

Factors Influencing Integration of Artificial Intelligence in Academic Libraries in Kenya

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Abstract

This study assessed the factors influencing the integration of artificial intelligence (AI) in Kenyan academic libraries, guided by the Technology Acceptance Model. As academic libraries increasingly seek to enhance service delivery through innovative technologies, AI has emerged as a promising tool for improving information management and access to library resources. However, despite its potential, AI adoption across Kenyan academic libraries remains uneven. A descriptive survey design employing quantitative and qualitative approaches was used to collect and analyse data from library staff, postgraduate students, and key informants. The findings revealed that AI integration is significantly influenced by the availability of ICT infrastructure, staff technical competencies, management support, institutional policies, and financial resources. The study concludes that successful AI adoption requires sustained institutional commitment, continuous staff capacity building, adequate funding, and supportive AI governance and ICT policies. It recommends increased investment in ICT infrastructure, continuous professional training, and the development of clear AI policies and ethical frameworks to facilitate sustainable AI implementation in academic libraries. The study contributes to the growing body of knowledge on AI adoption in academic libraries by providing empirical evidence on the institutional and organisational factors shaping AI integration in the Kenyan context. The findings also offer practical guidance for university administrators, library managers, and policymakers seeking to advance sustainable AI adoption in academic libraries.

Key terms: Academic libraries, artificial intelligence, ICT infrastructure, information services, technology acceptance model.

1.0 INTRODUCTION

Background of the Study

Despite the growing recognition of Artificial Intelligence (AI) as a transformative technology in higher education, the extent to which Kenyan academic libraries have integrated AI into their operations remains unclear. While universities are increasingly investing in digital technologies to improve service delivery, evidence on the institutional, technological, and organisational factors influencing AI integration in academic libraries is limited. This knowledge gap constrains the ability of university administrators, library managers, and policymakers to develop informed strategies for the effective adoption and sustainable implementation of AI technologies.

Artificial Intelligence refers to computer systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, problem-solving, language processing, and decision-making. In the context of academic libraries, AI encompasses technologies such as machine learning, natural language processing, chatbots, expert systems, robotics, and recommendation systems that support information management and service delivery. Academic libraries, as knowledge hubs within higher education institutions, are increasingly adopting digital technologies to improve access to information resources, enhance operational efficiency, and meet the evolving information needs of students, researchers, and faculty.

The rapid growth of digital information and the increasing demand for efficient, user-centred library services have accelerated the adoption of Artificial Intelligence (AI) technologies in libraries globally. Existing literature indicates that AI has the potential to transform academic library operations by supporting automated cataloguing, indexing, intelligent information retrieval, virtual reference services, collection management, archiving, literature analysis, and personalised information delivery. These applications enhance operational efficiency, reduce repetitive workloads, improve the accuracy and speed of information services, and allow librarians to concentrate on more strategic and value-added professional roles (Ali et al., 2020; Kumar & Sheshadri, 2019; Asemi et al., 2021; Bi et al., 2022; Harisanty et al., 2023; Lund & Wang, 2023). However, while the literature demonstrates broad agreement on the benefits of AI in improving library services, successful implementation depends on institutional readiness, including technological infrastructure, staff competencies, financial capacity, management commitment, and supportive policy frameworks.

This suggests that the value of AI in academic libraries is not determined solely by the availability of AI tools but by the organisational conditions that enable effective adoption and sustainable utilisation. Collectively, these studies suggest that AI has the potential to transform traditional libraries into intelligent libraries capable of providing faster, more responsive, and user-oriented information services. However, the literature also highlights that realising these benefits depends on favourable institutional conditions.

Research further indicates that the successful integration of AI is shaped by multiple interrelated factors, including ICT infrastructure, financial capacity, staff competencies, organisational readiness, management support, institutional policies, and ethical considerations such as data privacy and algorithmic bias (Cox et al., 2019). Although there is broad agreement that these factors influence AI adoption, existing studies have largely focused on the applications and potential benefits of AI in libraries, with relatively limited empirical attention to the contextual factors that determine successful implementation, particularly within

developing countries. Consequently, findings from studies conducted in technologically advanced settings may not adequately reflect the realities of academic libraries operating under different institutional, financial, and technological conditions.

In Africa, AI adoption continues to expand across sectors including education, healthcare, agriculture, finance, and manufacturing, with Kenya emerging as one of the continent's leading countries in AI readiness (Akello, 2022). The Kenyan government has identified AI as a strategic technology for driving innovation and supporting the Fourth Industrial Revolution. Despite this progress, empirical evidence on AI integration in Kenyan academic libraries remains scarce. Previous studies have provided valuable insights into AI applications and their potential benefits but have not comprehensively examined the institutional, technological, organisational, and resource-related factors influencing AI integration within Kenyan academic libraries. This study addresses that empirical gap by assessing the factors influencing AI integration in selected Kenyan academic libraries, thereby contributing context-specific evidence to inform policy, institutional decision-making, and future research on AI adoption in higher education libraries.

