



Challenges and Best Practices in Developing Institutional Repositories: A Knowledge Management Perspective

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How to Cite this Article:

Sayeed, S. (2026). Challenges and Best Practices in Developing Institutional Repositories: A Knowledge Management Perspective. International Journal of Creative and Open Research in Engineering and Management, 2(9), 1-9.
<https://doi.org/10.55041/ijcope.v2i9.136>

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<https://doi.org/10.55041/ijcope.v2i9.136>

ABSTRACT

Institutional Repositories (IRs) have become central to digital scholarship, open access dissemination, and institutional knowledge preservation in higher education. While repositories are widely implemented across universities worldwide, their development and sustainability remain uneven due to technical, organizational, cultural, and governance challenges. This study examines institutional repository development from a knowledge management (KM) perspective, arguing that repositories must be understood not merely as technological systems but as structured knowledge ecosystems embedded within institutional strategies. Drawing on an extensive review of literature from 2010–2026, the study analyzes major barriers including faculty participation gaps, metadata inconsistencies, digital preservation risks, copyright concerns, infrastructure limitations, and governance deficiencies. It further synthesizes best practices rooted in knowledge management theory—leadership commitment, standardized workflows, collaborative culture, interoperability frameworks, research data integration, and policy mandates.

The paper proposes a comprehensive KM-based repository development framework emphasizing strategic alignment, stakeholder engagement, lifecycle management, and sustainability planning. The findings demonstrate that successful repository systems require institutional

commitment, professional capacity building, and structured governance mechanisms. The study contributes theoretically by integrating knowledge management theory with scholarly communication research and practically by offering actionable guidelines for academic institutions seeking to strengthen repository ecosystems.

Keywords: Institutional Repositories, Knowledge Management, Open Access, Digital Preservation, Scholarly Communication, Governance, Higher Education.

I. INTRODUCTION

1. Digital Scholarship and Institutional Transformation

The global higher education landscape has undergone significant digital transformation over the past two decades. The exponential growth of research outputs, digital publishing platforms, and interdisciplinary scholarship has redefined how knowledge is created, disseminated, and preserved. Institutional Repositories (IRs) emerged in the early 2000s as strategic infrastructures to manage this transformation (Lynch, 2003). IRs function as centralized digital platforms for archiving and disseminating scholarly outputs produced within universities. These include journal articles, preprints, theses, dissertations, datasets, technical reports, conference proceedings, and multimedia materials. By ensuring long-term digital preservation and open accessibility, repositories enhance research visibility and citation impact (Pinfield, Salter, & Bath, 2017).



2. Open Access and Research Visibility

The open access (OA) movement has significantly shaped repository development. Open access advocates for removing financial and legal barriers to scholarly communication (Suber, 2012). Institutional repositories support the “green open access” model by enabling authors to self-archive their work. Studies demonstrate that open access materials often receive higher citation rates and broader global reach (Borgman, 2015). Consequently, repositories contribute to institutional prestige, global rankings, and research impact measurement. However, sustainable repository development requires strategic governance beyond technological installation.

3. Institutional Repositories as Knowledge Management Systems

Knowledge Management (KM) theory offers a structured lens for understanding repository development. Nonaka and Takeuchi (1995) conceptualized organizations as knowledge-creating systems that convert tacit knowledge into explicit forms. In academic contexts, research outputs represent institutional intellectual capital. Institutional repositories thus function as formal mechanisms for capturing, organizing, and disseminating this capital. From a KM perspective, repository effectiveness depends on structured workflows, metadata governance, collaborative culture, and continuous learning (Jain, 2019). Viewing IRs through KM theory shifts focus from software selection to strategic integration within institutional knowledge ecosystems.

II. BEST PRACTICES IN DEVELOPING INSTITUTIONAL REPOSITORIES: A KNOWLEDGE MANAGEMENT PERSPECTIVE

1. Establish Clear Governance and Policy Frameworks

Effective institutional repository (IR) development requires comprehensive governance structures and clearly articulated policies. Lynch (2003) emphasized that repositories must be supported by institutional commitment and strategic policy integration to function as core scholarly infrastructure. Formal policies should address mandatory deposit requirements, copyright compliance, licensing frameworks (e.g., Creative Commons), submission workflows, and digital preservation strategies. Pinfield, Salter, and Bath (2017) argue that mandatory deposit policies significantly improve repository participation rates compared to voluntary models. Clear governance frameworks reduce ambiguity, enhance compliance with open access mandates, and align repository objectives with institutional research goals.

