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Perceptions of Researchers and Academicians at Banaras Hindu University on Research Data Management Systems and the Role of Libraries: An Empirical Study

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Abstract

The effective management of research data has become a critical aspect of academic research in the digital era. This study investigates the awareness, practices, and challenges associated with Research Data Management (RDM) among faculty members and research scholars at Banaras Hindu University (BHU), Varanasi. The research focuses on identifying the types of research data generated, formats and mediums used for storage, data sharing practices, the role of libraries, and the level of awareness about existing data repositories and RDM tools. Findings reveal that while most respondents understand the importance of data sharing and open access, only a few know RDM tools, indicating a significant gap in practical knowledge and technical preparedness. Popular storage formats include .docx, .xls, and PDF, while storage media such as portable hard disks and USB drives are widely used. Despite the positive perception towards data sharing, issues related to storage challenges, data ethics, and copyright persist. The study underscores the urgent need for universities to develop comprehensive data management policies, conduct regular training programs, and enhance the role of libraries in supporting research data lifecycle management. Strengthening RDM infrastructure and awareness will significantly benefit researchers and improve research transparency and efficiency.

Keywords: Research Data Management, Data Sharing, RDM Tools, Academic Libraries, Data Storage, Open Access, BHU.

1. Introduction

The advent of Information and Communication Technology (ICT) has fundamentally reshaped modern society, with academia and research being among the most profoundly affected sectors. ICT has revolutionised the processes of knowledge generation, dissemination, and preservation, bringing increased efficiency, scalability, and accessibility to scholarly endeavours (Borgman, 2017; Briney, 2015). A pivotal outcome of this digital transformation is the unprecedented volume

of research data produced across disciplines, prompting a cultural shift toward openness, transparency, and collaborative inquiry (Borgman, 2017).

In the current knowledge-driven global economy, data is increasingly acknowledged as a strategic asset and a cornerstone of evidence-based decision-making (Yu, 2017). Research data refers to the digital or physical factual material collected, observed, generated, or created during a research process (Tenopir et al., 2015). Depending on the nature of the study, research data may include structured datasets, textual records, audio-visual content, laboratory notebooks, survey results, software code, field notes, and more (Davidson et al., 2014). This diversity reflects the complexity and interdisciplinary nature of contemporary research.

Importantly, research data often has a lifespan that extends well beyond the original project. When properly managed and preserved, datasets can be reused for longitudinal studies, meta-analyses, or interdisciplinary collaborations, thus maximising the return on investment in research and fostering cumulative scientific progress (Kennan & Markauskaite, 2015). For example, large-scale genomic data has been reused in numerous subsequent studies, facilitating advances in personalised medicine and global health research (Byrd et al., 2020).

The practice of sharing research data has gained traction globally due to its manifold benefits. It enhances the reproducibility and credibility of research findings, facilitates independent validation, reduces duplication of effort, and promotes interdisciplinary collaboration (Kim & Adler, 2015; Briney, 2015). Data sharing also increases research visibility and citation potential, offering broader recognition to original investigators (Tenopir et al., 2015; Staunton et al., 2021). Moreover, in an era where most academic research is publicly funded, there is a growing ethical and policy-driven demand for open access to research data (Wessels et al., 2014).

Recognising the importance of responsible data stewardship, major funding bodies now require applicants to submit comprehensive Data Management Plans (DMPs) that specify how data will be collected, organised, preserved, and made accessible during and after a project (European Commission, 2018). These requirements align with the principles of open science, which advocate for transparency, accessibility, and collaborative research practices (Chawinga, 2019). For example, the National Science Foundation (NSF) and the European Commission mandate data sharing and long-term data preservation as part of their grant proposals (Kennan & Markauskaite, 2015).

As a result, Research Data Management (RDM) has emerged as a critical function in academic and research institutions (Haendel et al., 2012; Ogier et al., 2018). RDM involves a set of practices and policies to ensure data is secure, well-organised, ethically handled, and available for future reuse. Effective RDM supports scientific integrity, minimises data loss, and contributes to research outputs' long-term impact and sustainability (Yu, 2017; Briney, 2015). Institutions are now prioritising RDM frameworks to help guide researchers through the complexities of data lifecycle management, from creation to curation, preservation, and sharing (Singh et al., 2018; Tenopir et al., 2015).