Artificial Intelligence (AI) has demonstrated considerable potential to improve academic library services through automation, enhanced information retrieval, personalised user support, and efficient management of information resources. Consequently, academic libraries worldwide are increasingly adopting AI technologies to enhance service delivery, operational efficiency, and user experience. Despite these benefits and Kenya's growing commitment to digital transformation, AI integration in Kenyan academic libraries remains limited.

Existing studies have primarily focused on the applications, benefits, and adoption challenges of AI in libraries. These studies report that AI can improve cataloguing, reference services, information retrieval, and collection management, while identifying barriers such as inadequate ICT infrastructure, limited financial resources, insufficient AI-related skills among library staff, inadequate training opportunities, and organisational constraints as obstacles to AI adoption (Abayomi et al., 2021). Although these studies provide valuable insights into the potential and challenges of AI in library services, they largely examine AI implementation from a general perspective or within contexts outside Kenya. Consequently, they offer limited empirical evidence on how institutional, technological, organisational, and human factors collectively influence AI integration in Kenyan academic libraries.

The absence of context-specific empirical evidence has created a knowledge gap that limits the capacity of university administrators, library managers, and policymakers to formulate strategies that address the unique challenges of integrating artificial intelligence (AI) into Kenyan academic libraries. Consequently, initiatives aimed at promoting AI adoption may not adequately reflect institutional realities or achieve sustainable implementation. This study addresses this gap by examining the factors influencing the integration of AI in academic libraries in Kenya. Specifically, it seeks to determine the factors influencing AI integration in Kenyan academic libraries and to answer the research question: Which factors influence the integration of artificial intelligence in academic libraries in Kenya? The findings are expected to provide empirical evidence on the technological, organisational, institutional, and human factors shaping AI integration, thereby informing policy formulation, institutional planning, and evidence-based strategies for sustainable AI adoption. In addition, the study is expected to demonstrate how AI integration can enhance information service delivery, improve the efficiency and effectiveness of academic library services, and

identify ethical and privacy concerns associated with AI implementation while proposing guidelines for its responsible use.

Conceptual Framework

A Conceptual framework is a diagrammatic expression linking the independent and the dependent variables in the study (Smyth, 2004). Figure 1 shows the constructs of the independent and dependent variables of the study.

Independent Variables

Factors influencing AI adoption

- Cost of AI Integration
- Staff Competency
- Management Support
- ICT Infrastructure

Dependent Variable

Integration of Artificial Intelligence in Provision of information services

- Extent of AI adoption
- Level of AI implementation
- Frequency of AI utilization
- Integration into library operations
- Sustainability of AI-enabled information services

Figure 1: Conceptual Framework

The study sought to establish factors influencing the integration of AI, such as cost of integration, staff competency, management support and ICT infrastructure, which may have a bearing on the integration of AI in academic libraries by playing a role in automated cataloguing, virtual assistants, data analytics, natural language processing, and security systems.

2.0 LITERATURE REVIEW

Theoretical Review

The study was anchored on the Technology Acceptance Model.

Technology Acceptance Model

The Technology Acceptance Model (TAM) was developed by Davis (1986) and subsequently refined by Davis (1989) to explain and predict individuals' acceptance and use of information technologies. The model posits that users' intention to adopt a technology is primarily influenced by two fundamental constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived usefulness refers to the degree to which an individual believes that using a particular technology will enhance job performance, whereas perceived ease of use is the extent to which an individual believes that using the technology will be free of effort (Davis, 1989). According to TAM, these perceptions shape users' attitudes toward a technology, which in turn influence their behavioural intention and actual technology use.

The model further recognises that users' perceptions are influenced by external variables, although it does not prescribe what these variables should be. Depending on the context, technological, organisational,

financial, and individual factors may shape users' perceptions of usefulness and ease of use, thereby influencing technology adoption. This flexibility has enabled TAM to be widely applied across different technological environments and organisational settings.

Since its development, TAM has been extensively validated and extended in studies examining the adoption of information systems, digital technologies, and artificial intelligence. Venkatesh and Davis (2000) expanded the model by demonstrating that organisational and social factors significantly influence users' technology acceptance. Similarly, Abdullah and Ward (2016), through a comprehensive review of TAM studies, concluded that perceived usefulness and perceived ease of use remain the most consistent predictors of technology adoption across diverse contexts. More recently, studies on AI adoption in libraries and higher education have applied TAM to explain users' acceptance of AI-enabled systems, reporting that technologies perceived as useful, easy to use, and supported by adequate institutional resources are more likely to be adopted and utilised effectively (Lund & Wang, 2023).