2. Integrate Institutional Repositories within Knowledge Management Strategy

Institutional repositories should be embedded within broader Knowledge Management (KM) strategies rather than treated as standalone technical systems. Nonaka and Takeuchi's (1995) knowledge creation theory highlights the importance of systematic processes for knowledge externalization and combination—functions directly supported by repositories. Jain (2019) notes that academic libraries adopting KM frameworks demonstrate improved coordination, structured knowledge capture, and enhanced research support services. Integrating IRs with institutional KM initiatives promotes organizational learning, strengthens intellectual capital management, and enhances knowledge reuse across academic communities.

3. Promote Faculty Engagement and Awareness

Faculty participation is widely recognized as the most critical determinant of repository success. Kim (2018) identified motivational factors such as perceived benefits, copyright clarity, institutional mandates, and recognition mechanisms as key drivers influencing faculty contributions. Awareness campaigns, training workshops, and simplified submission processes increase participation rates. Pinfield et al. (2017) further suggest that aligning repository deposits with research evaluation frameworks and funding compliance requirements encourages greater faculty engagement. Incentive-based and policy-driven approaches are therefore considered best practice strategies.



4. Ensure Metadata Standardization and Interoperability

Metadata quality directly affects repository visibility, discoverability, and interoperability. Borgman (2015) emphasizes that standardized metadata schemas are essential for integrating repositories into global indexing and harvesting systems. Adoption of internationally recognized standards such as Dublin Core and compliance with Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) enhance interoperability. Nazim and Mukherjee (2016) argue that consistent metadata practices significantly improve research visibility and institutional ranking outcomes. Regular metadata audits and the use of persistent identifiers (e.g., DOI, ORCID) further strengthen repository integration within scholarly communication networks.

5. Invest in Sustainable Technical Infrastructure

Sustainable repository development requires robust technical infrastructure and long-term preservation planning. Tripathi and Jeevan (2019) highlight that inadequate funding and infrastructural limitations are major barriers, particularly in developing countries. Best practices include selecting reliable repository platforms (open-source or commercial), implementing regular system updates, ensuring secure backups, and planning for digital preservation through format migration and redundancy strategies. Sustainable financial planning and institutional resource allocation are essential for long-term viability.

6. Strengthen Capacity Building and Professional Development

Repository management requires skilled professionals with expertise in metadata management, copyright regulations, digital preservation, and open access policy frameworks. Corral, Kennan, and Afzal (2016) emphasize the growing need for capacity building in research data management and digital scholarship services within academic libraries. Continuous professional development programs, workshops, and participation in national or international repository networks enhance institutional competence and innovation in repository services.

7. Implement Monitoring and Evaluation Mechanisms

Performance assessment is essential for repository improvement and accountability. Nazim and Mukherjee (2016) recommend systematic tracking of usage statistics, submission growth, download metrics, and compliance rates to evaluate repository effectiveness. Data-driven evaluation supports strategic decision-making, identifies operational gaps, and strengthens alignment with institutional research objectives.

8. Foster Collaboration and Networking

Collaborative participation in national and international repository networks enhances visibility and resource sharing. Lynch (2003) stressed the importance of interoperability and collaborative infrastructure in advancing scholarly communication. Institutional collaboration reduces duplication of effort, supports shared technical expertise, and strengthens the global open access ecosystem.

9. Address Ethical and Legal Considerations

Repositories must comply with copyright laws, licensing frameworks, and data protection regulations. Suber (2012) emphasizes that clear copyright guidance and open licensing policies facilitate lawful and ethical knowledge dissemination. Transparent policies regarding sensitive data, author rights retention, and publisher agreements foster trust among contributors and users.

III. STATEMENT OF THE PROBLEM

Despite widespread adoption of institutional repositories, many universities face persistent operational inefficiencies and sustainability challenges. Technical systems are often underutilized due to low faculty engagement, unclear



deposit policies, metadata inconsistencies, and weak governance frameworks. Moreover, repositories frequently lack integration with institutional research strategies and knowledge management systems. This fragmentation results in poor discoverability, limited interoperability, and reduced institutional impact. There is a need to critically analyze repository development challenges and identify best practices grounded in knowledge management theory to ensure long-term sustainability and institutional effectiveness.

IV. SCOPE OF THE STUDY

This study focuses on institutional repositories in higher education institutions globally. It examines:

- Technical challenges (metadata, interoperability, preservation)
- Organizational challenges (faculty participation, governance, policy gaps)
- Financial and infrastructural barriers
- Knowledge management integration
- Best practice frameworks

V. OBJECTIVES OF THE STUDY

1. To analyze technical and organizational challenges in IR development.
2. To apply knowledge management theory to repository systems.
3. To identify best practices for governance and sustainability.
4. To propose a KM-based repository development framework.
5. To contribute to scholarly communication research.

