

# INTEGRATING STATISTICAL AND KNOWLEDGE-BASED APPROACHES TO ENHANCE RECORDS RETENTION AND DISPOSAL POLICY ADOPTION IN UGANDAN HIGHER EDUCATION INSTITUTIONS

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## **ABSTRACT**

*The study examined how integrating statistical and knowledge-based approaches can improve the adoption and implementation of records retention and disposal policies in Ugandan higher education institutions. The target population comprised fifteen (15) institutions, of which twelve (12) were purposively selected for their involvement in policy formulation and implementation. These policies provide structured timelines for managing records from creation to final disposal or archival preservation, promoting accountability and compliance. Using a mixed-methods design involving questionnaires, interviews, and document analysis, results showed that only 14% of institutions had formal policies, 19% lacked them, 14% applied statistical methods, and 8% used knowledge-based approaches such as AI-driven classification and expert systems. Institutions employing both approaches demonstrated higher efficiency and compliance. The study concludes that integrating statistical and knowledge-based methods enhances data-driven decision-making and institutional accountability. It recommends adopting Electronic Records Management Systems (ERMS) with built-in analytical and intelligent features to strengthen records governance and policy implementation.*

## **KEYWORDS**

*Records retention, disposal policy, higher education, statistical analysis, knowledge-based systems, Uganda, information governance.*

## **1. INTRODUCTION**

Records are formal documents or materials that provide verifiable evidence of actions, decisions, or transactions. They include student transcripts, financial reports, meeting minutes, answer booklets, policy documents, and official emails. Records are characterized by authenticity, verifiability, and legal or institutional significance. In higher education, systematic management of records is essential for safeguarding student data, financial information, human resource files, and administrative documentation that support teaching, research, and governance (Tukahirwa, 2024). Despite the critical role of records retention and disposal policies, many Ugandan universities continue to face significant challenges in implementing these frameworks. Contributing factors include limited awareness, inadequate ICT infrastructure, reliance on manual record-handling systems, and insufficient use of data for informed decision-making (Ndagire &

Basuta, 2022; Saturday et al., 2023). As a result, institutional records are frequently misplaced, retained beyond their useful life, or destroyed prematurely, undermining accountability, compliance, and information governance.

To address these challenges, this study examines the application of statistical and knowledge based approaches to enhance the adoption and implementation of records retention and disposal policies. Statistical methods provide empirical insights into records usage and policy compliance, while knowledge-based systems, driven by artificial intelligence and expert reasoning, automate classification, appraisal, and disposal processes (Shinde et al., 2024). Integrating these approaches enables universities to transform records management from a manual, reactive activity into an evidence-based, intelligent practice that strengthens policy adoption, ensures compliance, and enhances institutional accountability (Tukahirwa, 2024; Shinde et al., 2024).

### **1.1. Problem Statement**

Records retention and disposal practices are essential for ensuring governance, accountability, and operational efficiency in higher education institutions. In Uganda, however, many universities continue to rely on manual, fragmented, and inconsistent recordhandling systems that lack standardization, accountability, and digital support mechanisms (Tukahirwa, 2024; Ndagire & Basuta, 2022). This has resulted in duplicated records, poor retrieval systems, premature destruction of critical documents, and widespread noncompliance with institutional and national regulatory frameworks (Saturday, Kyobe, & Wamala, 2023). The limited adoption of digital tools, statistical analytics, and artificial intelligence in records management has constrained the development of modern, evidencebased governance frameworks (Shinde, Deshmukh, & Rao, 2024). Without data-driven insights and intelligent systems, universities cannot systematically monitor policy compliance, optimize records usage, or ensure accountability (Katuu, 2021; Ngulube & Katuu, 2022). This study addresses these challenges by investigating the integration of statistical and knowledge-based approaches into records management. By leveraging empirical data and intelligent systems, institutions can automate classification, appraisal, and disposal processes, strengthen decision-making, and improve compliance with retention and disposal policies, thereby enhancing institutional governance and accountability.

### **1.2. Research Objectives**

To examine how the application of statistical and knowledge-based approaches can enhance the adoption and implementation of Records Retention and Disposal Policies in higher education institutions in Uganda.