The Technology Acceptance Model provides the theoretical foundation for the present study because it explains how external organisational factors influence the integration of Artificial Intelligence in academic libraries. In this study, ICT infrastructure, staff competency, management support, and the cost of AI integration are conceptualised as external variables that shape librarians' and library users' perceptions of the usefulness and ease of using AI technologies. Positive perceptions of usefulness and ease of use are expected to enhance the successful integration of AI into academic library information services. AI integration is reflected in the extent to which AI technologies are adopted, implemented, and routinely utilised to support library operations and service delivery. Accordingly, the conceptual framework positions Perceived Usefulness and Perceived Ease of Use as the key TAM constructs linking the identified external factors to the integration of AI in academic library information services. The model therefore provides an appropriate theoretical basis for examining the institutional, technological, organisational, and financial factors influencing AI integration in Kenyan academic libraries.

Factors Influencing AI Integration in Providing Information Services in Academic Libraries

The integration of Artificial Intelligence in academic libraries is influenced by technological, organisational, financial, and human factors. Existing literature generally agrees that successful AI implementation depends on the availability of adequate ICT infrastructure, competent personnel, financial resources, and institutional support. However, studies differ regarding the relative importance of these factors across different organisational and geographical contexts. Furthermore, most empirical evidence has been generated outside the Kenyan context, leaving limited understanding of how these factors collectively influence AI integration in Kenyan academic libraries. The following sections critically review the literature on the four factors investigated in this study and identify the empirical gaps that the present study seeks to address.

Cost of Integration and Integration of Artificial Intelligence

Research consistently identifies the cost of technology acquisition and maintenance as a critical determinant of Artificial Intelligence (AI) integration in academic libraries. AI implementation requires substantial investment in ICT infrastructure, specialised software, hardware, network connectivity, system upgrades, and staff training. Studies conducted in both developed and developing countries agree that organisations with adequate financial resources are better positioned to adopt and sustain AI technologies than those operating under budgetary constraints (Kamba, 2011; Baharuden et al., 2019). Similarly, Thuguri

(2018) argues that AI investment should be viewed from a long-term strategic perspective because its benefits are often realised gradually through improved efficiency and service delivery rather than immediate financial returns.

Although the literature consistently emphasises the importance of financial capacity, studies differ regarding the specific cost-related barriers affecting technology adoption. Earlier library automation studies highlight that institutions operating outdated systems often face significant financial demands associated with upgrading software, hardware, and technological platforms to remain compatible with emerging digital requirements. In contrast, contemporary studies on digital transformation in developing contexts emphasise that affordability of connectivity, digital infrastructure investment, and access to reliable broadband services remain major constraints, particularly in African institutions (World Bank, 2020; International Telecommunication Union [ITU], 2021). These differences suggest that financial barriers to AI integration are multidimensional, involving not only the acquisition of AI technologies but also the broader costs associated with infrastructure development, connectivity, maintenance, and institutional capacity building. Likewise, Ani et al. (2005) broaden the discussion by arguing that financial limitations interact with shortages of skilled personnel and inadequate technological resources, suggesting that cost alone may not fully explain successful AI integration.

Collectively, these studies demonstrate that financial resources are essential for AI adoption, but they also indicate that cost operates alongside organisational and technological factors. However, most existing studies have examined cost as a general barrier to library automation or technology adoption rather than specifically assessing its influence on AI integration within Kenyan academic libraries. Consequently, there is limited empirical evidence on the extent to which the cost of AI integration influences AI adoption in Kenyan academic libraries. The present study addresses this gap by examining the cost of AI integration as one of the key determinants of AI integration in selected academic libraries in Kenya.

Staff Competency and Integration of Artificial Intelligence

Staff competency is widely recognised as a critical determinant of successful Artificial Intelligence (AI) integration in academic libraries because librarians are responsible for implementing, managing, and utilising AI-enabled systems. Existing literature generally agrees that the adoption of emerging technologies requires employees to acquire new knowledge, technical skills, and professional capabilities beyond traditional library competencies. Heinrichs and Lim (2009) emphasise that academic libraries require skilled librarians capable of creating, managing, and disseminating knowledge within increasingly digital environments. Similarly, Saniuk et al. (2021) argue that the introduction of new technologies into organisations inevitably creates demand for new competency requirements, including technical knowledge, adaptability, and the ability to effectively interact with digital systems.

Studies further indicate that the nature of required competencies depends on the type and complexity of AI technologies being adopted. Bhar et al. (2019) observe that organisations require different competency levels depending on the AI applications implemented, suggesting that AI adoption is not only a technological issue but also a human capacity challenge. Guenole and Feinzig (2018) extend this argument by identifying employee competencies as a combination of technical knowledge, educational background, experience, cognitive abilities, and personal attributes that enable effective engagement with AI technologies. This implies that successful AI integration requires not only access to AI systems but also a

workforce capable of understanding, managing, and applying these technologies to improve service delivery.

While the literature largely agrees on the importance of staff competency, studies differ in their emphasis on the specific skills required for AI adoption. Some studies focus primarily on technical competencies, such as digital literacy, programming knowledge, and the ability to operate technology-based systems (Ismail & Hassan, 2019), whereas others highlight broader organisational competencies, including continuous learning, adaptability, and ethical awareness when working with AI systems. For example, research on AI applications in human resource management demonstrates that while AI can enhance efficiency through automation, it also introduces challenges related to algorithmic bias, fairness, and responsible use, requiring employees to develop both technical and ethical competencies (Zhao et al., 2021). These findings suggest that AI competency should extend beyond operational skills to include the ability to critically evaluate and manage AI-driven processes.