Academic libraries, IT departments, and research offices are increasingly collaborating to develop institutional frameworks and infrastructure that support RDM services. These services are crucial for guiding researchers through the intricacies of data management, ensuring that data are ethically stored, shared, and preserved for future use (Davidson et al., 2014; Borgman, 2017).

2. Research Data Management

Research Data Management, data curation, or research data stewardship involves systematically handling, organising, and preserving research data throughout its life cycle. From the initial stages of data collection, processing, and analysis to its final dissemination, long-term storage, and reuse, RDM is critical to ensuring that research data remains accessible, trustworthy, and reusable (Rafiq & Ameen, 2022; Tenopir et al., 2015). As data plays a central role in modern research, managing it effectively is vital to the integrity and credibility of scientific work (Borgman, 2017; Yu, 2017).

RDM extends beyond simple data storage; it provides essential services that assist researchers in best practices for organising, documenting, storing, and sharing data. These services help ensure compliance with ethical standards, institutional policies, and the increasingly stringent requirements set by funding agencies (Haendel et al., 2012). Effective RDM not only improves data accessibility and security but also enhances research efficiency, reproducibility, and transparency, thereby aligning with the broader goals of open science (Byrd et al., 2020; Davidson et al., 2014).

The growing emphasis on open science, which advocates for transparency, reproducibility, and the unrestricted sharing of data and findings, has led to significant advancements in the infrastructure and policies that support RDM (Chawinga, 2019; Briney, 2015). Open science encourages greater collaboration and maximises the value of research outputs by making data available to the wider community. In response, research institutions invest in comprehensive cyberinfrastructures and develop policies supporting secure, ethical, and efficient data management (Borgman, 2017). An effective RDM framework encompasses several key components:

- **Data Management Planning:** Developing comprehensive strategies for managing data at the outset of the research project. This includes plans for data collection, organisation, and sharing both during and after the project (National Science Foundation, 2018).
- **Metadata Development:** Creating standardised, machine-readable descriptions of datasets that enable their discoverability and reuse. This process enhances research data's long-term usability and interoperability (Yu, 2017).
- **Data Curation:** Ensuring that research data is properly formatted, verified, and documented for future usability, facilitating reuse in subsequent studies or by other researchers (Staunton et al, 2021; Kennan & Markauskaite, 2015).
- **Secure Storage and Backup:** Implementing robust systems to safeguard data against loss, corruption, or unauthorised access. This is critical for maintaining data integrity and ensuring it remains accessible over time (Tenopir et al., 2015).
- **Data Sharing and Archiving:** Establishing systems to make data available for future research use, often through institutional or discipline-specific data repositories. Archiving also ensures that datasets are preserved long-term, supporting future research and collaboration (Davidson et al., 2014; Haendel et al., 2012).

Additionally, RDM addresses the management and sharing of data even after the original research project concludes. This approach supports secondary data analysis, cross-disciplinary research, and collaborative opportunities, ensuring that datasets continue to contribute to scientific discovery (Kennan & Markauskaite, 2015). Many funding agencies now mandate DMPs as part of their grant application process. For instance, The National Science Foundation (NSF) in the United States requires DMPs for all grant proposals, ensuring that funded research adheres to proper data

management standards (National Science Foundation, 2018). The Australian National Data Service (ANDS) has established guidelines for data management to support research in Australia, focusing on best practices for data sharing and preservation (Byrd et al., 2020). UK Research and Innovation (UKRI) and the e-Science Core Programme in the United Kingdom enforce policies that promote responsible data stewardship, contributing to the global movement toward FAIR (Findable, Accessible, Interoperable, Reusable) data principles (Chawinga, 2019; Staunton et al., 2021).

These global initiatives underscore the commitment to responsible research practices, preserving data for long-term use, and promoting open, accessible science (Borgman, 2017). As the complexity and volume of research data continue to grow, implementing robust RDM practices is essential for ensuring scientific research's credibility, reproducibility, and impact.

