

Evolving Roles of Library and Information Science Professionals in Supporting Digital Health Research Information Systems

Ajit Kumar Pradhan*

Dr Manoj Mishra**

Dr. Susama Nanda***

Abstract

The digital transformation of health sciences has fundamentally altered the processes of research generation, dissemination, and evaluation. Health Research Information Systems (HRIS) have emerged as critical infrastructures that support research lifecycle management, including publication tracking, grant monitoring, and research analytics. Within this evolving digital ecosystem, Library and Information Science (LIS) professionals are transitioning from traditional information custodians to strategic enablers of research intelligence and data-driven decision-making. This study examines the evolving roles, competencies, and institutional contributions of LIS professionals in supporting HRIS in health science environments.

A descriptive and analytical research design was adopted, utilizing both primary and secondary data. Primary data were collected through structured questionnaires and semi-structured interviews with LIS professionals working in medical colleges and research institutions. Secondary sources included policy documents, institutional reports, and scholarly literature. Data were analyzed using descriptive statistics and thematic analysis.

Findings reveal that LIS professionals play a crucial role in research data management, bibliometric analysis, repository management, and research evaluation support. However, challenges such as limited technical infrastructure, inadequate training in advanced analytics, and lack of recognition in institutional governance persist. The study concludes that LIS professionals are pivotal to the success of HRIS and recommends strengthening their integration into research strategy frameworks and enhancing their digital competencies.

*PhD Research Scholar, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, India, Email: ajitkumarpradhan64@gmail.com <https://orcid.org/0000-0001-9999-7338>

**Librarian, IMS & SUM Hospital, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, India

***Librarian, IMS & SUM Hospital, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, India

Keywords: Health Research Information Systems (HRIS), Health Sciences Libraries, Research Data Management, Bibliometrics, Digital Transformation, LIS Professionals

Introduction

The proliferation of digital technologies has transformed the health research landscape, enabling unprecedented access to data, collaborative research, and real-time dissemination of knowledge. Health Research Information Systems (HRIS) serve as integrated platforms that support research management functions, including grant administration, publication tracking, and impact assessment.

In this dynamic environment, LIS professionals have expanded their traditional roles to encompass digital scholarship support, research analytics, and data stewardship. Their expertise in organizing, retrieving, and managing information positions them as key stakeholders in the implementation and optimization of HRIS.

Despite this evolution, there remains a gap in understanding the full scope of LIS contributions within digital health ecosystems. This study addresses this gap by analyzing their roles, competencies, and challenges in HRIS-supported environments.

Literature Review

The integration of digital technologies into research management has been extensively examined in contemporary scholarly discourse, particularly within the context of data-intensive and interdisciplinary research environments. Health Research Information Systems (HRIS) have emerged as pivotal infrastructures that enable the systematic organization, monitoring, and evaluation of research activities. These systems provide an integrated framework for capturing, analyzing, and reporting research data, thereby enhancing institutional efficiency, transparency, and strategic decision-making. As research ecosystems become increasingly complex and data-driven, the adoption of HRIS is no longer optional but a strategic necessity for institutions aiming to improve research performance and global visibility.

A foundational perspective on this transformation is offered by Borgman (2015), who underscores the paradigm shift toward data-intensive research and the corresponding need for robust information infrastructures. The management of large-scale, heterogeneous datasets requires sophisticated systems capable of ensuring data integrity, accessibility, and interoperability. HRIS platforms address these challenges by integrating multiple data sources, including publications, grants, researcher profiles, and institutional outputs, into a unified system. This integration not only streamlines research workflows but also facilitates real-time analytics and reporting. Complementing this view, It highlights the role of research information management systems in fostering collaboration, accountability, and evidence-based governance. Such systems enable institutions to align research activities with strategic priorities while ensuring compliance with funding and regulatory requirements.