In the Kenyan context, existing literature indicates that inadequate AI knowledge and limited technical expertise remain significant barriers to technology adoption across different sectors. Githui (2019) notes that AI requires multidisciplinary expertise that remains limited among Kenyan professionals, while Nyongesa et al. (2020) and Mvurya (2020) highlight gaps in AI awareness, education, and skills development as constraints to wider AI adoption. Although these studies provide evidence of national-level challenges, they primarily examine AI adoption broadly and do not specifically investigate the competency requirements of academic library staff in relation to AI integration.

Overall, the literature demonstrates that staff competency is an essential prerequisite for effective AI adoption, with evidence showing that inadequate skills can limit the successful implementation and utilisation of AI technologies. However, existing studies have largely focused on general organisational settings or broader technology adoption contexts, providing limited empirical evidence on how library staff competencies influence AI integration in Kenyan academic libraries. This study addresses this gap by examining staff competency as a factor influencing the integration of AI in academic library information services in Kenya.

Management Support in Integration of Artificial Intelligence

Management support is increasingly recognised as a critical organisational determinant of Artificial Intelligence (AI) integration because institutional leaders influence strategic direction, resource allocation, policy development, and organisational readiness for technological change. Recent studies on AI adoption emphasise that successful implementation is not determined solely by the availability of technology but also by the commitment of organisational leadership to create supportive structures, allocate resources, and promote a culture of innovation (Dwivedi et al., 2021; Mikalef & Gupta, 2021). In academic libraries, where AI adoption requires investments in infrastructure, staff development, ethical governance, and system maintenance, management commitment is essential for ensuring sustainable implementation.

Existing literature demonstrates that inadequate managerial support remains a significant barrier to technology adoption in academic and information service environments. Universities may prioritise teaching and learning initiatives while giving limited attention to transforming library services through emerging technologies, thereby limiting libraries' ability to respond to changing information needs (Ubaga et al., 2024). Recent research on digital transformation in higher education further indicates that

institutional leadership commitment influences the success of technology-driven change by determining the availability of financial resources, innovation strategies, and organisational policies that support adoption (Kraus et al., 2021). This suggests that AI integration requires university leaders to view academic libraries as strategic partners in digital transformation rather than merely as support units.

Beyond financial investment, contemporary studies emphasise that management support encompasses leadership involvement, change management, stakeholder engagement, and the development of clear governance frameworks. According to Venkatesh et al. (2016), organisational conditions influence technology acceptance by shaping users' perceptions of technological usefulness and ease of use, which are central assumptions within the Technology Acceptance Model. Similarly, Mikalef and Gupta (2021) found that organisational capabilities, including leadership support and resource commitment, significantly influence an organisation's ability to develop and utilise AI capabilities effectively. These findings indicate that management support facilitates AI adoption by creating conditions that enhance staff confidence, reduce resistance to change, and encourage effective utilisation of AI-enabled systems.

However, although existing studies consistently identify management support as an important factor in technology adoption, there is variation regarding the specific dimensions of support that have the greatest influence. Some studies emphasise financial commitment and infrastructure investment, while others highlight leadership vision, employee empowerment, and policy development as equally important components of successful implementation (Dwivedi et al., 2021; Mikalef & Gupta, 2021). This suggests that management support should be understood as a multidimensional construct involving strategic, financial, technical, and human resource commitments rather than merely the provision of funds.

Despite growing recognition of the role of leadership in AI adoption, much of the existing empirical literature focuses on AI implementation in business, healthcare, and general higher education contexts, with limited attention to academic libraries, particularly in developing countries. Furthermore, few studies have examined how university management support influences AI integration in Kenyan academic libraries. This study addresses this gap by investigating management support as an organisational factor influencing AI integration in academic library information services in Kenya, thereby providing context-specific evidence to guide institutional decision-making and AI adoption strategies.

ICT Infrastructure and Integration of Artificial Intelligence

ICT infrastructure is widely recognised as a foundational requirement for the successful integration of Artificial Intelligence (AI) in academic libraries because AI applications depend on reliable digital systems, adequate computing capacity, connectivity, data management capabilities, and secure technological environments. While academic libraries have historically adopted ICT-based systems to improve information access, storage, retrieval, and dissemination, the transition towards AI-enabled services requires more advanced infrastructure capable of supporting data-intensive applications, automation, and intelligent decision-making processes. Recent studies on AI adoption in academic libraries indicate that inadequate technological infrastructure, limited digital capacity, and insufficient institutional investment remain major barriers to effective AI implementation (Abayomi et al., 2021; Dada, 2025). Recent studies on digital transformation emphasise that organisations with mature ICT infrastructure are better positioned to adopt emerging technologies because infrastructure availability enhances technological readiness and reduces implementation barriers (Kraus et al., 2021; Mikalef & Gupta, 2021).

