational context of resources, structure and management support, and an environmental context of external pressures, funder or regulatory requirements, and sector norms, with no single context assumed to be sufficient on its own. This is directly relevant to Objective One, institutional readiness, and Objective Four, challenges affecting implementation. Recent reviews of the RDM literature reinforce the case for combining these perspectives rather than relying on any one of them: Sheikh, Malik, and Adnan (2025) show that the field has evolved from an early, largely technical conception of data management toward one that treats policy, institutional commitment and professional skill as equally central, a shift that maps closely onto the individual-belief, diffusion-process and organisational-context distinctions TAM, DOI and TOE separately capture.

Used together, the three theories separate what individual belief explains from what organisational context and diffusion process explain, a distinction this study needed because its four objectives span all three levels. Objective One draws primarily on TOE, since institutional readiness — the presence of an RDM unit, existing policy, and available infrastructure — is an organisational and technological condition rather than an individual belief; it also draws on DOI insofar as an institution's current state reflects how far it has progressed through the adoption process relative to other institutions. Dube (2025) makes a similar point in the South African context, arguing that institutional repositories function as a reservoir for research data only once governance, stakeholder coordination and technical infrastructure are jointly in place, which is an organisational-context claim consistent with TOE rather than a claim about individual librarian attitudes. Objective Two, sources of RDM knowledge, draws on DOI's knowledge stage and its emphasis on communication channels, and on TAM insofar as exposure to information about RDM shapes librarians' perceived usefulness of it. Objective Three, strategies for enhancing RDM adoption, draws on DOI's persuasion and decision stages, since awareness creation, demonstration of relative advantage, and communication are all DOI-derived levers, and on TOE's organisational and environmental levers, such as policy development and management support; Francis and Gopakumar (2025) similarly emphasise that structured curation training and clearly defined librarian competencies are what convert general awareness of RDM into an operational service, which is the persuasion-to-decision transition DOI describes. Objective Four, challenges affecting RDM implementation, draws primarily on TOE's three contexts — technological infrastructure gaps, organisational funding and management gaps, and environmental or regulatory gaps — and on TAM insofar as poor infrastructure reduces perceived ease of use and, in turn, acceptance. Each objective was therefore formulated to correspond to a specific combination of theoretical constructs rather than to the three theories as an undifferentiated whole.

The interview guide was constructed to elicit evidence for these constructs without requiring participants to name the theories themselves. Questions about RDM units, policies and institutional practice generate TOE-relevant organisational-context data; questions about how participants learned about RDM generate DOI-relevant knowledge-stage data; questions about proposed strategies generate DOI-relevant persuasion and decision-stage data alongside TOE-relevant organisational-lever data; and questions about challenges generate TOE-relevant technological, organisational and environmental barrier data. Because the study is qualitative and exploratory, TAM's constructs — perceived usefulness and perceived ease of use — were not operationalised as measured variables; instead, they are used in the Discussion as an interpretive lens for understanding why participants describe some RDM activities as more established than others. This theoretical structure is also what justified a qualitative design in the first place: because DOI and TOE both treat adoption as a multi-stage, multi-level process rather than a single decision, a qualitative approach allowed participants to describe institutional histories, sequences of events and layered barriers, which a structured quantitative instrument would have flattened into a single adoption score. The Discussion returns to this framework to examine whether the findings support each theory's assumptions — for instance, whether the unevenness observed across the four universities is better explained by differences in organisational context, as TOE predicts, than by differences in individual librarian belief, as TAM would predict on its own, and whether the sequence of awareness-building activities participants described matches the stages DOI proposes.

Collectively, these theories provide a coherent foundation for the study: TAM explains librarians' acceptance of RDM technologies, Diffusion of Innovations explains the process through which RDM practices spread and become established, and the TOE framework explains the organisational and environmental conditions necessary for successful RDM adoption in academic libraries in Jigawa State. Together, they support the investigation of RDM practices, sources of knowledge, challenges, and strategies for enhancing RDM adoption as an integrated whole rather than as separate, unconnected findings.