### **1.3. Research Questions**

How can the application of statistical and knowledge-based approaches enhance the adoption and implementation of Records Retention and Disposal Policies in higher education institutions in Uganda?

### **1.4. Significance of the Study**

This paper's main contribution is the development of a conceptual integration framework that combines statistical and knowledge-based approaches to strengthen records retention and disposal policy implementation in higher education institutions. The framework guides how data analytics, artificial intelligence, and expert decision-support tools can be embedded within Electronic Records Management Systems (ERMS) to enhance compliance, accountability, and efficiency.

Academically, the study advances understanding of data-driven policy adoption; institutionally, it provides practical guidance for improving information governance; and professionally, it equips records managers and administrators with intelligent tools for evidence-based decision-making. In practice, the framework supports the use of analytical dashboards and automated classification tools for proactive records management and policy enforcement.

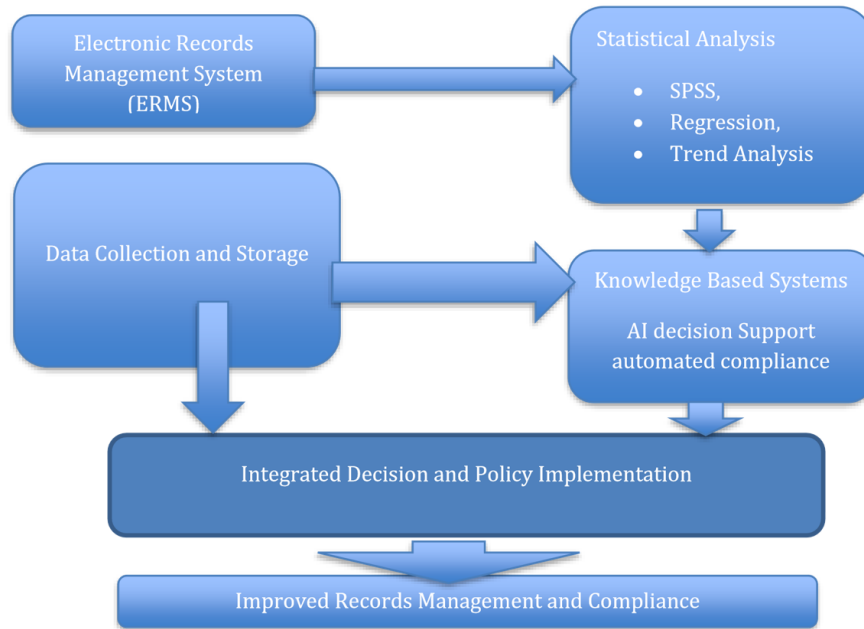


Figure 1: Conceptual framework integrating statistical and knowledge-based approaches

Source: Adopted from Bizi, Ghazali, & Yunus, (2025) modified by the research 2025

The conceptual framework integrates statistical and knowledge-based approaches with an Electronic Records Management System (ERMS) to improve the adoption and implementation of records retention and disposal policies in Ugandan higher education institutions. The ERMS serves as a centralized repository for electronic records, enabling metadata tagging, secure access, and audit tracking. Statistical analysis tools such as SPSS, R, and Excel are applied using methods like regression, trend analysis, and descriptive statistics to identify patterns, predict record usage, and determine optimal retention schedules.

Knowledge-based systems, including AI algorithms, expert systems, and decision support tools, use these statistical insights to provide automated compliance checks, intelligent recommendations, and alerts for retention policy violations. The integration ensures a continuous feedback loop where statistical findings inform AI predictions, and AI decisions guide ERMS actions, such as automatic retention or disposal. This combined approach enhances policy implementation, improves record management efficiency, and strengthens compliance, accountability, and informed decision-making across institutions.

## 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Effective records retention and disposal in higher education institutions increasingly depend on the integration of technology, knowledge systems, and data analytics into institutional processes. Contemporary research highlights that successful information governance requires both human

expertise and intelligent technological support to ensure accountability, compliance, and institutional learning (Ngulube & Katuu, 2022; Shinde, Deshmukh, & Rao, 2024).

