The Changing Landscape in Research Data Management in Kenya's Universities: An Analysis of Development and Implementation

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Abstract

This study assesses the current state of research data management (RDM) in universities in Kenya, focusing on policies, infrastructure, personnel, and preparedness by library to support. RDM is essential for academic institutions worldwide to ensure data is findable, accessible, interoperable, and reusable, meeting funder and institutional requirements. However, RDM adoption in Kenyan universities is not well understood.

Using a mixed-methods approach, surveys were distributed to 37 universities (29 public and 8 private), yielding a 37.8% response rate. The results show that only two universities have formal RDM policies, with 68.8% lacking any guiding framework. Furthermore, 42.9% of universities do not have dedicated RDM personnel, and 41.7% lack data repositories.

The study emphasizes the need for clear RDM policies, enhanced staff capacity, and improved infrastructure. It recommends establishing guidelines, appointing RDM personnel, providing targeted training, and fostering collaboration between institutions to align Kenyan universities with global RDM standards.

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Keywords: Research Data Management—Kenya academic libraries, research data infrastructure.

Introduction

Research data has gained significant importance in academic and research institutions globally due to its growing practices that require data to be findable, accessible, interoperable re-usable as well as able to fulfill funding body requirements, publishing outlets and research institutions. Research data is "the evidence that underpins the answer to the research question, and can be used to validate findings regardless of its form" and they consist of quantitative figures or qualitative descriptions gathered by researchers through various methods, including experimentation, observation, modeling, interviews, or other approaches, or it can be sourced from pre-existing evidence (Cox & Verbaan, 2018). Research data management involves handling quantitative data or qualitative information collected by researchers using methods such as experimentation, observation, modeling, interviews, or other techniques. It may also include managing data obtained from existing sources (Cox & Verbaan, 2018). Hence effective Research Data Management implies that data are systematically organized, conserved, and accessible for future utilization, promoting transparency, reproducibility, and collaborative opportunities in research.

Numerous studies, such as Higgins' (2008) research, have highlighted the substantial advantages and contributing factors that encourage universities and research institutions to implement Research Data Management (RDM) practices. These benefits encompass enhanced data sharing capabilities, cost reduction, improved data retrieval, the potential for discovering new research avenues through data reanalysis, long-term data preservation, data validation, increased visibility, and compliance with funder requirements.

The need for RDM is very critical to institutions as "Research Data is irreplaceable, expensive, time consuming to replicate" (Patterton, 2017) and every effort must be put to ensure that they are captured, preserved, available for re-use and for researchers to build upon works that have been done by other researchers.

The research funders are becoming very important players in pushing the agenda of Research Data Management. A number of them are imposing a requirement for research data must be placed in a repository. For instance OECD requires that a public funded research should as far as possible be openly available to scientific community (Corti et al., 2011).

Despite the rapid growth of research data across various fields, there is little evidence to suggest that Kenyan universities have successfully implemented RDM practices. This raises concerns about their preparedness and the challenges hindering the widespread adoption of RDM. Essential components for effective RDM include well-established information communication infrastructure, clear policies, trained personnel, and sufficient financial support.

Though some universities, such as Jomo Kenyatta University of Agriculture and Technology (JKUAT) and Kabarak University, have made identifiable progress by adopting RDM policies (Imbuga, 2017; Kabarak University, 2019), these efforts however remain limited. The Registry of Data Repositories lists only six research institutions in Kenya with data repositories, and none of them are university entities (GFZ German Research Centre for Geosciences et al., 2013). The absence of visible RDM activities on university websites highlights the need for this study to assess current practices and identify barriers to implementation. By investigating these issues, the study aims to contribute to improving RDM practices and aligning Kenyan universities with global standards such as the FAIR principles (Findable, Accessible, Interoperable, and Reusable).

