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Research Article

Electronic Resource Management Systems in Academic Libraries: A Comparative Study of Implementation and Impact on Access and Efficiency

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ABSTRACT

The purpose of this research is to explore the implementation of Electronic Resource Management Systems (ERMS) in Indian academic libraries and to analyse their impact in these libraries. Using a mixed methods approach, this study combines quantitative survey data collected from over 100 library professionals in 50 academic libraries with qualitative data collected through semi-structured interviews, observational studies, and the analysis of relevant documents. Quantitative results show that 45% of participants described ERMS as having a "very positive" impact on service efficiency, while 50% rated the effects on user satisfaction as "very positive". Yet, integration with legacy systems continues to pose challenges, with just 20% of surveyed boasting that their experience was "very positive." These findings are further corroborated by regression analysis, which indicates a significant relationship between improved system usability ($\beta = 0.45$, $p < 0.05$) and integration with existing systems ($\beta = 0.35$, $p < 0.05$) as predictors of operational efficiency, with a moderate positive correlation ($r = 0.65$, $p < 0.01$) between usability and satisfaction. Qualitative insights highlight the importance of intensive training programs and customized technical assistance, particularly for smaller institutions with fewer resources. These findings show that while ERMS substantially improve library operations and user experiences, challenges to their integration and the need for ongoing staff development will be important to realize these benefits to the fullest. The findings have implications for the strategies employed by academic libraries, which aim at balancing resource management operations with operational efficiency via targeted investment in technology and human capital.

Keywords: Electronic Resource Management Systems (ERMS), Academic Libraries, Library Automation, Digital Resources, Access and Efficiency.

1. INTRODUCTION

1.1 Background and Context

Academic libraries have changed a lot, moving from static print collections to large digital repositories. With the adoption of electronic resource management systems (ERMS), libraries have made the transition to acquiring, licensing, accessing, and

managing electronic resources (Tenopir et al., 2021). Through efficient management of resources, enhanced user experience and improved accessibility, ERMS serve a key role in the academic institution sector (Goud, 2021).

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However, since October 2023, academic libraries in India have started to increasingly use ERM to manage their heritage as well as their growing digital collections. Indian universities and colleges have widely adopted electronic resources in part due to government efforts such as N-LIST (National Library and Information Services Infrastructure for Scholarly Content) (Kumar & Prasad, 2023). Nevertheless, despite these strides, most organisations are handicapped when it comes to implementing ERMS as they are bound by budgetary limits, technical constraints, and the absence of specialisation (Verma & Nair, 2023).

1.2 Problem Statement

While ERMS has advantages, academic libraries also face some challenges in the implementation of ERMS. Several challenges to the adoption of Open Access publishing have been identified (Tenopir et al., 2021). Moreover, due to financial limitations and insufficient training, ERMS is often not utilised effectively, resulting in the inability to manage or access resources as intended (Goud, 2021). Studies in India note that while there is a growing uptake of ERMS, many institutions undergo interoperability and need solutions that can be tailored for their local and academic environments (Kumar & Prasad, 2023).

1.3 Objectives of the Study

This study aims to:

1. Assessing the implementation of ERMS in academic libraries
2. Evaluate how the structure of ERMS allows staff members to share, access and reuse resources and operational tasks efficiently.
3. Outline the challenges and solutions for the successful implementation of ERMS

1.4 Research Questions

The study seeks to answer the following questions:

1. What are the key features of ERMS?
2. How do ERMS optimise access to electronic resources?
3. What role do ERMS play in improving library workflows?

1.5 Significance of the Study

The findings of this research will contribute to the growing body of literature on electronic resource management, providing insights into best practices for ERMS implementation. Additionally, the study will offer practical recommendations for library administrators and policymakers to enhance the efficiency of academic libraries in the digital age. In the Indian context, this research will highlight the role of **open- source ERMS solutions** such as **CORAL**, which have been successfully implemented in institutions like **IIT Delhi** to improve electronic resource management (Kumar & Singh, 2023).

2. LITERATURE REVIEW

2.1 Evolution of Academic Libraries

Over time, academic libraries have transitioned from print-centric collections to full digital repositories. The study reveals that the study about the integration of Information and Communication Technology (ICT) in the library is a method of transforming it, but is only efficient for providing access to electronic resources (Tenopir et al., 2021). The transition to digital libraries has been propelled by the demand for distant access, the abundance of online databases, and the need for efficient resource management (Bassil et al., 2018).

Digitalization of university libraries is based on plans in India, for example, by INFLIBNET (Information and Library Network Centre) and N-LIST, providing electronic resources for academic institutions (Verma & Nair, 2023). These advancements have greatly expanded access to academic resources, but they come with challenges regarding resource allocation, licenses, and interoperability (Kumar & Prasad, 2023).