2.4 Conceptual Framework

The conceptual framework illustrates the relationship between the independent and dependent variables of the study. The independent variables comprise research data management (RDM), the current state of RDM practices in academic libraries, awareness of RDM among library staff, and challenges faced by academic libraries in implementing RDM. These factors influence the strategies for enhancing RDM in academic libraries, which serve as an intermediary variable. The strategies include policies, practices, actions, and interventions aimed at improving RDM adoption and strengthening RDM services. Ultimately, these strategies are expected to influence the implementation of RDM in academic libraries, which represents the dependent variable. The framework also incorporates a feedback loop, indicating that outcomes from RDM implementation can provide useful feedback for continuously improving RDM strategies, practices, and policies in academic libraries.

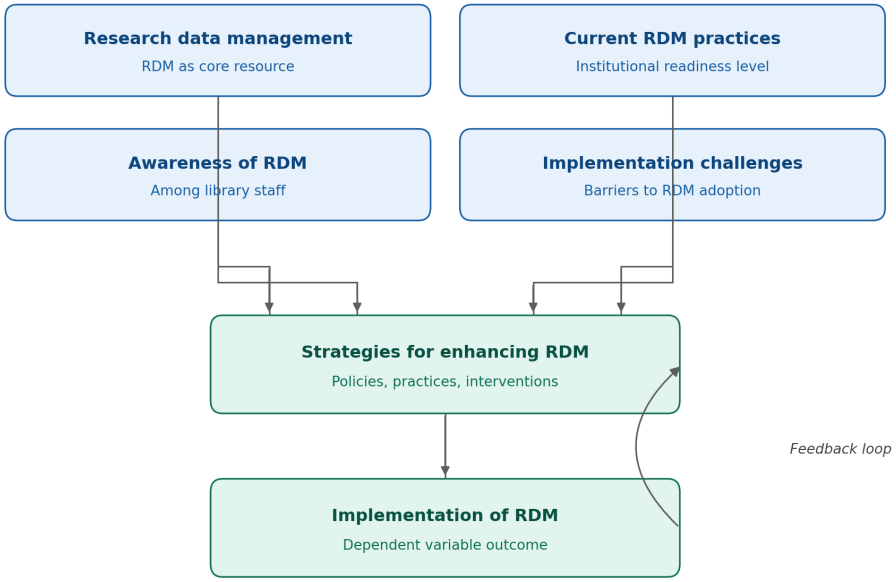

Figure 1. Conceptual framework for RDM adoption in academic libraries

3. Methodology

The study employed a qualitative descriptive design using structured interviews. The study was conducted in four Universities in Jigawa State, Nigeria: Federal University Dutse, Federal University of Technology, Babura, Sule Lamido University, Kafin Hausa, and Khadija University, Majiya. The population comprised ten participants: university librarians, heads of e-library units and the head of an RDM unit. Because the population was small, a census approach was used and all ten eligible participants were included. Participant codes are standardised as P1–P10.

Table 1: Population of the Study

S/N	Universities	E-LIB	UL	RDM
1	Federal University Dutse	1	1	1
2	Federal University of Technology, Babura	1	1	1
3	Sule Lamido University, Kafin Hausa	1	1	0
4	Khadija University, Majiya	1	1	0
	TOTAL	4	4	2

Key: E-LIB = Electronic Library; UL = University Librarian; RDM = Research Data Management. Grand total (E-LIB + UL + RDM responses across all four universities) = 10.

The data was analysed using thematic analysis, using the audio recordings of the interview verbatim, identifying and coding significant statements, phrases, and themes; grouping codes into broader themes and sub-themes to capture the key insights and patterns in the data; and interpreting the themes in the context of the research objectives. Ethical clearance was obtained from the four universities and a consent form was attached to the Interview Guide seeking permission from the respondents. The demographic information of the participants is given in Table 2.