Previous research

Bratt's (2022) study examined data management strategies and data sustainability. It finds that academic faculties are increasingly pressured to deposit data in open repositories, leading to "data articulations" to align local and institutional goals. The research offers insights into data management practices, institutional factors affecting data deposit, and a theoretical framework of data articulation. It also recommends strategies for data policymakers, repositories, and researchers to promote data reuse and employ computational approaches for better data management and deposit.

Academic libraries are increasingly involved in RDM, offering services like data management plans and training. However, they face challenges like limited resources and technical expertise. To effectively contribute to RDM, libraries need to collaborate with other stakeholders, invest in staff development, and adapt to the evolving landscape of research data management (Coravu, 2019).

A study in Malawi found universities create large amounts of digital research data but lack proper management practices. Researchers rarely share data due to limited infrastructure

and incentives. The study recommends a framework with collaboration, policies, rewards, infrastructure, and competency development to improve research data management (Chawinga, 2019)

Nakitare et al. (2024) in their study explored the early indicators of research data management (RDM) practices in Kenya. In their findings they argue that while RDM is increasingly recognized as important, its adoption in Kenya remains limited. The study further indicates that Kenya's research data management is hindered by a lack of a national framework, insufficient data repositories, and varying support services, necessitating a comprehensive approach involving government, universities, and international partners to establish clear guidelines, invest in repositories, and enhance researcher training and support.

Imbuga (2017) noted JKUAT's pioneering efforts to establish Open Access research data policies and infrastructure in Kenya, fostering a culture of data sharing and collaboration. The University has established a dedicated data center, implemented a policy, and collaborated with international partners to promote data sharing and reuse. These efforts contribute to advancing open science practices in Kenya.

A study on Strathmore University on research data management (Adika & Kwanya, 2020) found out that Strathmore University lecturers have varying levels of research data management literacy. While they understand the importance of RDM and participate in data-related activities, they lack skills in areas like open access sharing, data legislation, and security. The study suggests strengthening RDM capacity through institutional policies and training initiatives.

Moreover these studies have not fully addressed the current status of the RDM practices in universities in Kenya and the gaps that needs to be addressed to fully realize the effective RDM services. In order to accomplish this aim, the study outlines specific objectives:

1. To establish the current status of managing research data in universities in Kenya
2. To establish the current policies and guidelines that have been developed to guide and support research data activities in universities in Kenya.
3. To find out how prepared universities in Kenya are prepared to support research data management activities.
4. To establish the availability of skilled personnel to support the implementation of research data management.

Methods

The study employed a mixed-methods approach. Survey was conducted to gather data from university librarians and systems librarians. The survey questions focused on various aspects of research data management, including current status, policies, practices, challenges, and support services. Document analysis and website review was also carried out. This involved analyzing relevant policies, and institutional documents related to research data management, allowing for a deeper understanding of the implementation process and the evolution of data management systems in Kenya's universities. These combined approach ensured a thorough and multi-dimensional analysis of the topic.

Results

In this study, questionnaires were distributed to 37 universities, comprising 29 public universities and 8 private universities through emails. Response rate are summarized in table 1.

Table 1: Response Rate Table

S/No.	Type of University	Questionnaires Sent	Responses Received
1.	Public Universities	29	11
2.	Private Universities	8	3
	Total	**37**	**14**
	Response Rate (%)		**37.8**

Respondents per qualification as shown in Table 2:

Table 2: Breakdown of Respondents' Qualifications

S/NO.	Qualification	Number of Respondents
1.	PhD	3
2.	Master's	10
3.	Bachelor's	1
Total		**14**

A document analysis and review of university and library websites from 16 universities in Kenya revealed that only 2 universities have formal Research Data Management (RDM) policies in place. Seven universities mention the management of research data in their policies and guidelines, and only one had a link to RDM services on its website. The findings are summarized in Table 3.