Existing literature generally agrees that inadequate ICT infrastructure remains one of the major constraints affecting technology adoption in developing countries. Studies have identified limited access to reliable internet connectivity, insufficient bandwidth, outdated hardware, inadequate software systems, and unreliable power supply as persistent challenges affecting digital transformation initiatives in African higher education institutions (Kamba, 2011; Marino et al., 2020). These challenges are particularly significant for AI adoption because AI applications require stable connectivity, sufficient computational resources, and integrated information systems to function effectively. Consequently, institutions with weak ICT foundations may experience difficulties in implementing AI-driven services such as intelligent search systems, virtual assistants, automated cataloguing, and data analytics.

While previous studies consistently highlight the importance of ICT infrastructure, they differ in the extent to which infrastructure alone determines technology adoption. Some scholars argue that infrastructure availability is a prerequisite for AI implementation, while others suggest that infrastructure must be complemented by organisational readiness, skilled personnel, and institutional commitment for technology adoption to succeed (Dwivedi et al., 2021). This indicates that ICT infrastructure should not be viewed merely as physical equipment but as a broader technological capability that includes connectivity, system interoperability, cybersecurity, technical support, and the capacity to manage AI-enabled applications.

In the academic library context, professional and institutional frameworks emphasise the need for universities to maintain robust ICT environments that support teaching, learning, research, and digital information services. Effective adoption of emerging technologies requires adequate ICT infrastructure, including reliable connectivity, appropriate hardware and software systems, digital platforms, and skilled personnel capable of managing technology-enabled services. Studies on ICT implementation in higher education institutions indicate that infrastructure limitations, inadequate policy support, and insufficient technical capacity remain major barriers to the effective deployment of advanced digital services (Ntorukiri et al., 2022). Similarly, evidence from African academic libraries shows that successful digital transformation requires investment in ICT facilities, staff training, and institutional support to enable libraries to provide virtual services and improve access to electronic resources (Nzeyimana et al., 2022). Therefore, the transition from conventional digital library services to AI-enabled environments depends on strengthening ICT infrastructure and developing the human capacity required to effectively utilise emerging technologies. However, much of the existing literature focuses broadly on ICT adoption and digital library development rather than specifically examining the infrastructure requirements for AI integration.

Although ICT infrastructure is frequently identified as an important factor influencing technology adoption, limited empirical research has examined how infrastructure availability affects AI integration in Kenyan academic libraries. Existing studies have largely focused on general ICT challenges, without investigating whether current infrastructure can support AI-enabled information services or how infrastructural limitations influence AI adoption decisions. This study addresses this gap by examining ICT infrastructure as a technological factor influencing the integration of AI in academic library information services in Kenya. Within the Technology Acceptance Model perspective, ICT infrastructure represents an external condition that can influence users' perceptions of the usefulness and ease of use of AI technologies, thereby affecting their successful adoption and utilisation.

3.0 METHODOLOGY

This study adopted an explanatory sequential mixed-methods research design, consisting of a quantitative phase followed by a qualitative phase. Mixed-methods research integrates quantitative and qualitative approaches to provide a more comprehensive understanding of a phenomenon by combining statistical patterns with contextual explanations (Creswell & Creswell, 2023). The design was appropriate because the study sought to measure the factors influencing Artificial Intelligence (AI) integration in academic libraries while also obtaining deeper insights from key stakeholders regarding institutional experiences, challenges, and implementation conditions.

The target population comprised 439 respondents from three selected Kenyan universities, including 430 questionnaire respondents (library staff and active postgraduate students) and nine key informants. Table 1 presents the distribution of the target population across the selected universities.

Table 1: Target Population

Category of Respondents	Target Population
Library Staff	280
Active Postgraduate Students	150
Sub Total	430
Key Informants (Interviews):	
University Librarians	3
ICT Staff	3
Systems Librarians	3
Sub Total	9
Total	439

Source: (University of Nairobi, Kenyatta University and Catholic University library, 2025).

The sample was determined using the Taro Yamane formula (Yamane, 1967), resulting in 207 respondents, which was increased by 10 per cent to 228 to compensate for anticipated non-response and maintain the adequacy of the sample (Dillman et al., 2014). Library staff and postgraduate students were selected using systematic random sampling, while university librarians, ICT staff, and systems librarians were purposively selected because of their specialised knowledge and involvement in library technology management (Patton, 2015). The sample size for questionnaire respondents was determined using the Taro Yamane (1967) formula as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n = sample size

N = population size (430 questionnaire respondents)

e = level of precision (0.05)

Substituting:

$$n = 430 = 207$$

$$1 + 430(0.05)^2$$

Thus, the sample size for questionnaire respondents was 207. To account for non-response, the sample was increased by 10 per cent, resulting in a final sample size of 228 respondents (questionnaire participants).