3. Libraries and Research Data Management Services

Libraries have long been considered the intellectual heart of academic institutions, with their core expertise in organising, preserving, and facilitating access to information. In today's data-intensive research environment, academic libraries increasingly assume a pivotal role in supporting and enhancing RDM services. The evolving landscape of scholarly communication, with its increasing emphasis on data-driven research and open science, has prompted libraries to extend their traditional functions to meet the rising demands for robust data stewardship (Jørn Nielsen & Hjørland, 2014; Wałek, 2019).

Academic libraries contribute to the successful implementation of RDM in several ways, leveraging their longstanding experience in managing complex information systems and their deep understanding of scholarly resources (Xu, 2022). These roles include:

- **Standardised Information Organisation:** Libraries possess extensive expertise in cataloguing, classifying, and curating diverse types of information. This skill set is invaluable in managing research data, ensuring that data is systematically organised, easily discoverable, and compliant with international standards (Worthy, 2015; Buys & Shaw, 2015).
- **Support for Researcher Activities:** Libraries have traditionally supported researchers with services such as bibliometrics, citation analysis, systematic review support, and scholarly publishing platforms. As the needs of researchers evolve, libraries are expanding these services to include data literacy training and assistance with data management planning, helping researchers navigate the complexities of RDM (Koltay, 2017).
- **Institutional Repositories:** Academic libraries have historically managed institutional repositories for theses, dissertations, and faculty publications. More recently, they have expanded these repositories to include research datasets, acting as trusted stewards of traditional and digital research outputs. This shift aligns with the growing demand for accessible, reproducible, and FAIR-compliant data (Andrikopoulou et al., 2022; Witt, 2008).
- **Information Accessibility Skills:** Librarians bring specialised skills in organising, indexing, and retrieving information. These competencies are crucial in structuring and maintaining research data to ensure its long-term accessibility and reuse, supporting the broader goals of open science (Xu, 2022; Boté-Vericad & Healy, 2022).
- **Bridging the Gap:** Librarians increasingly serve as intermediaries between researchers, IT professionals, and administrators. This unique position enables them to facilitate collaboration and align data practices with institutional policies and funding agency requirements, ensuring

seamless data management across the research lifecycle (Searle et al., 2015; Jørn Nielsen & Hjørland, 2014).

- **Repository Guidance:** Academic libraries are instrumental in guiding researchers in submitting their data to appropriate national and international subject repositories. They play a critical role in helping researchers comply with FAIR (Findable, Accessible, Interoperable, Reusable) principles and funder mandates, ensuring that data is shared in ways that maximise its impact (Jørn Nielsen & Hjørland, 2014; Witt, 2008).
- **Instruction and Training:** Librarians are adept at designing and delivering educational programs tailored to researchers' needs, spanning disciplines and experience levels. They provide essential training in best practices for data management, from data collection to long-term preservation (Boté-Vericad & Healy, 2022; Buys & Shaw, 2015).
- **Development of Best Practices:** Given their expertise in information organisation and documentation, librarians actively contribute to developing standards, protocols, and best practices for managing digital research data. Their involvement ensures that data management practices are sustainable and aligned with evolving institutional and disciplinary needs (Monahan et al., 2017).
- **Trust and Reliability:** Libraries are regarded as neutral, trusted institutions, a quality that is especially valuable in the context of long-term data preservation and handling sensitive intellectual property (Andrikopoulou et al., 2022). Their role in safeguarding research data enhances the integrity of the academic process.
- **Intellectual Property Expertise:** Librarians also possess expertise in copyright, licensing, and intellectual property rights, assisting researchers with the legal and ethical considerations related to data sharing and reuse (Wałek, 2019).

In the era of open science and data-driven research, libraries have evolved from mere information providers to strategic partners in the research enterprise. Their expanding role in RDM is essential for ensuring the stewardship of research data, maintaining research integrity, and maximising the value of scholarly outputs for current and future generations (Xu, 2022; Jørn Nielsen & Hjørland, 2014).

4. Literature Review

A thorough and systematic review of national and international literature has been conducted to evaluate the current state, evolving practices, and challenges of RDM. This review identifies key trends, challenges, and opportunities in developing and delivering RDM services, particularly within academic libraries and institutions.