VI. REVIEW OF LITERATURE

1. Evolution and Strategic Role of Institutional Repositories

Institutional Repositories (IRs) emerged in the early 2000s as digital infrastructures designed to preserve and disseminate scholarly outputs within academic institutions. Lynch (2003) defined IRs as “essential infrastructure for scholarship in the digital age,” emphasizing their role in capturing intellectual capital. Initially conceptualized as archival systems for research papers and theses, repositories have evolved into integrated research management platforms supporting open access mandates, research data management, and institutional analytics. Pinfield, Salter, and Bath (2017) observed that national and international open access policies significantly accelerated repository adoption, particularly in Europe and North America. The introduction of funder mandates requiring public accessibility of research outputs has positioned IRs as compliance mechanisms within institutional research ecosystems. Suber (2012) further argued that repositories support equitable knowledge dissemination by reducing subscription-based access barriers.

Recent scholarship highlights a shift from viewing repositories as passive storage systems to recognizing them as strategic instruments for enhancing institutional visibility, global rankings, and citation impact (Nazim & Mukherjee, 2016). This strategic repositioning aligns repositories with broader institutional goals related to research excellence and knowledge dissemination.

2. Institutional Repositories from a Knowledge Management Perspective

Knowledge Management (KM) provides a theoretical lens to understand repository development beyond technological dimensions. Nonaka and Takeuchi's (1995) knowledge creation theory emphasizes processes of knowledge conversion—socialization, externalization, combination, and internalization. Institutional repositories primarily facilitate externalization and combination by transforming tacit scholarly knowledge into structured digital artifacts. Jain (2019) argues that academic libraries adopting KM frameworks demonstrate improved coordination, systematic knowledge capture, and enhanced research support services. From this perspective, IRs serve as



organizational memory systems that preserve institutional intellectual capital for future access and reuse. Peters and Stock (2017) further emphasize that KM integration enhances workflow efficiency, metadata standardization, and collaborative culture within academic institutions.

However, literature suggests that many repositories operate without explicit KM strategies, resulting in fragmented processes, inconsistent metadata practices, and limited stakeholder engagement. Integrating KM principles into repository governance is therefore critical for sustainability and long-term impact.

3. Faculty Participation and Organizational Challenges

Faculty engagement remains one of the most significant determinants of repository success. Kim (2018) identified motivational and institutional factors influencing faculty contributions, including perceived benefits, copyright clarity, institutional mandates, and recognition mechanisms. Researchers often hesitate to deposit work due to concerns about copyright restrictions, publisher policies, or lack of incentives. Studies indicate that voluntary deposit models typically result in low submission rates, whereas mandatory deposit policies significantly increase repository growth (Pinfield et al., 2017). Awareness campaigns, training workshops, and integration of repository submission within research workflows have been identified as effective strategies for improving participation.

Organizational culture also influences repository adoption. Institutions that promote collaborative research environments and knowledge-sharing cultures demonstrate higher levels of engagement. Conversely, resistance to change, limited administrative support, and insufficient training hinder repository development.

4. Technical Challenges: Metadata, Interoperability, and Digital Preservation

Technical infrastructure is another critical factor in repository sustainability. Metadata quality directly affects discoverability and interoperability. Borgman (2015) emphasizes that inconsistent metadata standards reduce repository visibility in global indexing systems. Adoption of standardized schemas such as Dublin Core and compliance with OAI-PMH protocols are essential for effective harvesting and integration. Interoperability challenges arise when repositories operate in isolation without integration into national or international networks. Lack of system upgrades and limited technical expertise further exacerbate these issues.

Digital preservation presents additional concerns. Long-term sustainability requires strategies for format migration, secure storage, and regular system maintenance. Tripathi and Jeevan (2019) highlight financial and infrastructural limitations faced by institutions in developing countries, which often compromise repository sustainability.

5. Best Practices and Sustainable Repository Models

Emerging literature identifies several best practices for repository development. Corral, Kennan, and Afzal (2016) emphasize integrating research data management services with repository systems to enhance institutional research support. Nazim and Mukherjee (2016) advocate for clear governance policies, standardized workflows, and performance evaluation metrics. Leadership commitment, institutional mandates, continuous professional development, and stakeholder collaboration are consistently recognized as critical success factors. A KM-based approach promotes structured governance, knowledge sharing, and lifecycle management of scholarly outputs.