The nine (9) key informants were not subjected to statistical sampling because they were purposively selected based on their roles and expertise.

Table 2: Study Sample Determination

Category of Respondents	Population (N)	Sample Size (n)
Library Staff	280	135
Active Postgraduate Students	150	72
Sub Total (Questionnaire)	430	207
Key Informants (Interviews)	9	9
University Librarians	3	3
ICT Staff	3	3
Systems Librarians	3	3
Total	439	216

Author's Computation.

The questionnaire sample was proportionally distributed as follows:

Library staff:

$$(280/430) \times 207 \approx 135$$

Postgraduate students:

$$(150/430) \times 207 \approx 72$$

All nine key informants were included purposively due to their expert roles in AI-enabled library systems.

This study used structured questionnaires and interview schedules to collect primary data from the respondents. The questionnaires were administered to library staff and active postgraduate students, while interview schedules were used for key informants, namely university librarians, ICT staff, and systems librarians from the University of Nairobi, Kenyatta University, and Catholic University of Eastern Africa.

The study mainly collected data from primary sources, with respondents using closed and open-ended questionnaires. The drop-and-pick method was used to distribute and collect the completed questionnaires.

Data analysis is the process of bringing order, structure, and interpretation to the mass of collected data (Mugenda & Mugenda, 2003). The study collected both quantitative (from closed-ended questionnaires) and qualitative data (from interview schedules). Analysis was at two levels: descriptive data analysis that measured frequencies, percentages, and means, and inferential statistics using the Statistical Package for Social Sciences (SPSS) version 26.0 software. The findings were presented in the form of tables and charts. The qualitative data from the interview schedules were subjected to content analysis according to thematic areas.

4.0 FINDINGS AND DISCUSSION

Response Rate

In this study, response rates are presented for questionnaire respondents (library staff and active postgraduate students) and key informant interviews.

Library Staff Response Rate

Table 3: Response Rate for Library Staff

Response Category	Number	Percentage (%)
Questionnaires Distributed	148	100.00
Questionnaires Returned	127	85.81
Questionnaires Not Returned	21	14.19
Non-usable Questionnaires	5	3.38
Usable Questionnaires	122	82.43

Source: Researcher (2026).

Out of the 148 questionnaires distributed to library staff, 127 (85.81%) were returned. Five of the returned questionnaires were incomplete and were excluded from the analysis, resulting in 122 usable questionnaires, representing an effective response rate of 82.43 per cent. The high response rate may be attributed to the relevance of the study topic and consistent follow-up with respondents during the data collection period.

Active Postgraduate Students Response Rate

Table 4: Response Rate for Active Postgraduate Students

Response Category	Number	Percentage (%)
Questionnaires Distributed	80	100.00
Questionnaires Returned	67	83.75
Questionnaires Not Returned	13	16.25
Non-usable Questionnaires	2	2.50
Usable Questionnaires	65	81.25

Source: Researcher (2026).

A total of 80 questionnaires were distributed to active postgraduate students. Of these, 67 questionnaires (83.75%) were returned, while 13 questionnaires (16.25%) were not returned. Following data screening, 2 questionnaires (2.50%) were excluded because they were incomplete, leaving 65 usable questionnaires, representing an effective response rate of 81.25 per cent. This response rate was considered adequate for reliable quantitative analysis.

Key Informant Interview Response Rate

Table 5: Interview Response Rate

Interview Category	Target	Successful Interviews	Percentage (%)
Key Informant Interviews	9	7	77.78

Source: Researcher (2026)

The qualitative component targeted nine key informants, comprising university librarians, ICT personnel, and systems librarians from the participating universities. Of these, seven interviews (77.78%) were successfully conducted. The achieved interview response rate was considered satisfactory because it provided sufficient qualitative data to explain, corroborate, and enrich the quantitative findings. The qualitative evidence further enhanced the credibility of the study through methodological triangulation.

Factors Influencing the Integration of Artificial Intelligence in Academic Libraries in Kenya

The study sought to determine the factors influencing the integration of Artificial Intelligence (AI) in academic libraries in Kenya. Quantitative data were collected from 122 library staff and 65 active postgraduate students, while qualitative data were obtained through interviews with seven key informants, comprising university librarians, ICT personnel, and systems librarians. The qualitative findings are presented alongside the quantitative results to explain and enrich the survey findings, consistent with the explanatory sequential mixed-methods design adopted in the study.

Quantitative Findings

Table 6: Factors Influencing the Integration of Artificial Intelligence in Academic Libraries

Factors	Library Staff (n=122) Mean (SD)	Postgraduate Students (n=65) Mean (SD)	Interpretation
Staff competency	4.35 (0.667)	4.18 (0.756)	High
ICT infrastructure	4.31 (0.733)	4.35 (0.689)	High
Management support	4.31 (0.825)	4.31 (0.721)	High
Institutional policies	3.85 (0.961)	4.05 (0.802)	High
Funding/Cost of AI integration	—	4.28 (0.741)	High
Overall Mean	4.13	4.23	High

Source: Researcher (2026)

Table 6 presents respondents' perceptions regarding the factors influencing the integration of Artificial Intelligence in academic libraries in Kenya. Overall, both library staff and postgraduate students reported high levels of agreement that staff competency, ICT infrastructure, management support, institutional policies and adequate funding are critical determinants of successful AI integration. The overall mean scores of 4.13 for library staff and 4.23 for postgraduate students indicate positive perceptions towards institutional readiness for AI adoption.