Within this evolving digital landscape, the role of Library and Information Science (LIS) professionals has expanded significantly, particularly in the domain of research data management (RDM). Cox and Pinfield (2014) argue that academic libraries possess inherent

strengths in information organization, metadata creation, and long-term preservation, positioning them as central actors in RDM initiatives. Their study emphasizes that LIS professionals are uniquely equipped to support researchers in managing data throughout the research lifecycle, from data creation and documentation to archiving and sharing. Similarly, Tenopir et al. (2017) document the increasing demand for data-related services in academic institutions, noting that researchers frequently rely on librarians for expertise in data curation, metadata standards, and compliance with open data mandates. This growing reliance reflects a broader recognition of LIS professionals as essential contributors to digital scholarship.

In addition to data management, bibliometric and scientometric analysis has emerged as a critical area of LIS engagement. Corral, Kennan, and Afzal (2013) highlight the expanding role of librarians in providing research evaluation services, including citation analysis, impact measurement, and benchmarking. These services are instrumental in supporting institutional research strategies, particularly in the context of global ranking systems and performance-based funding models. Wouters et al. (2019) further emphasize the importance of responsible metrics, advocating for a nuanced and context-sensitive approach to research evaluation. They argue that the interpretation of bibliometric indicators requires specialized knowledge and critical judgment, reinforcing the need for skilled LIS professionals in this domain.

Despite the expanding scope and strategic importance of LIS roles, the literature identifies several persistent challenges. Akers and Doty (2013) highlight significant gaps in research data management practices across disciplines, pointing to inconsistencies in data handling, documentation, and sharing. These gaps underscore the need for standardized frameworks and professional training. Lyon (2012) similarly emphasizes the necessity of developing new competencies in data science, informatics, and digital curation to meet the demands of the evolving research landscape. The transition from traditional library services to advanced digital roles requires continuous professional development and institutional support.

Furthermore, the integration of LIS professionals into institutional research strategies remains uneven. Jaguszewski and Williams (2013) argue that librarians must reposition themselves as active collaborators in the research process rather than passive service providers. This repositioning involves engaging with researchers, participating in interdisciplinary teams, and contributing to research planning and evaluation. It also necessitates a redefinition of professional identity and the acquisition of new skill sets aligned with digital scholarship and research analytics.

Overall, the literature provides compelling evidence of the critical role played by LIS professionals in supporting HRIS and digital research ecosystems. Their contributions to data management, bibliometric analysis, and research support services are essential for enhancing research quality, visibility, and impact. However, the evolving nature of these roles also presents challenges related to skills development, institutional recognition, and integration into research governance structures. Consequently, there is a clear need for further empirical research to explore the full extent of LIS contributions and to identify strategies for optimizing their role in digitally transformed research environments.

Methodology

This study adopts a mixed-methods research design to investigate the evolving roles of Library and Information Science (LIS) professionals in supporting Health Research Information Systems (HRIS) within health science institutions. The integration of quantitative and qualitative approaches enables a comprehensive understanding of both measurable trends and contextual experiences, thereby strengthening the validity and reliability of the findings. Such an approach is particularly appropriate for exploring complex professional transformations in digitally mediated research environments, where numerical data alone may not fully capture underlying dynamics.

Research Design

A descriptive and analytical research design was employed to systematically examine the roles, competencies, and challenges of LIS professionals. The descriptive component facilitates the identification of current practices and trends, while the analytical dimension enables interpretation of relationships among variables such as experience, skill levels, and engagement with HRIS functionalities. This dual approach ensures both breadth and depth in understanding the evolving professional landscape.

Data Collection

Primary data were collected using two complementary methods to ensure methodological triangulation. First, a structured questionnaire was administered to 120 LIS professionals working in medical colleges, teaching hospitals, and health research institutions. The questionnaire was designed to capture quantitative data on role engagement, competency levels, use of digital tools, and perceived challenges. It included both closed-ended questions (using Likert-scale and multiple-choice formats) and limited open-ended responses to allow for additional insights.

