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AN EMPIRICAL STUDY ON THE IMPACT OF LIBRARY AND DATA MANAGEMENT PLANNING ON RESEARCH DATA MANAGEMENT

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ABSTRACT

This study investigates the impact of library and data management planning on research data management. The present study used a quantitative design with cross-sectional data, wherein the sample included 300 respondents from the Bengaluru District. Data collection was made through a structured questionnaire adapted from earlier studies. The results indicates that Data security and privacy mediate the relationship between Librarians and Research Data Management. However, data security and privacy has a positive mediate the relationship between Data management planning and research Data Management. furthemore, Data security and privacy mediate the relationship between data storage and preservation and research Data Management. In addition, Data security and privacy has a direct impoact on research Data Management.

Keywords: Data Management Planning, Data Storage and Preservation, Data Sharing and Open Access, Data Security and Privacy, Librarians, Research Data Management

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1. INTRODUCTION

In the contemporary data-centric landscape, research data management (RDM) has emerged as a fundamental element of academic and scientific inquiry. Research Data Management (RDM) encompasses the organisation, storage, preservation, and dissemination of data gathered and utilised throughout research endeavours. It guarantees that data is accessible, comprehensible, and reusable, adhering to the principles of open science and ethical research methodologies.

Librarians are essential in facilitating Research Data Management (RDM). Librarians, historically regarded as caretakers of knowledge, have broadened their competence to encompass the management of both physical collections and digital resources, including research data. Their participation in RDM corresponds with their objective to promote knowledge discovery, accessibility, and preservation (Xu, 2022).

Librarians play a significant role in Research Data Management (RDM) through various means: Offering Guidance: They aid researchers in formulating data management plans (DMPs), assuring adherence to funding and institutional mandates. Librarians frequently conduct workshops and training sessions on subjects including data organisation, metadata generation, and best practices for data sharing. Managing Repositories: They supervise institutional repositories, guaranteeing appropriate curation, discoverability, and long-term preservation of research material. Librarians champion the FAIR Principles, ensuring data is Findable, Accessible, Interoperable, and Reusable, hence facilitating extensive utilisation and reproducibility of research. Ensuring Ethical Data Utilisation: They assist in navigating legal, ethical, and privacy matters, including copyright, data security, and informed permission. As research evolves to be more interdisciplinary and collaborative, librarians are distinctly equipped to connect researchers, institutions, and the public. Their expertise in metadata management, information organisation, and technology tools renders them essential collaborators in the RDM process. In conclusion, librarians serve not only as supporters but also as proactive facilitators of effective and ethical research data management, enabling researchers to enhance the impact and value of their data (Shahzad et al., 2024).

This study aims to investigate the impact of impact of library and data management planning on research data management

2. LITERATURE REVIEW

Librarians have always been viewed as guardians of knowledge, connecting information with those who seek it. Their role has greatly evolved, adjusting to the needs of the digital age while preserving their primary purpose: to facilitate learning, literacy, and access to information. Today, librarians are versatile professionals who manage physical collections and curate, organise, and facilitate access to extensive digital resources, rendering them increasingly pertinent in our knowledge-driven culture (Rod et al., 2024). The core function of a librarian is to organise and preserve knowledge. Libraries, be they public, academic, or specialised, serve as repositories of information. Librarians guarantee the maintenance, cataloguing, and accessibility of these materials for varied audiences. Effective cataloguing systems enable users to swiftly locate materials, from historical writings to contemporary research. By doing so, librarians safeguard cultural legacy, guaranteeing that future generations can access historical knowledge. Librarians serve as instructors as well. They are essential in instructing individuals on how to traverse the intricate terrain of information. This is especially crucial in the digital era, where misinformation and excessive amounts of data provide significant issues. Librarians empower individuals through literacy programs, workshops, and personalised coaching, equipping them with the ability to critically evaluate sources, conduct effective searches, and utilise information ethically. In academic environments, they partner with academics to facilitate research and education, instructing students on how to efficiently access and evaluate scholarly resources (Ren & Lu, 2024; Rod & Boruff, 2024).