Among library staff, the highest mean score was recorded for staff competency ($M = 4.35$, $SD = 0.667$), suggesting that respondents considered librarians sufficiently knowledgeable to support AI implementation. This was closely followed by management support and the availability of relevant ICT infrastructure, both recording mean scores of 4.31. However, institutional policy received the lowest rating ($M = 3.85$, $SD = 0.961$), indicating that although respondents generally agreed that supportive ICT policies facilitate AI adoption, experiences regarding policy implementation differed across institutions.

Similarly, postgraduate students identified ICT infrastructure as the most important determinant of AI integration ($M = 4.35$, $SD = 0.689$), followed closely by management support ($M = 4.31$, $SD = 0.721$) and adequate funding ($M = 4.28$, $SD = 0.741$). Staff technical competency ($M = 4.18$, $SD = 0.756$) and institutional policies ($M = 4.05$, $SD = 0.802$) were also rated highly, demonstrating that students perceived both technological and organisational factors as essential for successful AI implementation.

Overall, the findings reveal strong convergence between library staff and postgraduate students regarding the importance of organisational commitment, technological capacity and human resource capability in promoting AI integration within academic libraries.

Qualitative Findings

Staff Competency

Interview participants consistently emphasised that staff competency is fundamental to successful AI integration. Respondents observed that although AI technologies offer significant opportunities for improving library services, their successful implementation depends on librarians possessing adequate technical knowledge and receiving continuous professional development.

One systems librarian stated:

"Management should create an environment where staff feel comfortable experimenting with new technologies and exploring innovative uses of AI."

The respondents further explained that continuous capacity building enhances librarians' confidence in adopting emerging technologies and promotes innovation in library service delivery.

ICT Infrastructure

Participants unanimously indicated that robust ICT infrastructure provides the technological foundation necessary for AI implementation. They noted that inadequate internet connectivity, obsolete computer systems and limited digital infrastructure constrain AI adoption.

One university librarian observed:

"The university management should prioritize and ensure adequate funding, staffing and technological infrastructure are adequately available for successful AI implementation."

These responses demonstrate that technological infrastructure cannot be considered independently from financial investment and institutional commitment.

Institutional Policies

Respondents emphasised that supportive institutional policies provide clear guidance for AI implementation while promoting ethical and responsible use of emerging technologies.

One university librarian explained:

"Friendly ICT and related technology policies play a crucial role in supporting the integration of AI in academic libraries by providing a supportive framework for adoption, ensuring responsible use, and fostering a culture of innovation."

Interviewees further noted that institutional policies facilitate staff training, user awareness, ethical AI use and long-term sustainability of AI initiatives.

Management Support and Funding

Management support and financial investment emerged as critical enabling factors for AI integration. Participants explained that university management determines budget allocation, technology acquisition and staff development initiatives.

One university librarian stated:

"AI integration in libraries relies heavily on funding for acquiring and implementing technology, training staff and ensuring sustainable operation."

Similarly, a systems librarian observed:

"Without sufficient funds, libraries may struggle to adopt AI solutions, limiting their ability to improve services and remain relevant in the digital age."

These responses demonstrate that financial resources directly influence the acquisition, implementation and sustainability of AI technologies.

Integration of Quantitative and Qualitative Findings

The qualitative findings corroborated and expanded the quantitative results by explaining why respondents considered ICT infrastructure, staff competency, institutional policies, management support and funding as critical determinants of AI integration. While the survey findings established the relative importance of these factors through consistently high mean scores, the interview findings provided practical explanations of how each factor influences AI implementation within academic libraries.

For example, quantitative findings identified staff competency as one of the highest-rated factors among library staff ($M = 4.35$), while interview participants explained that continuous professional development enables librarians to confidently adopt emerging AI technologies. Likewise, the high ratings assigned to ICT infrastructure by both respondent groups were reinforced by interview evidence highlighting the importance of reliable technological systems for effective AI implementation. Interviewees also explained that management support influences strategic planning, resource allocation and staff motivation, thereby creating an enabling environment for AI adoption. Furthermore, respondents linked institutional policies with ethical AI implementation and sustainable innovation, while emphasising that adequate funding supports technology acquisition, infrastructure development and staff training.

The convergence of quantitative and qualitative findings therefore demonstrates that successful AI integration requires coordinated investment in technological infrastructure, human capacity development, supportive institutional policies, management commitment and sustainable financial resources. The consistency between the two data strands enhances the credibility of the findings through methodological triangulation.