Second, semi-structured interviews were conducted with 20 purposively selected participants to obtain in-depth qualitative insights. These interviews explored participants' experiences with HRIS implementation, their evolving professional roles, institutional expectations, and perceived barriers. The semi-structured format allowed flexibility in probing emerging themes while maintaining consistency across interviews.

Secondary data were collected to contextualize and support the primary findings. These included institutional reports on research information management systems, HRIS policy documents, and relevant peer-reviewed journal articles and conference proceedings. The integration of secondary data enhances the robustness of the study by providing a broader institutional and theoretical perspective.

Sampling Technique

A purposive sampling technique was employed to select participants with relevant expertise and experience in digital research environments. This method ensures that respondents possess

the necessary knowledge to provide meaningful insights into HRIS-related practices. Participants were selected based on criteria such as institutional affiliation, professional experience, and involvement in research support services.

Data Analysis

Quantitative data were analyzed using descriptive statistical techniques, including frequency distribution and percentage analysis. These methods facilitate the identification of patterns and trends in LIS professionals' roles and competencies. Where relevant, cross-tabulation was used to examine relationships between variables such as experience level and skill proficiency.

Qualitative data obtained from interviews were analyzed using thematic analysis. This involved coding the data, identifying recurring patterns, and grouping them into broader themes such as role transformation, skill gaps, and institutional challenges. Thematic analysis enables a nuanced understanding of participants' perspectives and complements the quantitative findings.

Overall, the mixed-methods approach adopted in this study provides a comprehensive and rigorous framework for examining the evolving role of LIS professionals in HRIS-supported research environments.

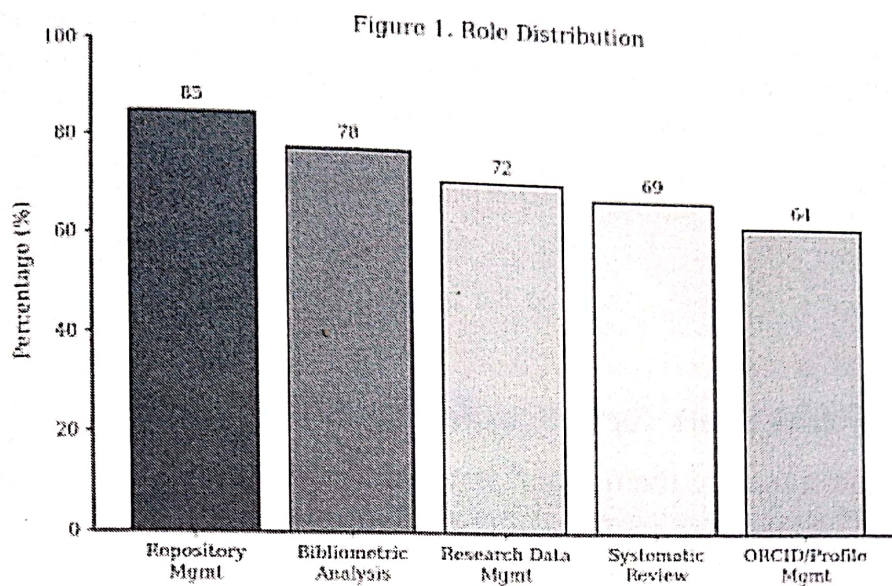
Results and Discussion

The findings of the study reveal a significant transformation in the roles of Library and Information Science (LIS) professionals within Health Research Information Systems (HRIS)-supported environments. The analysis, based on responses from 120 LIS professionals and qualitative insights from interviews, demonstrates a clear shift from traditional library functions toward advanced research support services. This transformation is driven by the increasing digitization of research processes, the growing importance of data-intensive scholarship, and institutional demands for enhanced research visibility and performance.

