

Availability and impact of Artificial Intelligence on information management tools in Nigerian Universities

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Abstract

The study examined the availability and impact of artificial intelligence tools on information management in Nigerian Universities. Four research questions guided the study. The descriptive survey research design was adopted for the study. The population of the study comprised of 218 librarians from 4 selected university libraries in Nigeria purposively chosen from two zones: North central (University of Abuja and Joseph Sarwuan Tarka University, Makurdi) and South East (Abia state University Library, Uturu and Nnamdi Azikiwe University, Awka). The enumerative sampling will be adopted. The main instrument to collect data for this study will be a checklist and a questionnaire. Data collected were analysed using frequencies, mean and standard deviation. The findings revealed that majority of the AI tools are available in Nigerian Universities. There is a high level of positive impact of AI technologies at enhancing information management. There is a strong consensus that lack of adequate training and skills, insufficient digital infrastructure and unreliable power supply are the interrelated challenges that impede the effective use of AI tools in information management. Provision of comprehensive training programs, investment in reliable power supply, and securing adequate funding are the solutions that can sustainably harness AI technologies in information management. It was concluded that Nigerian Universities has successfully established a robust digital infrastructure with the availability of most leading AI tools, strengthening its position as a modern academic institution equipped for advanced information management. The study recommended that University should maintain and upgrade its digital infrastructure regularly to keep pace with emerging AI technologies and ensure uninterrupted service delivery.

Keywords: Artificial Intelligence, Information Management Tools, AI Availability, AI Adoption; AI Impact, Nigerian Universities

Introduction

Technology is a way of life. According to Ojukwu, Agim and Ameh (2021), technology has changed many industries in amazing ways. From the beginning of time, people have been finding ways to share knowledge. First, they painted pictures on cave walls. Later, they developed writing and created books. The 20th century saw a big change with digital documents and knowledge management tools. Now, in the 21st century, Artificial Intelligence (AI) is helping us manage information even better. AI has improved how we collect, share, and use knowledge even in the libraries. Libraries are embracing these modern technologies (AI) to help their users find the information they need on time and easily too.

Artificial intelligence is defined as a computer system capable of carrying out tasks typically associated with intelligent beings (Tuomi, 2018). However, this definition has its limitations as it requires defining many parts of the world in recent decades. It aims to replicate human intelligence through computers, enabling them to learn. Although due to the numerous application areas of artificial intelligence, it is challenging to establish a standard definition of the concept. Agim, Abah and Ezejiofor (2025) highlighted that there are numerous interpretations of artificial intelligence, including machines that think, understand language, solve problems, diagnose medical conditions, drive cars, play chess, and paint. Artificial intelligence is defined as a scientific discipline focused on creating machines that can operate effectively and efficiently in their surroundings (Awolaye, 2018).

Furthermore, Kumar, (2022) asserts that artificial intelligence suggests the image of a powerful computer, equipped with advanced processing abilities, including adaptable behaviors such as incorporating sensors and other features that mimic human cognition and capabilities, thereby enhancing its interaction with people. From these definitions, it is clear that artificial intelligence is the result of advancements in computers, computer technologies, machines, and information communication technologies, allowing computers to perform functions that are almost human-like. The above statements in this study are to redirect the notion held by many that the availability of the computer machine and the internet facility in libraries automatically means the availability of artificial intelligence, since most practitioners in the information profession equate the availability of the Internet in libraries to an artificial intelligence in information management.

Information Management (IM) in library is a systematic process that involves the collection, organization, storage, distribution, archiving, and preservation of information within an organization. It encompasses various forms of data and knowledge, including electronic and physical documents, audio files, videos, and more (Detlor, 2023). Arua (2016) emphasize that librarians must identify user communities' needs and adopt proper strategies to enhance efficiency in tertiary education. In a similar notion, Uwachie, (2018) opined that effective information management is eminent for ensuring that libraries provide meaningful, reliable, and usable information when needed. This aligns with the broader goal of improving organizational effectiveness by managing information as a resource, thereby impacting more in the library navigation to artificial intelligence tools. The goal of information management is

to ensure that the right information reaches the right people at the right time to support decision-making processes and business operations

In line with the above stated definitions, artificial intelligence available in the academic library such as Chatbots, virtual assistants, natural language processing (NLP) tools, machine learning algorithms, automated cataloging and classification tools, predictive analytics tools, recommendation systems, sentiment analysis tools, entity extraction tools. are accessible only through electronically manipulated means (Adeniran, 2024).