Table 2: Demographic Data

S/N	Position	Institution	Code	Experience	Training	RDM Unit	Date
1	Librarian	Federal University Dutse	P1	8 years	Yes	Yes	17/05/26
2	Head of e-library	Federal University Dutse	P2	9 years	Yes	Yes	17/05/26
3	Head, RDM	Federal University Dutse	P3	13 years	Yes	Yes	17/06/26
4	Librarian	Federal University of Technology, Babura	P4	23 years	Yes	Yes	19/06/26
5	Head of e-library	Federal University of Technology, Babura	P5	26 years	Yes	Yes	19/06/26
6	Head, RDM	Federal University of Technology, Babura	P6	8 years	No	Yes	19/06/26
7	Librarian	Sule Lamido University, Kafin Hausa	P7	18 years	No	No	20/06/26
8	Head of e-library	Sule Lamido University, Kafin Hausa	P8	8 years	No	No	20/06/26
9	Librarian	Khadija University, Majiya	P9	14 years	No	No	23/07/26
10	Head of e-library	Khadija University, Majiya	P10	6 years	No	No	23/07/26

Key: P = Participant.

Table 3: Summary of the Coding Process

S/N	Stage	Description
1	Familiarisation	Interview transcripts were read several times.
2	Initial Coding	Important statements relating to RDM adoption.
3	Theme Development	Similar codes were grouped together.
4	Theme Review	Themes were checked against participants' responses.
5	Theme Definition	Themes were refined and clearly named.
6	Report Writing	Themes were presented with supporting quotations.

4. Results and Discussion

The data collected was presented and discussed based on the five major themes that were derived from the objectives of the study, presented below.

Theme 1: Current State of RDM Practices

The findings indicate that RDM development differed across the four universities. Participants from Federal University Dutse and Federal University of Technology, Babura reported the existence of RDM units, while participants from Sule Lamido University, Kafin Hausa and Khadija University, Majiya reported no RDM unit. The participant records also indicate that formal policy coverage was concentrated at Federal University Dutse. Participants P1, P2 and P3 reported the presence of an institutional policy document, whereas P4–P10 reported that their institutions did not have such a policy document. This difference is important because the presence of an RDM unit does not necessarily mean that an institution has a comprehensive policy framework.

Participants described a range of RDM-related activities, including the organisation, storage, preservation, backup and sharing of research data. Institutional repositories, cloud storage and local library servers were identified in the original responses as technologies or facilities used in supporting data management. Participants also described library roles involving research support, organisation of research outputs, preservation and repository-related activities. The findings further indicate collaboration between library personnel and ICT units. Such collaboration was associated with repository management, server maintenance, digital preservation, system administration and technical troubleshooting. Overall, the selected institutions appear to be at different stages of RDM development, with policy, infrastructure and organisational maturity varying across institutions.

Theme 2: Sources of RDM Knowledge and Professional Exposure

Participants reported several sources through which they had acquired knowledge or professional exposure related to RDM. These included workshops, conferences, professional associations, online learning platforms, webinars and professional networking. The evidence should not, however, be interpreted as demonstrating that all participants had received formal RDM training. Table 2 distinguishes formal training from other forms of professional exposure, and the original data do not adequately establish whether all reported workshops and professional activities were formal RDM training programmes. The finding is therefore reported as sources of knowledge and professional exposure rather than as a measured level of RDM awareness.

Theme 3: Strategies for Enhancing RDM Adoption

Policy development emerged as a prominent strategy in the participants' responses. The participants emphasised the need for institutional policies that define responsibilities, procedures and standards for managing research data. Continuous professional development was another major strategy. Participants referred to training, workshops, seminars, conferences and other capacity-building activities as ways of improving staff competence. The responses also pointed to the importance of awareness and researcher support. The proposed approaches included educating researchers about data sharing, providing technical assistance and simplifying processes for depositing or managing research data. Technological investment was identified as another important requirement. Participants' responses pointed to the need for adequate storage, repository software, reliable connectivity and modern computing equipment. Finally, collaboration between libraries, ICT units and other stakeholders was viewed as important for the practical operation and sustainability of RDM services.