Role Transformation of LIS Professionals

The data indicate that institutional repository management (85%) is the most dominant role performed by LIS professionals. This reflects the increasing emphasis on open access, digital preservation, and institutional visibility. Bibliometric analysis (78%) and research data management (72%) also show high engagement, highlighting the growing importance of research evaluation and data-driven decision-making in health sciences.

Systematic review support (69%) represents a critical emerging function, particularly in clinical and evidence-based research contexts. LIS professionals contribute significantly to literature search strategies, database selection, and reference management, thereby improving the quality and reliability of systematic reviews.



- X-axis: Roles
- Y-axis: Percentage (%)

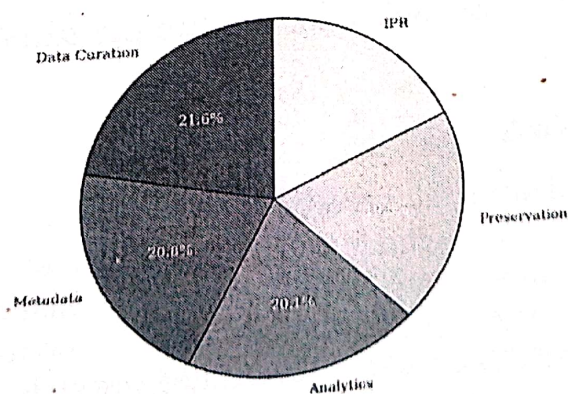
Analytical Interpretation of Role Transformation

The high involvement in repository management suggests that LIS professionals are central to institutional knowledge dissemination systems. Their expertise ensures compliance with open access mandates and enhances global research visibility. Meanwhile, bibliometric services demonstrate the increasing reliance of institutions on research impact metrics for funding, ranking, and strategic planning.

The relatively lower percentage in ORCID and profiling systems (64%) indicates that while researcher identity management is gaining importance, it is still in a developmental phase compared to other roles.

Competency Distribution

Figure 2. Competencies



The findings reveal that data curation (82%) and metadata management (79%) are the most critical competencies required in HRIS environments. These skills are essential for organizing, preserving, and ensuring the interoperability of research data.

Research analytics and visualization (76%) highlight the growing demand for evidence-based insights and decision-making tools. Digital preservation (74%) underscores the importance of long-term accessibility of research outputs, while intellectual property rights (68%) indicate a relatively lower but still significant need for legal and ethical awareness in data sharing.

Competency framework for LIS professionals

Based on questionnaire themes and interview narratives, LIS professionals reported that the following competencies have become more important:

Competency area	What it enables in HRIS	Examples
Metadata standards & interoperability	Better discovery, linking, harvesting, and accurate reporting	DOI/ORCID linkage workflows, schema mapping
Research data management and curation	Dataset discoverability, reuse, preservation	Data documentation, curation plans, retention policies
Research analytics tools	Evidence-based evaluation and monitoring	Bibliometrics dashboards, impact analysis pipelines
Digital preservation	Long-term access to outputs	Preservation metadata, file format guidance
Scholarly identity management	Author disambiguation and stable researcher records	ORCID support, identity verification
Policy and compliance literacy	Open science and mandate workflows	License/permissions guidance, reporting support