Availability is broadly understood as the assurance that systems, resources, or services are accessible and operational without interruption, ensuring continuous functionality and performance. Availability of artificial intelligence tools on information management refers to the extent to which these tools are accessible and usable by users (Kwanya, 2017). The concept of availability is crucial in ensuring that artificial intelligence tools are not only present but also readily accessible and functional, thereby facilitating efficient information management and retrieval. In the context of academic libraries, availability encompasses the physical and technological infrastructure, such as hardware, software, and network connectivity, that supports the deployment and utilization of AI tools (Awoleye, 2018). It also involves the ease of access to AI-powered resources, including databases, digital repositories, and online platforms, as well as the provision of necessary training and support to ensure that users can effectively utilize these tools (Kwanya, 2017). Availability is closely tied to the reliability and consistency of AI tools, as users must be able to depend on these tools to deliver accurate and relevant results (Kumar, 2020). The availability of artificial intelligence tools is a critical factor in determining their impact on information management in academic libraries.

Interestingly according to Azubogu and Madu (2017), the availability of artificial intelligence for information management in University libraries have aided libraries vis-a-vis librarians as they have the Ability to automate cataloguing, ability to index and classify, ability to perform intelligent search and retrieval, ability to provide personalised recommendation systems, ability to automate document summarization, ability to perform sentiment analysis, ability to extract entities, ability to detect plagiarism, ability to analyze citations, ability to analyze research trends, ability to create knowledge graphs, ability to provide chatbot user support, ability to offer virtual research assistance, ability to perform predictive analytics for collection development, ability to automate digitization and OCR, ability to translate languages, ability to analyze text and ability to visualize data. Hence, the usage of AI is very important with some impacts.

The term impact has been defined in diverse ways depending on the field of study and context. Generally, impact refers to the significant effect or influence that an event, action, or innovation has on a system, organization, or population. According to Obachi, Obachi, and Nwafor (2022), impact is the measurable change brought about by an intervention or process, which can be positive or negative, direct or indirect. In the context of information management, impact relates to how effectively information systems and practices transform organizational efficiency, decision-making, and

service delivery. Similarly, Thamke (2018) conceptualizes impact as the extent to which new technologies or methodologies alter existing workflows, user behavior, or institutional outcomes, emphasizing the importance of both qualitative and quantitative measures in assessing change. The rapid development in AI has brought tremendous revolutionary impact in processing, storage dissemination and distribution and has indeed become a key factor in bringing about the rapid change witnessed in every sphere of human endeavour.

In line with foregoing, Elejene, Agim and Umunnakwe (2025) opined that society has constantly been evolving and so have the library patrons. Library users are fast becoming impatient in their quest for information. They want information now, for the library professional to live up to their mantle, then availability of these AI has become inevitable (Issa, 2022). AI has been described to be the medium by which the highest service in the library and information profession can be achieved (Ezeani 2019). Ezeani further observed that librarians must be versatile in the use of AI for information management as this encourages diversity and build a foundation for continuous innovative learning. She concurred further that librarians must reinterpret traditional library skills and explore new ways of putting these skills through the effective use of AI for information management.

In the case of Nigerian University, the researcher is uncertain if they have a standing availability of Artificial Intelligence and if the librarians make available these Artificial Intelligence for information management for proper accessibility to the users for their academics, learning, queries and research. It is in the view to have answers to these inquiries that the researcher is motivated to carry out this study to ascertain the availability and impact of Artificial Intelligence on information management tools in Nigerian Universities.