## 2.1. Theoretical Framework

This study draws on four complementary theories, Knowledge Management Theory (KMT),

Technology Acceptance Model (TAM), Decision Theory, and Diffusion of Innovations Theory to provide a conceptual foundation for understanding how statistical and knowledgebased approaches can enhance policy adoption and implementation in Ugandan universities. KMT emphasizes capturing and applying organizational knowledge through databases, expert systems, and AI-driven decision-support tools to improve operational efficiency, policy compliance, and institutional memory (Katu, 2021; Mugisha & Ssekamate, 2023). TAM explains how staff adoption of new technologies, influenced by perceived usefulness, ease of use, and institutional support, determines the success of technological interventions in records management (Ndagire & Basuta, 2022; Saturday, Kyobe, & Wamala, 2023).

Decision Theory supports the use of evidence-based, data-driven decision-making, guiding institutions in setting optimal retention schedules, monitoring adherence, and refining policies using statistical and predictive analytics (Tukahirwa, 2024; Shinde et al., 2024). Meanwhile,

Diffusion of Innovations Theory elucidates how statistical and knowledge-based innovations are adopted across institutions, highlighting the importance of relative advantage, compatibility, complexity, trialability, and observability in shaping uptake (Ngulube & Katuu, 2022; Saturday et al., 2023). Together, these theories explain. Integrating statistical and knowledge-based approaches transforms traditional manual recordkeeping into an intelligent, adaptive, and policy-compliant system, providing both a practical and theoretical framework for improving records retention and disposal in Ugandan higher education institutions.

## 2.2. Global Perspectives on Records Retention and Disposal in Higher Education

Global perspectives on records retention and disposal in higher education highlight that integrating statistical and knowledge-based approaches with electronic records management systems (ERMS) enhances policy adoption, compliance, and institutional learning. International case studies reveal common challenges and effective practices: South African universities and UNISA emphasize robust ERM policies, staff training, and awareness programs (Ngulube & Katuu, 2022; Shinde, Deshmukh, & Rao, 2024); Libyan institutions face difficulties due to inadequate guidelines and limited technical capacity (Luyombya, 2021); while Kenyan and Ugandan universities, such as Moi University and Makerere

University, demonstrate the importance of strategic planning and digital transformation (Abong, Turyahabwe, Owomugisha, & Mbabazi, 2025; Wilbrod & Tumwine, 2024). These insights indicate that combining data-driven decision-making, knowledge-based tools, and well-structured ERMS strengthens records management practices, transforming traditional manual systems into intelligent, adaptive, and policy-compliant frameworks, providing practical and theoretical guidance for Ugandan higher education institutions and lessons applicable across global higher education contexts.

## 2.3. Identified Research Gap

Although numerous studies have explored records management and electronic document systems globally, there remains a contextual gap in understanding how statistical and knowledge-based

approaches can be effectively integrated within Ugandan institutions. Most existing research originates from developed countries where digital infrastructures are more advanced, leaving limited evidence on how such analytical and AI-driven methods function in Uganda's organizational environments. Additionally, a methodological gap exists because prior studies have mainly employed descriptive or qualitative designs without combining statistical techniques with knowledge-based modeling to analyze policy adoption and implementation. This study addresses that gap by using both quantitative and intelligent analytical methods to produce more reliable and predictive results. Finally, a practical and policy gap persists, as many Ugandan institutions have developed records management policies but struggle with enforcement and monitoring. By demonstrating how data-driven and knowledge-based systems can strengthen compliance and decision-making, this research contributes both academically and practically to the improvement of records management practices in Uganda.

### **3. METHODOLOGY**

This study adopted a conceptual mixed-methods research framework that integrated statistical and knowledge-based approaches to evaluate the adoption and implementation of records retention and disposal policies in Ugandan higher education institutions. The framework consisted of four phases design, data collection, analysis, and validation to ensure both empirical rigor and theoretical contribution.