Theme 4: Challenges Affecting RDM Adoption

The reported challenges were institutional, human, financial and technological. They included inadequate staff training, shortages of servers and storage, limited repository software, unreliable internet connectivity, insufficient practical knowledge of data curation and metadata standards, weak repository management capacity, inadequate management commitment, absence of institutional policies, financial constraints and limited access to modern computing equipment. The challenges should not be interpreted as equally severe in every institution because the original data do not provide a reliable ranking of severity by institution. Nevertheless, the pattern indicates that RDM development is constrained by interconnected capacity, infrastructure, governance and resource issues.

4.2 Discussion

The study shows that RDM adoption in the selected universities is uneven and patterned by institution rather than by individual participant. At Federal University Dutse, all three participants reported an RDM unit, an institutional policy and RDM training; at Federal University of Technology, Babura, all three participants reported an RDM unit and training but not policy; and at Sule Lamido University and Khadija University, no participant reported an RDM unit, training or policy. This clustering by institution, rather than by individual role or years of experience, speaks directly to the theoretical framework set out in Section 2.3: it is more consistent with the Technology–Organization–Environment (TOE) framework's assumption that adoption is jointly shaped by organisational and environmental conditions than with an account in which each librarian's own perceived usefulness and ease of use, as the Technology Acceptance Model (TAM) would frame it in isolation, independently determines their institution's RDM development. Institutional context, not individual belief on its own, appears to be the primary driver of the differences observed across the four universities. This finding is consistent with Cox et al. (2017), who observed variation in the maturity of RDM services across academic libraries. The presence of RDM units in two of the four institutions suggests that organisational structures are beginning to emerge, but the limited policy coverage indicates that institutionalisation has not progressed uniformly. The prominence of policy development in the participants' responses is also consistent with the wider RDM literature. Cox et al. (2017) identified policy development and advocacy as areas in which libraries have often taken leadership roles, even where more technically intensive services remain less developed. In the present study, the distinction between having an RDM unit and having an institutional policy is particularly important: an organisational unit can exist without a sufficiently developed governance framework, again pointing to organisational and environmental conditions — the core TOE contexts — rather than to individual staff attitudes.

The emphasis on training and professional development agrees with Badenhorst and Raju (2023), who identified data management, repository management, data curation, ICT and research-process knowledge as important RDM competencies. It also aligns with Igbinovia et al. (2025), whose discussion of RDM implementation emphasises data literacy and technological infrastructure. Consistent with TAM's assumption that perceived ease of use shapes perceived usefulness, participants' emphasis on practical, service-oriented training suggests that librarians who feel equipped to perform RDM tasks are more likely to regard RDM systems as genuinely useful, rather than usefulness

and ease of use operating as independent judgements. The present findings therefore suggest that staff development in Jigawa State should be practical and service-oriented rather than limited to general awareness.

The technological challenges reported by participants raise a more specific question for TAM's assumption that external variables such as infrastructure act only indirectly, through perceived ease of use and usefulness, rather than as direct barriers to adoption in their own right. Several participants described infrastructure gaps — unreliable connectivity, insufficient storage and absent repository software — as obstacles to implementing RDM services they already recognised as useful and wished to provide. This pattern looks like a structural constraint operating independently of individual belief rather than a belief that happens to be low. In the Jigawa State context, then, TAM's belief-mediation assumption may not fully hold: usefulness can be clearly recognised while ease of use remains structurally unattainable rather than merely perceived as low, a distinction TAM's original formulation does not clearly separate. Where these systems are weak, even trained library staff may have limited capacity to provide sustainable services. The interaction between skills and infrastructure is therefore more important than treating either factor independently, and again points toward the organisational and technological contexts TOE identifies rather than toward individual acceptance alone.