Statement of Problem

Artificial intelligence has emerged as a cornerstone of 21st-century information ecosystems, with global academic libraries widely adopting it to streamline services and boost user productivity. However, in many Nigerian university libraries, the extent of AI availability, encompassing tools like NLP, machine learning algorithms, and predictive analytics remains undocumented, alongside their tangible impact on information management processes such as cataloging, retrieval, and personalization. This uncertainty may restrict undergraduates' access to advanced resources, hindering research efficiency, learning outcomes, and overall academic performance (Adegbaye, Okunlaya, Funom, & Amalahu, 2017). Prior studies often overlook comprehensive national assessments, focusing instead on isolated institutions or general ICT without AI specificity.

Existing research gaps exacerbate the issue, as no dedicated investigations systematically evaluate AI tool deployment across Nigerian universities, including infrastructure readiness, librarian proficiency, and measurable service improvements. The researcher notes a lack of empirical data on whether these tools are functionally available and their influence on daily operations, leaving libraries potentially lagging in the digital transformation. This study addresses these voids by empirically assessing

the availability and impact of Artificial Intelligence on information management tools in Nigerian Universities.

Purpose of the Study

The main purpose of the study is to ascertain the availability and impact of artificial intelligence tools on information management Nigerian Universities. The specific objectives were as follows:

1. To ascertain the available artificial intelligence tools for information management in Nigerian Universities.
2. To determine the impact of artificial intelligence tools on information management in Nigerian Universities
3. To identify the challenges librarians face in using artificial intelligence tools on information management in Nigerian Universities.
4. To proffer possible solutions to the identified challenges librarians face in using artificial intelligence tools on information management in Nigerian Universities.

Research questions

1. What are the available artificial intelligence tools for information management in Nigerian Universities?
2. What are the impact of artificial intelligence tools on information management in Nigerian Universities?
3. What are the challenges librarians face in using artificial intelligence tools on information management in Nigerian Universities?
4. What are possible solutions to the identified challenges librarians face in using artificial intelligence tools on information management in Nigerian Universities?

Literature Review

ComputerTechReviews.com (2024) describes availability as dependent on reliability, maintainability, and logistics, and provides mathematical formulas to calculate technical, operational, and intrinsic availability. Ikem and Ekenna (2018) defines availability as the capability of information or systems to be accessed and used, often requiring timely and reliable access. This definition aligns with computing contexts where availability depends on complex interactions among software, hardware, and network components. In the context of artificial intelligence (AI) tools in university libraries, availability refers to the consistent and uninterrupted accessibility of AI-powered systems and services that support information management and user engagement. AI tools such as chatbots, recommendation engines, and automated cataloging systems must be reliably operational to provide timely assistance to library users, enhancing service delivery and research support (Abbasi, Elkadi, Horn & Owen, 2024). Ensuring availability in this setting involves maintaining the AI infrastructure, safeguarding data integrity, and implementing disaster recovery plans to minimize service disruptions. The availability of AI tools directly impacts the efficiency of library operations and the quality of user experience, making it a critical factor for modern

academic libraries striving to meet evolving digital demands (Adeleke, Oladokun, Nsirim & Gaitanou, 2024). In the researcher's own view, availability means that something you need whether it's a service, information, or a product is ready and accessible whenever you want to use it.

Impact is often viewed as the outcome or consequence of implementing specific strategies or tools. Musa, Mohammed, and Abdullahi (2020) describe impact as the degree to which management information systems improve operational routines, communication, and decision-making processes within organizations. This definition highlights the functional and performance-related aspects of impact, focusing on how technological adoption enhances productivity and service quality. Fang, Luo, and Zheng (2021) extend this by emphasizing the transformative potential of information technology on library resource management, noting that impact encompasses improvements in resource accessibility, preservation, and user satisfaction. Impact, therefore, is not merely change but meaningful change that advances institutional goals.