Table 1. Competencies required for effective LIS participation in HRIS

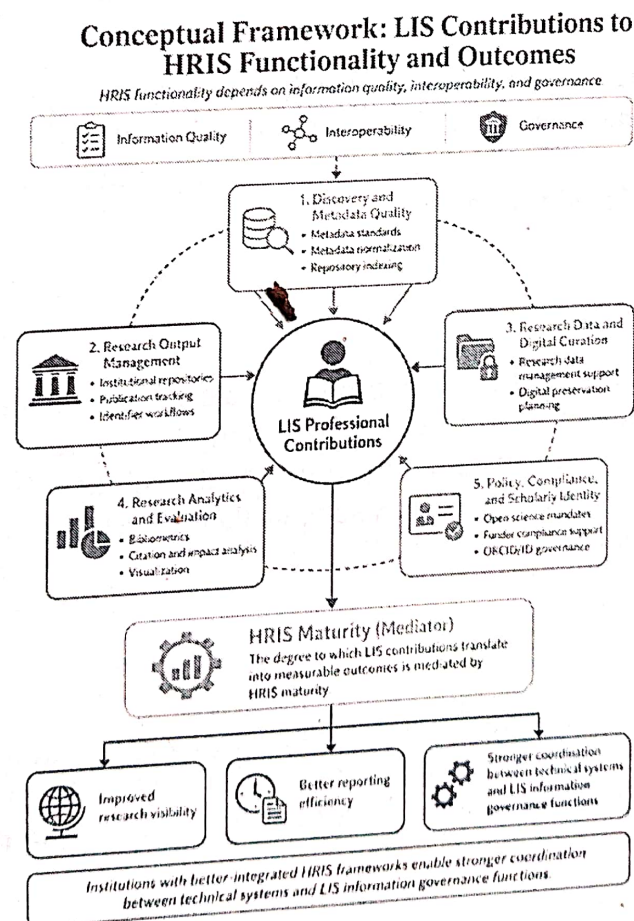
Conceptual Framework

This study is grounded in the premise that the functionality of Human Resource Information Systems (HRIS) in academic and research institutions is shaped by three core conditions: information quality, interoperability, and governance. Within this framework, Library and Information Science (LIS) professionals are positioned as key contributors to the effective design, management, and use of HRIS-related research information systems.

The framework identifies five interconnected domains of LIS contribution. First, discovery and metadata quality support accurate information retrieval through metadata standards, metadata normalization, and repository indexing. Second, research output management strengthens institutional repositories, publication tracking, and identifier workflows, thereby improving the visibility and traceability of scholarly work. Third, research data and digital curation enhance research data management, digital preservation planning, and long-term accessibility of academic outputs. Fourth, research analytics and evaluation contribute to bibliometrics, citation analysis, impact assessment, and visualization, enabling institutions to make evidence-based decisions. Fifth, policy, compliance, and scholarly identity support open science mandates, funder compliance, ORCID/ID governance, and responsible management of researcher profiles.

A central assumption of the model is that HRIS maturity acts as a mediating factor between LIS professional contributions and measurable institutional outcomes. In other words, the effectiveness of LIS interventions depends not only on professional expertise but also on the degree to which HRIS infrastructure is technically integrated, institutionally governed, and strategically aligned with research management objectives.

The expected outcomes of this framework include improved research visibility, greater reporting efficiency, stronger coordination between technical systems and information governance functions, and more reliable institutional research intelligence. Therefore, the model suggests that institutions with mature and well-integrated HRIS frameworks are better positioned to convert LIS expertise into measurable improvements in research administration, compliance, and scholarly communication.



Challenges

Despite their expanding roles, LIS professionals face several challenges. Limited technical infrastructure remains a major barrier, particularly in developing regions. Many institutions lack the necessary tools and platforms to support advanced research services.

Insufficient training is another critical issue. The rapid pace of technological change requires continuous skill development, but many LIS professionals lack access to training programs in data analytics and digital technologies.

Additionally, the lack of institutional recognition limits the ability of LIS professionals to contribute effectively to research governance. Their roles are often undervalued, leading to limited involvement in strategic decision-making processes.

Discussion

The results confirm a paradigm shift in the professional identity of LIS practitioners. Their increasing involvement in research data management and bibliometric analysis aligns with global trends in digital scholarship and open science. The integration of LIS expertise within HRIS platforms has significantly improved research monitoring, evaluation, and dissemination processes.

The findings also highlight the interdisciplinary nature of LIS competencies, which now extend beyond traditional information management to include data science, analytics, and digital preservation. This transformation requires continuous professional development and institutional support.