Frederick & Run (2019) highlighted the crucial role that academic libraries in Ghana play in institutional RDM services. Their study emphasised that effective RDM requires collaboration among libraries, IT departments, and research support offices. Such partnerships are vital for integrating RDM services into the broader research infrastructure of universities. Similarly, Chiwara and Mathe (2015) conducted a study at the Cape Peninsula University of Technology (CPUT) in South Africa, noting that while many libraries were still in the early stages of RDM implementation, efforts in policy formulation, infrastructure development, and staff training were already underway. They also highlighted efforts to raise awareness among faculty and researchers about the importance of RDM.

Subaveerapandiyan (2023) found that while libraries had plans to offer RDM services, many were

still in the nascent stages of implementation. They recommended building librarians' capacities through professional development opportunities such as workshops and conferences to equip them with the skills needed to support RDM effectively. Andrikopoulou et al. (2022) extended this research, identifying librarians' challenges in scaling RDM services. They pointed out the need for specialised skills and institutional support to address operational and conceptual barriers in RDM.

Flores et al. (2015) explored the growing engagement of libraries in providing RDM as a core service, with librarians offering direct support to researchers through training, creating subject-specific data guides, and assisting with compliance with data-sharing mandates from funding agencies and publishers. Similarly, Perrier et al. (2017) examined the global rise of RDM services, emphasising libraries' critical roles in preserving, organising, and disseminating research data across the research lifecycle.

Tmava (2023) focused on researchers' perceptions of the availability of raw data in open-access environments. They argued that libraries should play a key role in establishing institutional repositories to facilitate the deposit and preservation of raw research data. Yi Shen (2015) studied data-sharing and reuse practices at Virginia Tech and found a significant gap between the potential and actual data-sharing activities. His research highlighted the risks of losing valuable research data after project completion due to inadequate data-sharing practices.

Tenopir et al. (2020) researched data management and data-sharing practices and revealed persistent barriers such as security concerns, legal issues, and a lack of training. Despite these challenges, their findings emphasised that researchers overwhelmingly supported formal training in RDM. Ekeh et al. (2023) reiterated the global importance of RDM, stressing the critical role of libraries and academic institutions in delivering comprehensive data management services.

Zhou (2018) examined institutional surveys and websites to evaluate RDM service offerings across academic libraries. The study provided insights into the scope, coverage, and developmental opportunities in RDM services, suggesting that libraries could benefit from improving their service offerings. Similarly, Mannheimer et al. (2019) investigated the collaborative role of data repositories and academic libraries in addressing ethical and legal challenges in managing qualitative research data. They noted that while a definitive solution does not exist, close collaboration between libraries, repositories, and researchers could help mitigate issues such as informed consent, data deidentification, and legal sharing.

Furthermore, Cox & Pinfield (2014) surveyed libraries in the UK regarding bibliometric and data support services. While bibliometric services were more established, engagement with RDM was still limited. However, there was strong anticipation for future involvement, especially in technology support, policy development, and researcher training. Their study underscored the need for librarians to deepen their understanding of the research environment to offer more relevant and timely RDM services.

Recent studies further affirm the expanding role of libraries in RDM. For example, Lee & Stvilia (2017) emphasised the importance of institutional repositories in managing research data effectively, suggesting that libraries are central to ensuring that research data is accessible, preserved, and reusable. Additionally, Lyon (2016) examined the role of libraries in supporting open science practices and the need for robust data management policies that ensure transparency

and reproducibility in research.

The literature reveals that while academic libraries have made substantial progress in providing RDM services, challenges such as a lack of training, insufficient infrastructure, and legal complexities remain. However, with continued investment in skills development, policy creation, and collaboration across institutional departments, libraries are well-positioned to take a leading role in the future of research data management.

5. Need for the Study

BHU was established in 1916 by Pandit Madan Mohan Malaviya and is one of India's premier multidisciplinary academic institutions. Located in Varanasi, the university offers various academic programs across 34 institutes, covering disciplines such as Engineering, Pharmacy, Medicine, Law, Arts, Social Sciences, Agriculture, Commerce, and more. With over 160 undergraduate, postgraduate, and doctoral programs, BHU has a rich tradition of fostering academic excellence and cutting-edge research.