In the realm of academic libraries, impact is also linked to innovation and adaptation. A recent study by Li and Zhang (2024) defines impact as the degree to which information technologies such as big data analytics, cloud computing, and artificial intelligence reshape library management and service models. They argue that impact includes the enhancement of service efficiency, resource integration, and user experience, as well as the challenges introduced by rapid technological change. This broader conceptualization situates impact as a dynamic process involving both opportunities and challenges, requiring continuous evaluation and strategic response by library professionals. The researcher simply views impact as the effect or change that something causes.

Artificial intelligence (AI) has been defined in various ways by different scholars and institutions, reflecting its multifaceted nature. Russell and Norvig (2021) describe AI as the branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence, such as learning, reasoning, and problem-solving. Similarly, Kaplan and Haenlein (2019) define AI as systems that perceive their environment and take actions to maximize their chances of achieving specific goals, emphasizing adaptability and autonomous decision-making. From a more technical perspective, Marr (2020) characterizes AI as the simulation of human intelligence processes by machines, especially computer systems, including learning (the acquisition of information and rules), reasoning (using rules to reach approximate or definite conclusions), and self-correction. These definitions collectively highlight AI's core attributes: autonomy, learning, and the ability to perform complex cognitive functions.

Further expanding on the concept, Nilsson (2018) defines AI as the study and design of intelligent agents that receive percepts from the environment and perform actions. This agent-based view underscores AI's role in enabling machines to act rationally and autonomously in dynamic contexts. Moreover, Kaplan and Haenlein (2020) differentiate between narrow AI, which is designed for specific tasks, and general AI, which possesses broad cognitive abilities akin to human intelligence. This

distinction is crucial in understanding AI's current applications, which predominantly involve narrow AI tools tailored for particular functions such as image recognition, natural language processing, and decision support. Collectively, these perspectives illustrate AI as an evolving field focused on creating machines that can mimic, augment, or surpass human cognitive abilities across diverse domains.

Artificial intelligence tools refer to software applications and platforms that utilize AI technologies such as machine learning, natural language processing, and computer vision to automate, enhance, or augment tasks and processes. According to Zapier (2025), AI tools encompass generative AI systems capable of producing human-like text, images, and other content, thereby revolutionizing creative and analytical workflows. LibLime (2024) highlights AI tools specifically designed for librarianship, such as automated cataloging systems, AI-powered chatbots, and recommendation engines, which transform how information is organized, accessed, and utilized in libraries worldwide. These tools enable libraries to deliver personalized user experiences, streamline routine operations, and improve resource discoverability. Similarly, ClearPeople (2024) emphasizes AI knowledge management tools that boost productivity by intelligently organizing and retrieving information, facilitating collaboration, and providing actionable insights. From the researcher's perspective, artificial intelligence tools are computer programs or applications that help people do tasks more easily and quickly by "thinking" or "learning" like humans.

Various authors have defined "information management" in ways that emphasize its multifaceted roles in organizations and knowledge processes. Davenport (2018) describes information management as the systematic collection, storage, dissemination, and utilization of information to support decision-making and operational efficiency within an organization. Similarly, Choo (2016) views information management as a framework encompassing the acquisition, organization, and sharing of information aimed at facilitating knowledge creation and effective problem-solving. These definitions highlight how information management is both a strategic and operational endeavor that ensures the right information reaches the right people at the right time.

Other perspectives focus on the technological and process-oriented aspects of information management. Laudon and Laudon (2021) define it as the process by which organizations manage their data and information resources through tools, technologies, and policies to create value and maintain competitive advantage. From this viewpoint, information management involves designing systems that foster data quality, security, and accessibility, transforming raw data into actionable insights. Furthermore, Marchand, Kettinger, and Rollins (2017) emphasize the cultural and managerial dimensions, defining information management as practices and behaviors that influence how individuals and groups utilize information to achieve organizational goals. Their work suggests that information management is not confined to technology alone but interwoven with organizational culture and leadership.