Moreover, the data suggest a strong correlation between digital competency and role expansion. LIS professionals equipped with advanced technical skills are more likely to engage in strategic research support activities. This underscores the need for training programs and curriculum reforms in LIS education.

Synthesis of Findings

The study demonstrates that LIS professionals are no longer passive information providers but active contributors to research ecosystems. Their roles in HRIS environments enhance research efficiency, transparency, and global visibility. However, to sustain this transformation, institutions must address existing challenges related to infrastructure, training, and professional recognition.

Conclusion

This study demonstrates that LIS professionals play a pivotal role in supporting digital health research ecosystems through their involvement in HRIS. Their evolving roles reflect the changing nature of scholarly communication and the increasing importance of data-driven research.

To maximize their impact, institutions must integrate LIS professionals into research strategy frameworks, invest in capacity-building initiatives, and update LIS education curricula to include digital competencies. By doing so, they can enhance research performance, improve compliance with global standards, and promote innovation in health sciences.

References

1. Borgman, C. L. (2015). *Big data, little data, no data: Scholarship in the networked world*. MIT Press. <https://doi.org/10.7551/mitpress/9963.001.0001>
2. Cox, A. M., & Pinfield, S. (2014). Research data management and libraries: Current activities and future priorities. *Journal of Librarianship and Information Science*, 46(4), 299–316. <https://doi.org/10.1177/0961000613492542>
3. Tenopir, C., Sandusky, R. J., Allard, S., & Birch, B. (2017). Research data services in academic libraries: Data intensive roles for the future? *College & Research Libraries*, 78(6), 1–21. <https://doi.org/10.5860/crl.78.6.1>
4. Corral, S., Kennan, M. A., & Afzal, W. (2013). Bibliometrics and research data management services: Emerging trends in library support for research. *Library Trends*, 61(3), 636–674. <https://doi.org/10.1353/lib.2013.0000>
5. Wouters, P., Sugimoto, C. R., Larivière, V., McVeigh, M. E., Pulverer, B., de Rijcke, S., & Waltman, L. (2019). *Rethinking impact factors: Better ways to judge a journal*. Springer. <https://doi.org/10.1007/978-3-030-02511-3>
6. Akers, K. G., & Doty, J. (2013). Disciplinary differences in research data management practices and perspectives. *International Journal of Digital Curation*, 8(2), 5–26. <https://doi.org/10.2218/ijdc.v8i2.263>
7. Lyon, L. (2012). The informatics transform: Re-engineering libraries for the data decade. *International Journal of Digital Curation*, 7(1), 126–138. <https://doi.org/10.2218/ijdc.v7i1.220>
8. Pinfield, S., Cox, A. M., & Smith, J. (2014). Research data management and libraries: Relationships, activities, drivers and influences. *Journal of Documentation*, 70(6), 1063–1088. <https://doi.org/10.1108/JD-09-2013-0111>
9. Federer, L. (2018). Defining data librarianship: A survey of competencies, skills, and training. *Journal of eScience Librarianship*, 7(1), e1109. <https://doi.org/10.7191/jeslib.2018.1109>
10. Bryant, R., Lavoie, B., & Malpas, C. (2017). *Research information management: Defining RIM and the library's role*. OCLC Research.
11. Higgins, S. (2011). The DCC curation lifecycle model. *International Journal of Digital Curation*, 3(1), 134–140. <https://doi.org/10.2218/ijdc.v3i1.48>
12. Rice, R., & Southall, J. (2016). *The data librarian's handbook*. Facet Publishing.

13. Zhan, M., & Widén, G. (2018). Understanding big data in library and information science. *Journal of Documentation*, 74(5), 1–18. <https://doi.org/10.1108/JD-09-2017-0126>
14. Jaguszewski, J. M., & Williams, K. (2013). *New roles for new times: Transforming liaison roles in research libraries*. Association of Research Libraries.