The university has made significant strides in research and innovation in recent years. Establishing the Center for Research for Development (CR4D) has been pivotal in enhancing the university's role in research-industry collaborations, fostering interdisciplinary projects, and driving innovation. BHU's remarkable achievement of generating 124 Intellectual Property Rights (IPRs) in just three years is a testament to its dynamic research environment and growing focus on fostering a knowledge-based, innovation-driven academic culture.

In light of the rapidly growing and evolving research landscape at BHU, there is an urgent need to ensure that researchers, faculty members, and other academic stakeholders are fully equipped to handle the complexities of RDM and RDS. As research becomes increasingly data-driven and collaborative, effective research data management is essential for ensuring research findings' integrity, transparency, and reproducibility. Additionally, adherence to funding agency guidelines and meeting the expectations of academic publishers regarding data sharing has become a critical requirement.

Despite the university's expanding research activities, there is limited evidence on the extent to which researchers at BHU understand and implement RDM practices. Without proper awareness and training, important research data might be lost, poorly used, or not preserved well, limiting future research and valuable academic collaborations. This study is timely and crucial because it aims to:

- Bridge the knowledge gap related to RDM and RDS among the researchers and faculty members at BHU.
- Promote a culture of data sharing and openness within the academic community.
- Empower university stakeholders with the knowledge and skills necessary for effective research data management, which aligns with best practices in the field.
- Support the development of institutional strategies and enhance library services aligned with global research data management and stewardship standards.

6. Objectives of the Study

The present study explores perceptions, attitudes, and practices related RDM among faculty members and research scholars at Banaras Hindu University (BHU), Varanasi. As the role of data in academic research becomes increasingly critical, understanding how researchers manage, preserve, and share their data is essential for fostering a culture of openness, collaboration, and sustainable research practices. The study focused on the following objectives;

- To assess the level of awareness among research scholars and faculty members at BHU regarding research data-sharing practices and their significance in the scholarly ecosystem.
- To examine the attitudes and perceptions of researchers and academicians toward RDM systems, including their perceived benefits, challenges, and institutional support.
- To investigate the data preservation strategies adopted by research scholars and faculty members to ensure long-term accessibility and usability of research data.
- To analyse the willingness and concerns of researchers in sharing their research data with peers and to understand the factors that influence their data-sharing decisions.
- To evaluate the role of academic libraries in supporting RDM practices, including their involvement in data curation, preservation, awareness programs, and infrastructure support for data repositories.

By achieving these objectives, the study seeks to provide actionable insights for developing effective institutional policies, enhancing library support services, and promoting a more robust research data management culture within BHU.

7. Scope and Limitation of the Study

This study primarily examines the awareness, perceptions, and attitudes of research scholars and faculty members at BHU regarding RDM systems and RDS. It aims to explore how these academic stakeholders understand, utilise, and engage with research data. It also evaluates the role of the library in data management, sharing, and preservation. The scope of the study is confined to the following key parameters:

- **Target Population:** The study is limited to research scholars and faculty affiliated with BHU. Therefore, other academic institutions or external stakeholders, including non-academic professionals, are excluded from the scope of this research.
- **Thematic Focus:** The primary focus is on evaluating the awareness levels, attitudes, and practices concerning RDM and RDS. This study does not involve the technical assessment of data repositories, infrastructure systems, or tools. Instead, it focuses on the perceptions and practices of managing and sharing research data.
- **Geographical Limitation:** The study is institution-specific, so the findings are not generalisable to other universities or research institutions unless further comparative studies are conducted.
- **Time Frame:** The data collected pertains to a specific period and reflects the current perceptions and practices of research scholars and faculty members at the university. Hence, the study may not fully capture long-term trends or future developments in research data management practices or changes in institutional policies.

While this study provides valuable insights into the RDM landscape at BHU, it does not account for practice variations across different disciplines or departments unless explicitly mentioned.

Additionally, the study relies on self-reported data from the participants, which could be influenced by biases such as social desirability, personal perceptions, or limited technical knowledge regarding certain aspects of RDM.

Despite these limitations, the findings are expected to contribute significantly to developing tailored RDM support services at BHU. They may also inform policy recommendations for improving research data management practices and act as a basis for future comparative research in similar academic settings.