#### **3.1. Research Design and Population**

A convergent mixed-methods design (Creswell & Plano Clark, 2021) was used, enabling simultaneous collection and integration of quantitative and qualitative data. The target population comprised fifteen (15) institutions, of which twelve (12) were purposively selected based on their active involvement in records management policy formulation and implementation (Etikan & Bala, 2023). Quantitative data were collected through structured questionnaires focusing on policy implementation and system efficiency, while qualitative data were gathered using semi-structured interviews exploring perceptions, challenges, and enforcement mechanisms (Alvesson & Sandberg, 2023).

#### **3.2. Data Analysis and Interpretation Framework**

Data were analyzed using SPSS (version 26) for descriptive and inferential statistics to identify patterns and predictors of policy adoption (Shinde, Deshmukh, & Rao, 2024), while qualitative responses were examined using Braun and Clarke's (2021) six-phase thematic analysis to uncover institutional attitudes and implementation gaps. The integration of both data streams formed a knowledge-based analytical layer, combining statistical findings with expert insights to develop a conceptual integration framework that enhances policy adoption, compliance, and efficiency. This methodology goes beyond mere statistical analysis by offering a replicable model that merges quantitative rigor with contextual understanding. Despite limitations such as small sample size and potential respondent bias, the framework provides a solid foundation for future longitudinal and cross-national research and can serve as a decision-support model for improving records management maturity in academic and governmental institutions.

Table 1: Summary of the Proposed Mixed-Methods Methodological Framework

Phase	Purpose	Key Methods / Tools	Outcome
<b>1. Design</b>	Establish integration of statistical and knowledge-based approaches	Convergent mixedmethods design (Creswell & Plano Clark, 2021)	Structured, triangulated research framework
<b>2. Data Collection</b>	Gather quantitative and qualitative data from selected institutions	Questionnaires and interviews using purposive sampling (Etikan & Bala, 2023)	Reliable, contextrich dataset
<b>3. Analysis</b>	Examine patterns, predictors, and institutional practices	SPSS (v26) for statistics; Braun & Clarke's (2021) thematic analysis	Combined quantitative and qualitative insights
<b>4. Integration &amp; Validation</b>	Merge findings into a conceptual decision-support model	Comparative analysis and expert validation	Replicable framework for policy evaluation and improvement

Table 1 summarizes the proposed mixed-methods framework, outlining each phase, its purpose, methods applied, and expected outcomes to ensure methodological rigor and replicability.

#### 4. RESULTS AND ANALYSIS

Data were collected from twelve purposively selected higher education institutions in Uganda, comprising both public and private universities. The findings reveal significant disparities in the adoption and implementation of records retention and disposal policies. As shown in Table 1, only five institutions (14%) reported having formal records retention and disposal policies, while seven institutions (19%) lacked such frameworks. This demonstrates a general gap in policy adoption and implementation across the sector. Policy awareness and training also varied widely. Institutions with existing policies conducted training at different intervals four offered annual sessions, three every six months, two quarterly, and three had no training at all. This inconsistency contributes to low awareness and compliance levels. Respondents rated compliance as generally low, with only two institutions reporting high or very high compliance.

In terms of statistical approaches, five institutions (14%) reported using data analytics tools to monitor records management, while seven (19%) did not employ such methods. The institutions applying statistical analysis used techniques such as tracking document access frequency, analyzing record age and retention periods, and generating compliance reports. These tools assist in identifying inactive records and ensuring timely disposal or archiving. However, their application remains limited. As one participant stated, *“Statistical reports help, but we rarely use them to make real decisions.”*