The finding that library–ICT collaboration is important is consistent with the multidisciplinary character of RDM. Libraries provide expertise in information organisation, metadata, preservation and research support, while ICT units often provide infrastructure, systems administration and technical support. Effective RDM therefore requires institutional coordination rather than assigning the entire responsibility to the library. The findings can also be examined against Diffusion of Innovations theory's five-stage sequence. Participants' accounts of workshops, conferences, professional associations, online learning and networking correspond most directly to DOI's knowledge stage, and their identification of policy development, training and awareness-raising as priority strategies corresponds to the persuasion and decision stages that, according to Rogers (2003), follow once potential adopters have been exposed to an innovation. The evidence does not, however, extend clearly into DOI's implementation and confirmation stages: only two of the four universities have reached the point of establishing a functioning RDM unit, and no participant account describes a completed cycle in which RDM practices have been adopted, evaluated and reconfirmed as routine. The uneven institutional development observed in this study is therefore consistent with DOI's premise that innovations diffuse gradually and unevenly across a population of adopters, but the present evidence speaks mainly to the earlier stages of that process rather than to its completion.

As with Diffusion of Innovations theory, TAM and TOE were not directly measured in the interviews; all three theories are therefore best regarded in this study as interpretive frameworks that organise the qualitative findings, rather than as causal models formally tested through hypothesis testing. Even with this caveat, the pattern of evidence — institutional clustering consistent with TOE, an emphasis on early-stage knowledge and persuasion activities consistent with DOI, and infrastructure barriers that appear to constrain adoption more directly than TAM's belief-mediation assumption would predict on its own — together suggest that organisational and environmental context, rather than individual acceptance alone, is the more powerful explanation for the RDM adoption pattern observed in this setting. The study also contributes a useful state-level perspective. Existing Nigerian research has documented broader challenges affecting RDM services, including limited institutional involvement and infrastructure. The present study adds evidence from four universities within Jigawa State and shows that even within a relatively bounded geographical setting, RDM development can vary considerably between institutions.

5. Conclusion and Recommendations

The study concludes that RDM activities are emerging in the selected academic libraries in Jigawa State, but institutional development is uneven. Two of the four universities represented by the participants have RDM units, while formal policy coverage appears more limited. Participants reported activities involving data organisation, storage, preservation, backup, sharing and repository support. The study further concludes that professional workshops, conferences, associations, online learning and related activities are important sources of RDM knowledge and exposure. However, the available evidence does not justify claiming that participants possess a measured or uniformly high level of RDM awareness. The principal strategies identified are institutional policy development, continuous staff capacity building, adequate funding, management support, technological infrastructure, repository development and collaboration among libraries, ICT units and other stakeholders. The main barriers are inadequate training, financial constraints, infrastructure limitations, weak policy support and limited management commitment.

5.1 Recommendations

1. University management should develop and approve comprehensive RDM policies that clearly define responsibilities for data management, storage, preservation, sharing, security, access and long-term retention.

2. Academic libraries should strengthen staff capacity through regular practical training, workshops, seminars, professional development and relevant certification opportunities.

3. Universities should provide sustainable RDM infrastructure, including secure storage, backup facilities, repository systems, reliable internet connectivity and appropriate computing resources.

4. Academic libraries should establish or strengthen RDM units or service teams where institutional capacity permits, with clearly defined responsibilities and links to research support structures.

5. Libraries and ICT units should formalise collaboration on repository management, infrastructure, preservation, system administration and technical support.

6. Libraries should develop researcher-focused RDM education and advocacy programmes, including guidance on data management planning, organisation, documentation, preservation and responsible sharing.

7. University management should provide dedicated financial support for RDM development and ensure that RDM is incorporated into institutional research-support planning.

6. Limitations of the Study

The study was limited to four universities in Jigawa State and ten participants; consequently, the findings should not be generalised statistically to all Nigerian academic libraries. The study also relied on participants' self-reported experiences. In addition, limited access to comprehensive institutional RDM documents and operational records constrained independent verification of some participant reports. The use of structured interviews also limited the depth of qualitative exploration that might have been possible with semi-structured or in-depth interviews.

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