8. Research Methodology

This study adopts a descriptive research design to explore the perceptions, awareness, and practices related to Research Data Management (RDM) systems among faculty members and research scholars at BHU. The primary objective was to understand how stakeholders perceive data sharing, use RDM tools, and view the role of libraries in facilitating research data management.

- **Research Design:** The research employed a quantitative survey method using a structured questionnaire as the main data collection tool. This method was chosen for its effectiveness in gathering standardised data from a large population, enabling statistical analysis and generalisation of findings within the institution.
- **Population and Sampling:** The target population included faculty members and research scholars from different faculties such as Science, Social Sciences, Arts, Commerce, Law, Medicine, Engineering and Management. The purposive sampling approach was adopted to target individuals, faculty members, and research scholars directly involved in academic research and data generation. This ensured that only those participants who were relevant to the objectives of the study were included.
- **Sample Size:** A total of 110 questionnaires were distributed using a combination of convenience and random sampling methods. 107 completed responses were received, resulting in a high response rate of 97.27%. The high response rate reflects the relevance of the topic and the engagement level of BHU's academic community.
- **Data Collection Tool:** A questionnaire was developed and distributed among Respondents. The questionnaire consisted of closed-ended and a few open-ended questions to allow for standardised analysis while capturing individual insights.
- **Data Analysis:** The collected data were entered into Microsoft Excel and analysed using descriptive Frequencies and Percentages. Multiple response questions were coded appropriately, and analytical insights were drawn to interpret patterns in data awareness, data management behaviour, and expectations from the institutional library.

9. Data Analysis and Interpretation

9.1. Response Rate

A total of 110 questionnaires were distributed to faculty members and research scholars, and 107 were completed and returned, resulting in a response rate of 97.27%.

9.2. Respondents

Table 1 provides the designation-wise data of the respondents. It is found that 7.48% of the respondents are Professors, 12.15% are Associate Professors, 30.84% are Assistant Professors, and 49.53% are Research Scholars. This data deviation reflects considerable variation in the number of respondents across different designations, with Researchers being the dominant group while Professors being the smallest. Early-career academics (i.e., Researchers and Assistant Professors) are more actively engaged in the study.

Table 1: The designation of respondents

Designation	Respondent	Per cent
Professor	8	7.48
Associate Professor	13	12.15
Assistant Professor	33	30.84
Research Scholars	53	49.53

9.3. Type of Raw Data Generated

Table 2 reveals that experimental data (98.13%), textual data (83.18%), and images (71.03%) are the most commonly generated types of research data among researchers and faculty members, indicating a strong emphasis on empirical, documentation-based, and visual research outputs. The generation of questionnaire-based data (60.75%) and video data (42.06%) also highlights the growing use of surveys and multimedia tools in research practices. The lower percentages for audio (17.76%), codes (24.30%), diaries (14.95%), letters (2.80%), and clinical data (0.93%) suggest these formats are limited to specific disciplines or niche research areas. The predominance of experimental, textual, and image data points to universities' need to prioritise storage, preservation, and develop sharing systems that accommodate these formats while preparing to support emerging and specialised data types to foster broader research innovation.

Table 2: Types of research data generated

Type of Data Generated	Respondent	Per cent
Experimental data	105	98.13
Textual	89	83.18
Images	76	71.03
Video	45	42.06
Newspaper Articles	39	36.45
Dairies	16	14.95
Audio	19	17.76
Codes	26	24.30
Questionnaires	65	60.75
Letters	3	2.80
Clinical data	1	0.93
Others	1	0.93

*Multiple answers were permitted

9.4. Type of Format Used to Save Data

Table 3 shows that researchers and faculty members use various formats to save their research data, with text-based formats being the most dominant. The majority of respondents save their data in .docx (89.72%), .xls (85.98%), and PDF (81.31%) formats, demonstrating a strong reliance on easily accessible and widely compatible file types for data management. Similarly, using tables (79.44%) and text documents (71.03%) reflects a traditional preference for structured and narrative data representation. Meanwhile, formats such as graphs/images (42.06%), PPTs (60.75%), and SPSS spreadsheets (49.53%) indicate the integration of visual, statistical, and presentation-oriented data handling into research activities. The lower usage of specialised or less conventional formats like audio (11.21%), CSV (33.64%), and codes (12.15%) suggests that computational and multimedia data management practices are less widespread among the respondents. This finding suggests that future training programs should emphasise the benefits of diverse data formats to encourage broader adoption of data science practices across disciplines.