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2.2 Electronic Resource Management Systems (ERMS)

In the domain of libraries, the importance of Electronic Resource Management Systems (ERMS) is well known as it allows us to purchase, license, access, and maintain electronic content for our end-users in a streamlined fashion. Academic libraries utilize ERM tools to maintain subscriptions, stay abreast of usage stats and compliance (Goud, 2021).

The key stages in the ERMS lifecycle are,

- **Selection and Acquisition –** The process of discovery and purchase of electronic resources.
- **License and Access Management** – Enforce compliance with agreements; provide graceful access
- **Utilization Monitoring and Evaluation** –Monitoring of resource utilization and evaluation of effectiveness.
- **Preservation and Renewal** – Coordinating long-term access and subscription renewals (Verma & Nair, 2023).

  Open source ERMS solutions like CORAL have been progressively gaining popularity among Indian academic libraries and are being productively implemented to manage electronic resources, with a case study being reported at IIT Delhi (Verma & Nair, 2023).

2.3 Existing Research on ERMS

The implementation of an enterprise reference management system (ERMS) has been studied in several academic libraries. Scene 8- ERMS allow for automation of workflow. According to research, ERMS helps improve operational efficiency (Goud, 2021). Technical integration issues, budget constraints, and staff training continue to be major obstacles to successful implementation, however (Rawat & Kaushik, 2023).

An Indian study discusses the development of tailored solutions to cater to the local institutional needs in the choice of an ERMS. Libraries that have successfully implemented ERMS have reportedly experienced improved accessibility, better resource utilisation, and enhanced user satisfaction (Verma & Nair, 2023).

2.4 Theoretical Frameworks

Various theoretical models can be used to Analyze the adoption and effectiveness of ERMS:

- **Technology Acceptance Model (TAM) –** Describes how users accept and use technology driven by its perceived utility and ease of use (Emery & Stone, 2013).
- **Diffusion of Innovations Theory –** Analyses the spread of ERMS adoption through academic institutions (Bassil et al., 2018)
- **Resource-Based view (RBV) –** Evaluates how libraries utilise ERMS to maximise resource management and institutional efficiency (Rawat & Kaushik, 2023)

These frameworks offer valuable insights regarding the determinants of ERMS adoption and the difficulties of implementation.

3. METHODOLOGY

3.1 Research Design

The combination of qualitative and quantitative data was collected under this mixed-methods research design to provide an in-depth analysis of Electronic Resource Management Systems (ERMS) utilized in the user academic libraries in this study. The quantitative aspect analyses ERMS adoption, usage and user satisfaction, while the qualitative aspect interviews librarians about their experiences and challenges and the best practices established (Patton, 2020).

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3.2 Research Approach

The study employs a descriptive research design to systematically analyse the patterns, trends, and correlations of the state of the implementation of ERMS in academic libraries. This approach facilitates a methodical assessment of ERMS functionalities, their relevance to library workflows and adoption challenges.

3.3 Data Collection Methods

Both primary and secondary sources are used for data collection.

a. **Primary Data Collection**

- **Surveys and questionnaires:** A structured survey is distributed among librarians, administrative staff, and faculty members with the purpose of collecting information regarding the level of ERMS adoption, usability and efficiency.
- **Interviews**: These semi- structured interviews with library professionals' highlight implementation challenges, user experiences institutional policies.
- Observational Studies: ERMS observation in a few selected academic libraries to evaluate the system functionality and user interaction.

b. Secondary Data Collection

- **Analysis of institutional documents**: Institutional reports, ERMS usage logs, etc., as well as documents highlighting policies are reviewed to understand how the system is performing and using the software (Bell et al., 2021).
- **Literature Review:** A review of existing studies on ERMS implementation, best practices, and case studies to provide context for findings.

3.4 Sample and Population

This study investigated the academic libraries in India (specifically those of universities and research institutions) with experience in implementing ERMS.

- **Targeted Audience:** Librarians, administrators, faculty and students who are interacting with ERMS.
- **Sampling Method**: We use purposive sampling, which allows for selecting libraries that already have ERMS in place, providing relevant information on adoption and efficiency of systems.
- **Sample Size**: It includes responses from 50 academic libraries of different regions & 100+ library professionals in India to achieve statistical significance

3.5 Data Analysis Techniques

The quantitative and qualitative methods are used to analyze the data to obtain insights.

Quantitative Analysis

- **Descriptive Statistics:** Survey responses are summarized using means, frequencies and percentages.
- **Inferential Statistics:** Regression analysis and correlation tests evaluation of ERMS – library efficiency.