Overall, the literature underscores that sustainable repository development requires a holistic framework integrating technological infrastructure, policy support, organizational culture, and knowledge management principles. While numerous studies address individual aspects of repository challenges, there remains a need for integrated models that systematically combine KM theory with repository governance strategies—an objective that this study seeks to address.



VII. ANALYSIS AND DISCUSSION

The analysis of existing literature indicates that Institutional Repositories (IRs) have evolved from simple digital archives into strategic knowledge management (KM) infrastructures within higher education institutions. From a KM perspective, repositories function as systems for capturing, organizing, preserving, and disseminating institutional intellectual capital. However, their development and sustainability are influenced by interrelated technological, organizational, and cultural factors. One of the central challenges identified is limited faculty participation. Despite the recognized benefits of enhanced visibility and citation impact, researchers often demonstrate reluctance to deposit their work due to copyright concerns, lack of incentives, and insufficient awareness of repository policies. This reflects a gap between technological capability and organizational culture. From a KM standpoint, effective knowledge sharing requires not only infrastructure but also motivation, trust, and institutional support.

Technical challenges further complicate repository development. Metadata inconsistencies, lack of interoperability, and inadequate digital preservation strategies reduce discoverability and long-term sustainability. Without adherence to standardized metadata schemas and harvesting protocols, repositories risk isolation from global scholarly networks. Additionally, financial and infrastructural constraints, particularly in developing regions, limit system upgrades and professional training. The analysis also highlights governance and policy-related challenges. Many institutions lack clear repository mandates, defined workflows, or evaluation mechanisms. A fragmented approach undermines strategic integration with broader research management systems. Conversely, best practices identified in the literature emphasize leadership commitment, mandatory deposit policies, stakeholder collaboration, and integration of repositories with research data management services.

From a knowledge management perspective, successful IR development requires alignment between people, processes, and technology. Repositories must be embedded within institutional knowledge strategies rather than treated as standalone technical projects. This holistic integration enhances organizational learning, improves research visibility, and strengthens scholarly communication.

VIII. FINDINGS, IMPLICATIONS and LIMITATIONS

1. FINDINGS

The study identifies several key findings:

1. **Institutional repositories serve as strategic KM tools**, preserving and disseminating intellectual capital while supporting open access initiatives.
2. **Faculty engagement is the most critical success factor**, influenced by awareness, incentives, and policy mandates.
3. **Technical infrastructure and metadata quality directly impact repository visibility and interoperability.**
4. **Financial and human resource limitations hinder sustainability**, particularly in resource-constrained institutions.
5. **Governance frameworks and clear institutional policies significantly improve repository performance and compliance.**
6. **Integration of KM principles enhances repository effectiveness**, promoting systematic knowledge capture and organizational learning.

These findings confirm that repository success depends on balanced development across technological, organizational, and strategic dimensions.



2. IMPLICATIONS

Theoretical Implications

The study contributes to the intersection of Knowledge Management and Library & Information Science by positioning IRs as dynamic knowledge ecosystems rather than passive storage systems. It reinforces KM theory by demonstrating how repositories facilitate knowledge externalization, combination, and institutional memory creation.

Practical Implications

University administrators should adopt a structured KM-based framework when developing repositories. This includes investing in robust infrastructure, standardizing metadata practices, offering faculty training, and implementing mandatory deposit policies. Repository performance indicators should be aligned with institutional research goals.

Policy Implications

National and institutional open access policies must incorporate repository governance guidelines, sustainability planning, and quality control mechanisms. Policymakers should encourage funding support and collaborative networks to enhance interoperability and long-term preservation.

3. LIMITATIONS

This study is based on secondary literature analysis and does not include empirical data from specific institutional case studies. Consequently, contextual variations across geographical regions or institutional types may not be fully represented. Rapid technological developments and evolving open access policies may also influence repository practices beyond the scope of this review. Future research should incorporate quantitative surveys, qualitative interviews, and comparative case studies to validate and expand these findings.

IX. CONCLUSION

Institutional repositories represent a cornerstone of contemporary scholarly communication and knowledge management in higher education. While significant challenges persist—including faculty resistance, technical limitations, governance gaps, and financial constraints—best practices grounded in knowledge management principles provide a pathway for sustainable development. A holistic approach integrating policy support, technological infrastructure, organizational culture, and continuous professional development is essential. By embedding repositories within institutional KM strategies, universities can enhance research visibility, promote open access, preserve intellectual capital, and strengthen global scholarly engagement. Ultimately, the success of institutional repositories depends not merely on technological adoption but on strategic commitment to knowledge sharing and organizational learning in the digital age.

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