Librarians exemplify the essence of lifelong learning, perpetually enhancing their knowledge and skills to address the changing requirements of their communities. They are educated in several fields including information science, digital archiving, and teaching. This versatility enables them to maintain relevance in a swiftly evolving information environment and to act as reliable partners for individuals pursuing knowledge in many media (Rammutloa, 2023; Silkotch et al., 2023). Librarians are essential assets to society. Their diverse functions as educators, digital curators, campaigners, and ethical stewards underscore their versatility and significance in contemporary society. Librarians enhance informed, equitable, and literate societies by providing individuals with access to information and promoting critical thinking. As society progresses, the significance of librarians will increasingly amplify, guaranteeing that knowledge remains accessible, preserved, and utilisable for all. The following hypothesis is proposed for this purpose (Hrynick et al., 2023). The research model is presented in Fig. 1.

H1: Data security and privacy mediate the relationship between Librarians and Research Data Management.

H2: Data security and privacy mediate the relationship between Data management planning and research Data Management.

H3: Data security and privacy mediate the relationship between Ddata storage and preservation and research Data Management.

H4: Data security and privacy has a direct impoact on research Data Management

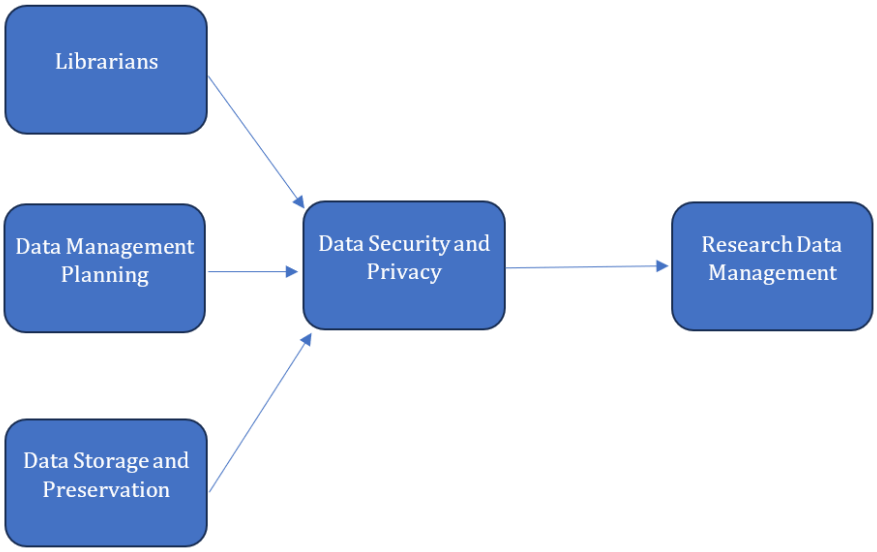

Figure 1: Research model

3. METHODS

The convenience sample method was employed for data collection, ensuring that the responses from 509 participants accurately reflected the rural population. The sample comprised a varied cohort of students, private sector employees, public sector employees, farmers, labourers, and others. This would allow the study to encompass a broad spectrum of perceptions on digital connectivity and e-commerce adoption. According to the power analysis conducted with G*Power, the minimum adequate sample size was 188; however, the actual sample size of 300 improved the reliability and generalizability of the findings. Materials were gathered using a modified structured questionnaire based on prior studies to assure the validity of this research.

4. RESULTS

This section presents the results of PLS-SEM using SmartPLS 4. First, the narrative presents results pertaining to the measurement model assessment with regard to its reliability and validity. Next, the testing of the structural model to test the hypothesized relationships along with the mediation effects will be reviewed. Fig. 2: Research model with values of outer loading, R-square and path coefficients.