Table 3: Document analysis and website visits

S/No	Category	No.
1.	Universities with RDM Policies	2
2.	Management of Data is Mentioned in Research Policies and Guidelines	7
3.	Universities with RDM Links on Websites	1
4.	Not Clear	2

The results indicated that 68.8% universities do not have RDM policy or guidelines that directs how research data are to be handled, 18.8% indicated that they have and 12.5% were not sure.

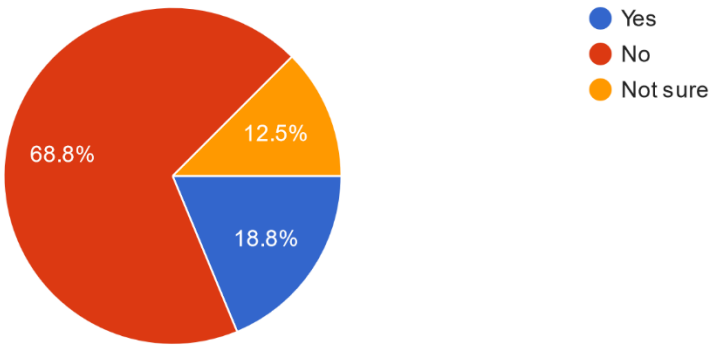

Figure 1: Presence of RDM policy or Guidelines

The findings revealed a mixed picture regarding the implementation of Research Data Management practices in Kenyan universities. Half of the respondents reported that their institutions have implemented RDM services, while the other half indicated that RDM services

are not offered, signaling that the adoption of RDM is still in its early stages in many universities. Though responses shows a number of universities have implemented RDM, analysis of documents and websites point a different picture. The analysis indicates that only two universities in Kenya have RDM policies and guidelines. The absence of links to RDM services as well as Data Repositories point a low provision of RDM services. A number of universities have captured in their research policies that researchers are required to deposit research data with the institution but fails to indicate how they should be captured.

A critical challenge is the lack of guiding policies, with 64.3% of respondents indicating the absence of an RDM policy. This lack of policy framework not only affects the development and consistency of RDM practices but also reflects a gap in institutional preparedness to support effective research data management.

The presence of personnel designated to support RDM services, with 57.1% of respondents confirming their existence, demonstrates some universities' effort toward RDM provision. However, the fact that 42.9% of institutions do not have such personnel highlights the need for increased capacity-building and staff deployment to support RDM. Furthermore, while a majority of institutions (58.3%) indicated that they have established research data repositories, primarily using Dspace platform, the remaining 41.7% do not, indicating an infrastructure gap that hinders the effective preservation and management of research data. In addition, despite 66.7% of library staff having received RDM training, notable skill gaps persist in crucial areas such as metadata management, software development, and data governance.

Library staff training in RDM was also evaluated, with 63.4% indicating they had received training, primarily through workshops and seminars, self-phased modules, on-the-Job Training, webinars, and reading and research.

Conclusion

While there is some progress in the adoption of RDM in Kenyan universities, significant challenges remain in terms of policy development, personnel capacity, and infrastructure. The absence of RDM policies, skill gaps among library staff, and the lack of designated RDM personnel in many universities hinder the effective management of research data.

Recommendations

The study findings highlight several critical areas for improving RDM practices in Kenyan universities. There is a pressing need for the development and implementation of comprehensive RDM policies. Establishing these policies will help provide clear guidelines for managing research data and ensure consistency and accountability across institutions.

Significant skill gaps were identified among library staff and researchers in areas like metadata management and data governance. To address these deficiencies, universities should invest in targeted training programs that include workshops and online courses. With institutions lacking dedicated RDM personnel, appointing RDM Librarians is essential for overseeing and implementing RDM initiatives effectively. This will also require adequate financial support and resources to establish and maintain research data repositories.

Enhancing collaboration and networking among universities is crucial for sharing best practices and resources related to RDM. Implementing these recommendations will significantly improve RDM practices in Kenyan universities, ultimately advancing scholarly communication and data accessibility.

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