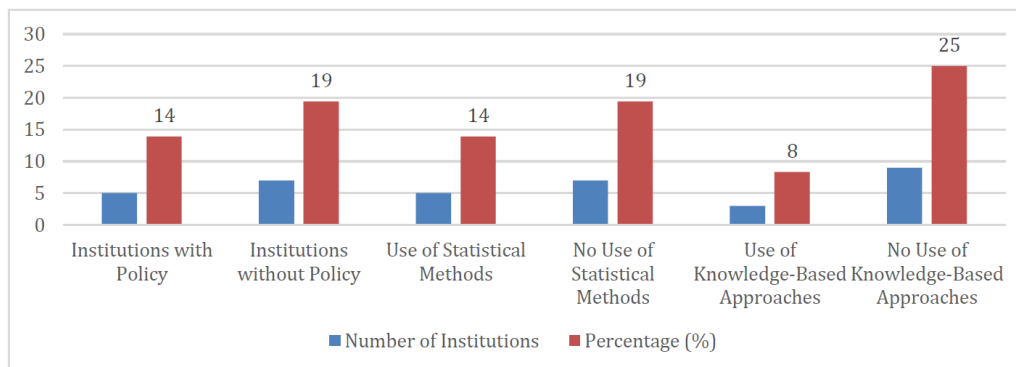
Knowledge-based approaches were adopted by three institutions (8%), while nine (25%) had not integrated them into their records management systems. The few institutions using AI-driven tools employed automated classification, expert decision-support systems, and compliance monitoring applications. These enable intelligent recommendations for retention or disposal and generate alerts for non-compliance. One respondent commented, *“AI tools are promising, but we have not fully integrated them into everyday practice.”*

Participants suggested strategies to enhance adoption and compliance, including regular statistical analyses of records, integration of AI-based decision-making tools, periodic audits, awareness campaigns, and continuous staff training.

Overall, the findings suggest that while there is growing recognition of the value of statistical and knowledge-based approaches in managing records retention and disposal, their implementation in Ugandan higher education institutions remains minimal. Strengthening these approaches can significantly improve compliance, enhance decision-making, and promote institutional accountability.

Table: 2 presents the adoption rates of records retention and disposal policies among surveyed institutions.

Category	Number of Institutions	Percentage (%)
Institutions with Policy	5	14
Institutions without Policy	7	19
Use of Statistical Methods	5	14
No Use of Statistical Methods	7	19
Use of Knowledge-Based Approaches	3	8
No Use of Knowledge-Based Approaches	9	25
	<b>36</b>	<b>100</b>



Bar chart: 1 Adoption rates of records retention and disposal policies among surveyed institutions.

## 5. DISCUSSION OF FINDINGS

The findings indicate that while many Ugandan higher education institutions acknowledge the importance of records retention and disposal policies, the level of adoption and compliance remains suboptimal. Most institutions lack structured implementation frameworks, and policy awareness among staff is limited, reflecting inconsistent training and enforcement mechanisms. This aligns with recent studies highlighting that insufficient institutional support and staff sensitization hinder effective records management in African universities (Ndagire & Basuta, 2022; Tukahirwa, 2024). The observed gaps in compliance and accountability suggest that policy formulation alone is insufficient without systematic capacity building and operational integration.

The use of statistical approaches remains underdeveloped, despite their proven potential for enhancing records management efficiency through tracking, analysis, and evidence-based decision-making. Institutions employing these methods reported measurable performance

improvements, such as monitoring record access, analyzing retention periods, and generating compliance reports. However, the limited adoption reflects challenges in technical capacity, inadequate training, and weak integration between analytical tools and policy processes, consistent with findings by Shinde, Deshmukh, and Rao (2024).

In contrast, knowledge-based approaches including AI, expert systems, and decision-support tools show higher adoption rates but limited depth in practical application. Institutions utilizing these tools reported improvements in record classification, automated retention decisions, and compliance monitoring, yet many have not fully leveraged predictive analytics or AI-driven recommendations to optimize outcomes. This underscores the need for enhanced technical training, infrastructure investment, and institutional support to maximize the value of knowledge-based systems (Mugisha & Ssekamatte, 2023; Ngulube & Katuu, 2022).

Overall, the study highlights that a hybrid approach, integrating statistical and knowledgebased techniques, offers the most promising pathway to strengthen records retention and disposal policy adoption. By combining data-driven insights with intelligent decision-support systems, institutions can enhance governance structures, improve compliance, and ensure sustainable and accountable information management practices, aligning with global trends in digital transformation and evidence-based records management (Saturday, Kyobe, & Wamala, 2023).