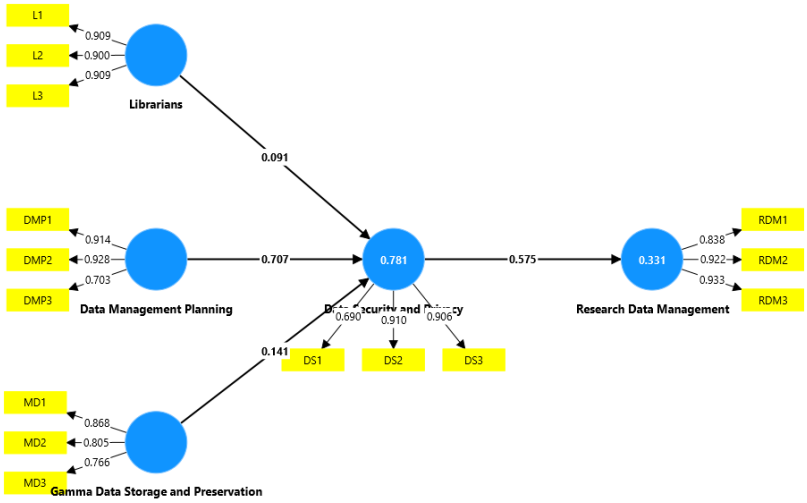

Figure 2: Statistical representation of Research model

The construct's reliability and validity were assessed using Smart PLS. The outcome of the measuring model is presented in the table below. In the table, the outer loadings for all maintained items exceeded the threshold of 0.6, with

the exception of PerEU2, which is at 0.549 but remains acceptable. ConBe3 was excluded from the items due to its two outer loadings exhibiting low estimates. The Cronbach's Alpha values range from 0.703 to 0.813, indicating acceptable internal consistency. The results demonstrated that the CR values exceeded the criterion, ranging from 0.744 to 0.826; thus, these constructions were deemed dependable. The AVE was deemed adequate as all values exceeded 0.5, ranging from 0.509 to 0.678. This may suffice to demonstrate the existence of a dependable and valid measurement model of the constructs, which may be utilised for further investigation.

Table 1: Measurement model - Reliability and Validity

Variables	Cronbach's alpha
Data Management Planning	0.810
Data Security and Privacy	0.788
Gamma Data Storage and Preservation	0.745
Librarians	0.891
Research Data Management	0.881

The HTMT values presented in Table 2 are beneath the conservative criterion of 0.85, signifying robust discriminant validity among the components. This verifies that each construct in the model is distinct and assesses separate notions, hence reinforcing the validity of the structural model. The Variance Inflation Factor (VIF) values for all variables are much below the typical threshold of 5, suggesting that multicollinearity is not an issue in the model. The Standardised Root Mean Square Residual (SRMR) values of 0.07 for the saturated model and 0.069 for the estimated model are below the 0.08 criterion, signifying a favourable model fit to the data.

Table 2: HTMT - Discriminant validity

Variables	Data Management Planning	Data Security and Privacy	Gamma Data Storage and Preservation	Librarians	Research Data Management
Data Management Planning					
Data Security and Privacy	1.075				
Gamma Data Storage and Preservation	0.929	0.919			
Librarians	0.896	0.854	0.746		
Research Data Management	0.729	0.669	0.880	0.522	

PLS-SEM hypothesis testing results show that direct and indirect paths are statistically significant, with a p-value of 0.000. The scale of the path coefficients is high, reflecting a strong positive relationship

Hypothesis	P value
Data Management Planning -> Data Security and Privacy -> Research Data Management	0.000
Gamma Data Storage and Preservation -> Data Security and Privacy -> Research Data Management	0.0003
Librarians -> Data Security and Privacy -> Research Data Management	0.0002
Librarians -> Research Data Management	0.000

5. CONCLUSION

This study aims to investigate the impact of impact of library and data management planning on research data management.

The digital revolution has altered libraries and the function of librarians. Libraries are no longer restricted to physical locations; they now provide online catalogues, e-books, digital journals, and virtual research tools. Librarians are leading the management of this digital revolution. They collect digital resources, guarantee open access to academic publications, and employ advanced technologies like artificial intelligence to enhance information retrieval. They play a crucial role in research data management, assisting researchers in organising, preserving, and sharing their data in accordance with international standards. Librarians are fervent proponents of equal information access. They strive to eliminate the digital divide by offering complimentary access to technology, the internet, and digital literacy education. Libraries frequently function as secure, inviting environments for marginalised populations, providing initiatives that foster social inclusion and continuous education. Librarians curate collections that embody varied voices and perspectives, guaranteeing that their institutions represent the full spectrum of human experience. In a time characterised by privacy issues and ethical challenges related to technology, librarians serve as ethical guides. They advocate for intellectual freedom, safeguarding users' rights to access information without censorship. Furthermore, they tackle matters such as copyright, data security, and the ethical application of artificial intelligence, assisting people and institutions in making educated judgements regarding these crucial topics (Bincy & Vasudevan, 2023; Curry, 2023; Sulyman et al., 2023).

CONFLICT OF INTERESTS

None.

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