Table 3: Types of format used to save research data

Types of formats used to save research data	Respondent	Per cent
PDF	87	81.31
Tables	85	79.44
.docx	96	89.72
.xls	92	85.98
Graph/Images	45	42.06
PPTs	65	60.75
Text Documents	76	71.03
SPSS Spreadsheet	53	49.53
Audio	12	11.21
.csv	36	33.64
Codes	13	12.15
Others	3	2.80

*Multiple answers were permitted

9.5. Storage Medium Used To Preserve Research Data

Table 4 reveals that researchers and faculty members employ a variety of storage media to preserve their research data. The most commonly used mediums are portable hard disks (97.20%), USB flash drives (95.33%), and personal computers (85.98%), highlighting a strong inclination towards self-managed, portable, and easily accessible storage solutions. Printed forms (83.18%) and local computers (71.03%) are also widely used, reflecting a continued reliance on digital and traditional physical formats. In contrast, cloud-based storage is utilised by only 58.88% of respondents, indicating moderate adoption despite the growing trend towards online storage solutions that offer enhanced accessibility and backup security. The lower usage of CDs (11.21%) and DVDs (13.08%) shows that older optical storage media are becoming largely obsolete in favour of more modern alternatives. The findings suggest that while researchers value control over their data through physical and personal storage means, there is a need to encourage greater trust and usage of cloud-based storage for its benefits in collaboration, recovery, and long-term preservation.

Table 4: Storage medium used to preserve research data

Storage medium	Respondent	Per cent
Personal Computer	92	85.98
USB Flash Drive	102	95.33
Portable Hard Disk	104	97.20
Cloud-based storage	63	58.88
Personal Email	79	73.83
Local Computer	76	71.03
Printed Form	89	83.18
CD	12	11.21
DVD	14	13.08

*Multiple answers were permitted

9.6. Problems in Storage of Data

Table 5 shows that most researchers and faculty members (63.55%) reported facing problems in storing research data, while 36.45% did not encounter such issues. The findings suggest that despite the widespread use of various storage media, significant challenges persist in effectively managing and preserving research data. The relatively high percentage of respondents facing difficulties highlights the urgent need for universities and research institutions to strengthen their infrastructure, offer regular training on research data management, and implement clear policies and technical support systems to ensure the safe, organised, and sustainable storage of valuable research outputs.

Table 5: Problems in the storage of research data

Problems in Storage of Research Data	Respondent	Per cent
Yes	68	63.55
No	39	36.45

9.7. Practice of Data Sharing Exists in the Discipline

Table 6 reveals that 57.01% of the respondents acknowledged the existence of the practice of data sharing within their discipline, while 42.99% reported that such practices do not exist. These findings suggest that while a slight majority of researchers and faculty members are engaged in or aware of data-sharing practices, a substantial proportion still lack the practice or awareness. It underscores the importance of creating awareness about the benefits of data sharing, such as fostering collaboration, increasing research visibility, and accelerating scientific discovery while addressing concerns related to data privacy, ownership, and ethical use.

Table 6: The practice of data sharing exists in the discipline

The practice of Data Sharing exists in the discipline	Respondent	Per cent
Yes	61	57.01
No	46	42.99

9.8. Freely Access of Raw Data in the Public Domain

Table 7 highlights the opinions of researchers and faculty members regarding the free accessibility of raw data in the public domain. A considerable proportion of respondents, 28.97%, strongly agreed, while 28.04% agreed that raw research data should be freely accessible. Conversely, 19.63% disagreed, and 10.28% strongly disagreed with this notion, while 13.08% of respondents were uncertain. The findings suggest that a significant majority favour open access to research data, reflecting an encouraging trend towards transparency and data sharing among the academic community. However, a major portion of disagreement points out that while there is a positive inclination towards open data, there remains a need for structured policies, awareness programs, and trust-building measures to address apprehensions among researchers regarding data sharing in the public domain.