Table 3: Comparative Summary of Main Approaches, Metrics, and Outcomes

Methodology	Metrics Used	Key Findings	Limitations
Descriptive survey on records retention disposal policy in Ugandan higher education institutions	Policy existence rate, staff awareness levels	Found low policy adoption due to limited staff training	Lacked integration of statistical analysis; context-specific
Quantitative analysis using SPSS	Compliance rate, records disposal timelines	Statistical tracking improved compliance monitoring	Focused only on quantitative data; ignored qualitative insights
Qualitative case study of Ugandan institutions	Thematic codes on governance and compliance	Highlighted knowledge gaps in policy implementation	Did not quantify adoption levels; limited generalizability
Mixed-methods study of ERMS adoption	Usage frequency, user satisfaction indices	Integration of ERMS improved record accessibility and retention	Limited to technology adoption; did not address policy alignment
Mixed-methods integrating statistical and knowledgebased approaches	Policy adoption percentage, efficiency index, compliance rating	Developed a conceptual integration framework linking analytics and AI for enhanced records governance	Limited sample size (12 institutions); recommends longitudinal validation

## **6. CONCLUSION AND FURTHER RECOMMENDATIONS**

### **6.1. Conclusion**

This study demonstrates that integrating statistical and knowledge-based approaches significantly enhances the adoption and implementation of records retention and disposal policies in Ugandan higher education institutions. While many institutions have formal policies, adoption and compliance remain limited due to low awareness, weak enforcement, and inadequate technical capacity. Statistical methods provide a quantitative foundation for evaluating policies, tracking performance, and informing data-driven decision-making, whereas knowledge-based systems, including artificial intelligence and expert decision support tools, improve automation, accuracy, and policy compliance.

To strengthen practical implementation, institutions should align their Electronic Records Management Systems (ERMS) and information governance practices with recognized international frameworks such as the NIST Cybersecurity Framework and ISO/IEC 27001 standards on information security management. These standards provide structured guidelines for risk assessment, data protection, and continuous improvement in digital recordkeeping. Integrating these frameworks alongside statistical and knowledge-based approaches ensures that records management processes are not only efficient but also secure, auditable, and compliant with both institutional and national regulatory requirements. Collectively, these measures foster a culture of accountability, transparency, and sustainability in higher education records management.

### **6.2. Recommendations**

To enhance Records Retention and Disposal Policy compliance in higher education institutions, it is recommended that institutions adopt a secure and structured ERMS with role-based access and organized records according to departments, record types, or retention schedules. Staff should receive hands-on training to create, store, retrieve, and archive records, generate reports, and interpret analytics dashboards. Integrating statistical analysis, AI modules, and decision-support systems within the ERMS can enable automated monitoring, alerts for records nearing retention deadlines, and real-time tracking of compliance, workflow efficiency, and institutional performance. Collaboration between records managers and ICT teams is essential to troubleshoot technical issues, customize workflows, and ensure alignment with institutional policies.

Continuous evaluation and automation are critical for sustaining policy compliance. Institutions should use audit trails, centralized dashboards, and AI monitoring to enforce retention schedules, flag potential violations, and benchmark departmental practices. Periodic audits, policy reviews, and staff feedback help refine workflows and retention schedules, ensuring the ERMS remains efficient and adaptable to evolving technological and institutional needs. Implementing these measures fosters a data-driven, intelligent records management environment, strengthening governance, operational efficiency, and institutional accountability.

### **6.3. Practical Hands-on Applications**

This study highlights practical steps for implementing an ERMS effectively in alignment with Uganda's Vision 2040, which promotes digital transformation and efficient information management for national development. Institutions should establish secure digital repositories with role-based access and organize records by department or retention schedule. Staff should receive hands-on training in creating, storing, retrieving, and archiving records, as well as using analytics dashboards for monitoring and decision-making. Integrating automated alerts and AI-driven

compliance checks ensures adherence to retention policies, while collaboration between records managers and ICT teams supports workflow customization and technical troubleshooting. Regular audits, policy reviews, and staff feedback help refine processes, enhance efficiency, and maintain adaptability to evolving technologies and institutional needs.

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