Qualitative Analysis

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Table 1. Respondent Demographics

Sr. no	Respondent Category	Number of Respondents (out of 100)	Percentage (%)
1	Librarians	60	60
3	Faculty Members	40	40
4	**Total**	**100**	**100**

- **Thematic Analysis:** The transcript from the interview is coded to determine common themes surrounding the challenges and benefits presented by ERMS implementations.
- Comparative Case Studies

4. RESULTS & FINDINGS

4.1 Quantitative Findings

4.1.1 Demographic Overview and Sample Distribution

More than one hundred library professionals across five regions of India participated in the survey from 60 academic libraries. Respondents are drawn from a cross-section of librarians and faculty who collectively provide a broad overview of ERMS usage. Table 1 provides a summary of the respondent demographics:

The table shows the target population, which proportional to the views is obtained concerning the openness and diversity of opinions gathered.

4.1.2 ERMS Performance Survey Results It addressed areas such as service efficiency, user satisfaction, and integration with legacy systems already in use. Respondents scored each element on a scale from "Very Positive" to "Negative." Based on the results, the table below shows the percentage of responses:

Table 2. Survey Response Distribution on ERMS Performance

Sr.No	Survey Item	Very Positive (%)	Moderately Positive (%)	Neutral (%)	Negative (%)
1	**Impact on Service Efficiency**	45	33	15	7
2	**User Satisfaction**	50	28	12	10
3	**Ease of Integration with Legacy Systems**	20	40	25	15

However, Table 2 highlights that the service efficiency and user satisfaction were widely viewed favorably among respondents, integration with legacy systems still poses a challenge.

4.1.3 Inferential Statistical Analysis Table 3. Regression Analysis Summary

Predictor Variable	Beta Coefficient (β)	p-value	Interpretation
System Usability	0.45	$P < 0.05$	Strong positive effect, indicating that improved usability directly increases efficiency.
Integration with Legacy Systems	0.35	$p < 0.05$	Integration success is moderately predictive of operational efficiency.

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Table Number 3 -To also quantify the extent the various features of ERMS affect library operations, regression analysis was carried out. The relative importance of predictors like system usability and integration effectiveness, which had a strong bearing on overall efficiency, was scored. The important results were derived from the regression model:

Furthermore, the correlation analysis confirmed a moderately strong positive correlation between ERMS usability and

4.2 Qualitative Findings

Through semi-structured interviews, observational studies and document analysis, several themes could be identified:

- **Improved Operating Efficiency:** Interviewees uniformly stated that turnaround times were reduced with ERMS. For example, librarians observed that resource retrieval had been drastically shortened, thanks to improved workflows.
- **Integration and Training Challenges:** A constant theme was the steep learning curve that the new system requires. Ideas for improvement: Although the outlook was generally positive in terms of increased efficiency around ERMS, lack of training and limited technical support inhibited the full potential of ERMS.
- **Institutional Variability:** Comparative case studies highlighted how large institutions were able to create structured training regimes, balanced between dedicated support teams and library staff, which stood user satisfaction ($r = 0.65$, $p < 0.01$), thus reinforcing the idea that technology design and user experience are inextricably linked in stark contrast to budget-limited smaller libraries.
- **Policy and Best Practice Development:** Libraries with strong policies regarding the use of ERMS had more successful outcomes upon the implementation of an ERMS. Document reviews revealed that successful ERMS adoption correlates with periodic system audits and regular training workshops.
- Qualitative findings were also validated by observational data from libraries with strong support systems, as users reported higher satisfaction and higher operational effectiveness in library settings where staff received training and technical assistance programs.

4.3 Synthesis of Quantitative and Qualitative Data

The merging of survey data and interview narratives provides a holistic understanding of ERMS implementation:

- **Data Convergence:** High satisfaction ratings in surveys were echoed by qualitative accounts highlighting efficiency gains across operations.
- **Complementary Factors:** While numerical data emphasized the importance of usability and system integration, qualitative findings provided context regarding human factors like training, emphasizing that technology alone is not enough.
- **Institutional Readiness:** Comparative case studies revealed that proactive policy implementation and dedicated support are key to overcoming integration challenges, indicating that both technological and organizational facets must evolve simultaneously.

5. DISCUSSION

5.1 Overview of Key Findings

The Influence of the Electronic Resource Management System (ERMS) on Academic Libraries in India: A Study. Based on the survey results, we found that:

Service Efficiency: Approximately 45% rated the impact on service efficiency as "very positive", and 33% rated it as "moderately positive."

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- **User Satisfaction:** About half (50 per cent) expressed that ERMS had a “very positive" impact on user satisfaction, while another 28 percent reported moderate improvement.
- **Integration with Legacy Systems**: Just 20% rated ERMS integration with legacy systems as " very positive", while 40% rated it moderately positive, with the rest neutral or negative.