Discussion

The findings indicate that AI integration in Kenyan academic libraries is influenced by a combination of technological, organisational and human factors. The prominence of ICT infrastructure, management support and staff competency supports the Technology Acceptance Model (TAM), which posits that users are more likely to adopt new technologies when organisational conditions facilitate perceptions of usefulness and ease of use (Davis, 1989; Venkatesh & Davis, 2000). Adequate infrastructure and management support create an enabling environment that enhances users' willingness to adopt AI technologies, while competent staff improve confidence in their effective utilisation.

The findings are consistent with Asemi et al. (2021), who emphasised that the transformation of traditional academic libraries into intelligent information environments requires appropriate technological infrastructure, including digital systems, connectivity, and platforms capable of supporting AI-driven information services. They also support Cox et al. (2019), who identified organisational readiness, management commitment and technological capacity as essential prerequisites for AI adoption in libraries. Similarly, Lund and Wang (2023) observed that successful implementation of AI applications depends on institutional investment in technological infrastructure and human resource development. Furthermore, the findings corroborate Bouchetara et al. (2024), who emphasised that effective AI implementation requires supportive policies, ethical governance frameworks and adequate institutional resources to maximise the benefits of AI technologies in academic libraries.

Collectively, these findings suggest that successful AI integration extends beyond the acquisition of technology and requires a holistic institutional approach that combines strategic leadership, adequate funding, competent personnel, supportive policy frameworks and modern ICT infrastructure. This integrated perspective provides empirical evidence on the factors shaping AI adoption in Kenyan academic libraries and contributes to the growing body of literature on digital transformation in higher education institutions.

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusion: The study concluded that the successful integration of Artificial Intelligence (AI) in academic libraries in Kenya is influenced by a combination of organisational, technological, human, and financial factors. Findings from both the quantitative and qualitative strands consistently demonstrated that staff competency, ICT infrastructure, management support, institutional policies, and adequate funding are fundamental enablers of AI integration in the provision of information services. The convergence of evidence from library staff, postgraduate students, and key informants strengthened the validity of these findings and underscored the interdependent nature of these factors.

The study established that competent library personnel are critical to the effective implementation and utilisation of AI technologies. Continuous staff training and professional development enhance librarians' capacity to adopt emerging AI applications and improve service delivery. Similarly, adequate ICT infrastructure, including reliable internet connectivity, modern computing facilities, and AI-compatible systems, was found to provide the technological foundation necessary for successful AI implementation. Without appropriate infrastructure, libraries are unlikely to realise the full benefits of AI technologies.

The findings further revealed that management support plays a strategic role in facilitating AI integration through policy formulation, resource allocation, staff motivation, and institutional commitment. Closely linked to management support is the availability of adequate financial resources, which enable the acquisition, implementation, maintenance, and continuous upgrading of AI technologies. Supportive institutional policies were also found to promote responsible AI adoption by providing governance frameworks that address ethical considerations, staff capacity development, and sustainable implementation.

Overall, the study concludes that AI integration in Kenyan academic libraries cannot be achieved through technological investment alone. Rather, it requires a holistic institutional approach that combines strong leadership, adequate funding, robust ICT infrastructure, skilled human resources, and supportive policy frameworks. These factors collectively create an enabling environment that enhances the adoption and sustainable use of AI technologies in academic library services. The study therefore contributes empirical evidence on the determinants of AI integration in Kenyan academic libraries and provides a basis for informed policy formulation and strategic planning aimed at accelerating digital transformation in higher education libraries.

Recommendations: Based on the study findings, the following recommendations are made to enhance the successful integration and sustainable utilisation of Artificial Intelligence (AI) in academic libraries in Kenya.

The study recommends that universities should prioritise investment in modern ICT infrastructure to support AI-enabled library services. This should include upgrading computer systems, improving internet connectivity and bandwidth capacity, adopting AI-compatible library management systems, and ensuring reliable digital platforms for information access. Since ICT infrastructure was identified by both library staff and postgraduate students as a major determinant of AI integration, academic institutions should develop long-term ICT investment plans that align with emerging AI technologies and digital transformation goals.

As well, the study recommends that university libraries should establish continuous professional development programmes focused on AI literacy, data management, machine learning applications, natural language processing, and ethical use of AI technologies. Library staff should be provided with opportunities for workshops, certifications, collaborations with ICT departments, and practical exposure to AI-enabled systems. Since staff competency was among the highly rated factors influencing AI integration, developing librarians' technical capabilities will enhance their confidence and effectiveness in adopting and managing AI-driven services.

Finally, the university management should demonstrate stronger commitment towards AI adoption by incorporating AI integration into institutional strategic plans and allocating sufficient resources for implementation. Management should support innovation by creating an environment that encourages experimentation, collaboration, and acceptance of emerging technologies among library personnel. Since management support was consistently identified by respondents as a key factor influencing AI integration, sustained leadership involvement is necessary for successful implementation.

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