Table 7: Freely accessibility of raw data in the public domain

Freely accessibility of raw data in the public domain	Respondent	Per cent
Strongly Agree	31	28.97
Agree	30	28.04
Strongly Disagree	11	10.28
Disagree	21	19.63
Cannot say	14	13.08

9.9. Awareness of Data Repositories of the Discipline

Table 8 presents the awareness level among researchers and faculty members regarding existing data repositories within their discipline. The data shows that 42.99% of respondents are aware of the data repositories, while a larger proportion, 57.01%, indicated a lack of awareness. These findings reveal a significant gap in knowledge about available data repository resources in the academic community. Despite growing global emphasis on data sharing and open-access initiatives, most researchers at the studied institution are still unaware of where and how to properly deposit or access research data. Thus, there is a critical need for targeted awareness campaigns, workshops, and training programs to familiarise researchers with existing repositories and the benefits of utilising them for preserving and sharing their research outputs.

Table 8: Awareness about the existing data repositories of the discipline

Awareness about the existing data repositories of the discipline	Respondent	Per cent
Yes	46	42.99
No	61	57.01

9.10. Awareness of Research Data Management Tools

Table 9 focuses on the respondents' awareness of RDM tools. The data shows that only 28.97% are aware of these tools, while a significantly higher proportion, 71.03% of respondents, reported that they are not aware of RDM tools. This indicates the need to raise awareness and educate researchers and faculty members about the importance and usage of RDM tools.

Table 9: Awareness of the Research Data Management Tools

Awareness of Research Data Management Tools	Respondent	Per cent
Yes	31	28.97
No	76	71.03

9.11. Role of Libraries in Research Data Management

Table 10 illustrates the perception of researchers and faculty members regarding the role of libraries in managing research data. The data reveals that a significant majority (89.72%) of respondents acknowledge the involvement of libraries in managing research data, while a smaller proportion (10.28%) disagrees with this notion. This gap in perception could point to a need for further promotion of library data management services or the improvement of the services provided to address the concerns of the minority who feel libraries are not adequately supporting research data management. Libraries could address this gap through outreach programs, providing more targeted services, and ensuring clear communication about their roles in research data management.

Table 10: Role of libraries in managing research data

Role of Library in Managing Research Data	Respondent	Per cent
Yes	96	89.72
No	11	10.28

10. Conclusions and Recommendations

The growth in research activities has resulted in an ever-increasing volume of research data. With advancements in information technology, the storage, sharing, and reuse of research data have become more feasible, benefiting researchers by saving time and reducing costs for funding agencies. In many countries, funding bodies now mandate the submission of research data to institutional repositories. RDM systems, which facilitate the managing, preserving, sharing, and retrieving of research data, have been widely implemented across universities globally. Libraries play a vital role in supporting these systems by providing guidance and promoting RDM services to their academic communities. The findings indicate that while most respondents know the importance of research data sharing, and many strongly support the free accessibility of research data, there remains a significant gap in awareness regarding Research Data Management tools. This lack of familiarity with RDM tools highlights the need for more focused training and information dissemination to ensure researchers can effectively manage, share, and preserve their research outputs. While the university's stakeholders acknowledge the broader importance of open-access data sharing, targeted efforts are still required to raise awareness about research data management's practical aspects and technical tools. To develop an efficient and effective RDM system, BHU must continue prioritising policy development and capacity building among its academic community.

The findings suggest several key recommendations to strengthen RDM practices at BHU. The Research Cell should develop a comprehensive and accessible data management policy, with detailed resources hosted on the university's website. University libraries must regularly organise

hands-on training sessions and workshops to support researchers in uploading, accessing, preserving, and sharing research data while introducing them to available RDM tools. Additionally, libraries should conduct frequent seminars and awareness programs to educate stakeholders on safeguarding their work in an open-access academic environment. Library professionals require intensive training to support this ecosystem, including introducing dedicated Data Services Librarians and opportunities for continuous professional development through in-house workshops and regular meetings. Although BHU researchers display a commendable level of awareness regarding the importance of data sharing, a pressing need remains to enhance their understanding of specific RDM tools and frameworks. Universities and libraries must proactively develop robust infrastructure, offer targeted training, and ensure compliance with global standards and funding agency requirements.

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