These figures mean that while a solid majority of library professionals value the enhancements to everyday applications and satisfaction, serious issues are still there when it comes to systems integrations with older infrastructures. The numerical data paired with qualitative insights highlights the significance of both strong technology and a good support system.

5.2 Quantitative Findings in Detail

The quantitative analysis yielded some important insights into the performance of ERMS:

Impact on Efficiency:

- 45% of respondents rated the system’s effect on service efficiency as “very positive”.
- 33% rated it “moderately positive,” meaning close to 78% of respondents noticed improvements in daily operations.

Impact on User Satisfaction:

- 50% of respondents rated the system’s effect on overall satisfaction as “very positive.”
- 28% gave a "moderately positive" indication, which means that 78% of users felt increased satisfaction towards the new ERMS.

- **Legacy Systems Coupling:**
  - Just 20% rated its integration with existing systems as “very positive.”
  - 40% deemed it at best moderately successful, 25% were neutral, and 15% negative.

System usability emerged as a significant predictor of overall efficiency in regression analysis ($\beta = 0.45$, $p < 0.05$), along with integration efficacy ($\beta = 0.35$, $p < 0.05$). Moreover, a strong positive relationship ($r = 0.65$, $p < 0.01$) was found between usability and satisfaction, again confirming that the more ease of use the system has, the more satisfied the user will be.

5.3 Qualitative Insights

The qualitative phase helped explain these numbers in context:

- **Improved Day-to-Day Functioning:**

Interviewees uniformly stated that ERMS had enabled greater efficiency in day-to- day activities, correlating with 45%- 50% positive response rates for efficiency and satisfaction. Resource retrieval and cataloguing now require less time, librarians noted, thus affirming the statistical trends of the survey.

Training and Integration Issues: Several participants made it clear they were struggling to adapt to the new system thanks to insufficient training, which likely explains some of the limited success, with 20% indicating the integration with the legacy systems was “very positive.” No single library seemed to provide the necessary support, and had steep learning curves that led to unfulfilled potential in many libraries.

Institutional Differences: Larger institutions reported advantages like formal training programs and a dedicated tech support line. Conversely, the challenges observed in integration ratings were mirrored for smaller libraries, which often function with limited resources. This variation indicates that the effect on efficiency and satisfaction is greater in the stronger organizational support context.

As a whole, the discussion shows that though the majority of library professionals’ rate ERMS as high in enhancing

efficiency as well as the user experience as well, the lower percentages concerning system integration are telling of a gap needing amelioration, and that positive user experience is not an automatic output of implementation, but one that needs to be worked at. The findings further stress the importance of comprehensive training and the adoption of effective integration strategies to harness the full potential of ERMS in academic libraries, as reflected in both quantitative and qualitative insights.

CONCLUSION

This study demonstrates that the adoption of Electronic Resource Management Systems (ERMS) in academic libraries in India leads to significant improvements in service efficiency and user satisfaction, with **45%** and **50%** of respondents rating these aspects as "very positive," respectively. However, challenges remain, particularly with the integration of ERMS into existing legacy systems, as only **20%** of respondents reported very positive outcomes in this area. These findings supported by genuine studies (e.g., Patton, 2020; Bell et al., 2021; Tenopir et al., 2012), underscore the need for continuous improvements, targeted training programs, and stronger support structures to fully realise the potential of ERMS. Overall, a balanced approach focusing on both technological enhancements and human resource development is essential for optimising access and efficiency in academic libraries.

6. Conclusions, Limitations, and Future Directions

Implications for Practice:

- **Training & Development Investments:** The extent, nature, and frequency of training a critical success factors because, for many respondents, there was a steep learning curve.
- **System Upgrades**: User interface design will continue to improve, and the protocols for integration will be better than what we have now.
- **Policy Development:** Developing robust policies and regular audits of system performance can help mitigate integration issues beforehand.

Limitations:

- **Sampling bias**: The purposive sampling and use of self-reported data can compromise generalizability.
- **Scope of the Study**: As this study was conducted in selected states of India, the purpose and outcomes might vary in different contexts due to the effect of culture and region.

Suggestions for Future Research:

- **Longitudinal Studies:** Tracking ERMS over extended periods and monitoring ERMS performance may help future research to capture the long-term benefits and challenges.
- **Interoperability Studies:** A thorough assessment of different data models for effectively integrating ERMS into existing legacy systems, including insights from real-world deployments, will be extremely valuable.
- **User Experience Focus:** It will be beneficial to explore more later about what specific training needs or barriers the users face — this will allow for support initiatives to be tailored specifically.

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