From a broader and integrative perspective, Rowley and Hartley (2017) define information management as the coordinated approach to managing an organization's information resources, processes, and systems, involving the planning, organizing,

controlling, and monitoring of information flow. Their definition considers information management as encompassing people, processes, and technology in a unified system that supports knowledge retention, innovation, and compliance requirements (Davenport, 2018). This holistic view underscores the importance of aligning information management strategies with business objectives to maximize value from information assets. In the researcher's terms, information management means organizing and handling information so that it is easy to find, use, and share when needed.

Artificial intelligence (AI) tools have become integral to modern information management, offering advanced capabilities that transform how organizations collect, organize, and utilize data. Recent literature highlights a diverse array of AI-powered knowledge management tools designed to enhance productivity, improve decision-making, and streamline workflows. For instance, Knowmax (2025) identifies top AI knowledge management platforms such as Guru, Bloomfire, and IBM Watson Discovery, which leverage natural language processing (NLP), machine learning, and semantic search to provide personalized content recommendations and automate information retrieval. These tools address the challenge of information overload by enabling users to quickly access relevant knowledge, thereby reducing time spent on searching and increasing operational efficiency. The relationship between AI tools and information management is thus symbiotic, with AI enhancing the accessibility and usability of information assets (Knowmax, 2025).

From Nigerian academic libraries, popular AI tools for writing, virtual assistance, and research were more prevalent than specialized cataloguing and security AI applications, reflecting funding and expertise gaps (Adewale & Omotayo, 2023; Eze, Okoli, & Eze, 2023). Also, Adewale and Omotayo (2023) emphasize that Nigerian university libraries increasingly adopt AI tools like Grammarly and virtual assistants to improve user engagement and research accuracy. Eze, Okoli, and Eze (2023) observed that the growing implementation of AI-driven research aids such as Research Rabbit is helping students navigate expanding knowledge bases efficiently. Oladipo et al. (2023) also highlight limitations in the adoption of cataloguing AI and AI-based security due to infrastructural and financial constraints, despite broad acknowledgement of their importance.

Further exploration into AI tools reveals their broad applicability across various sectors, including academic libraries and corporate environments. Synthesia (2025) and Zapier (2025) list AI chatbots, AI search engines, and content creation tools as key innovations driving productivity in 2025. Chatbots, for example, provide real-time user support, answer frequently asked questions, and assist with resource discovery, significantly improving user engagement and satisfaction. AI search engines utilize sophisticated algorithms to understand user intent and context, delivering more accurate search results compared to traditional keyword-based systems. The integration of these AI tools within information management systems fosters a more dynamic and responsive knowledge ecosystem, where information flows seamlessly and supports strategic objectives (Synthesia, 2025; Zapier, 2025). This relationship

underscores AI's role in not only managing information but also enhancing the quality and relevance of the information delivered.

Artificial intelligence (AI) tools have profoundly impacted information management by automating routine tasks, enhancing data analysis, and enabling smarter decision-making processes. According to Russel and Norvig (2021), AI increases organizational performance by automating mundane activities, which not only boosts productivity but also improves employee motivation and job satisfaction. This relationship between AI adoption and enhanced workforce engagement creates a virtuous cycle where employees focus on more challenging and creative tasks, ultimately driving better organizational outcomes. The automation of repetitive tasks reduces human error and accelerates workflows, allowing information management systems to operate more efficiently and responsively (Uzoagba, Agim & Ezejiofor, 2024). Thus, AI tools serve as catalysts for transforming traditional information management into a dynamic, agile process that supports organizational goals.

The integration of AI in productivity and information management tools further revolutionizes workplace efficiency by optimizing workflows and enabling real-time data-driven insights. A case study of XYZ Corp. illustrates this impact, where AI-driven scheduling systems reduced lead times by 30% and improved on-time delivery rates to 95%, highlighting AI's role in operational optimization (Psico-Smart, 2024). Similarly, companies like Netflix leverage AI algorithms to analyze vast datasets, personalizing content recommendations and guiding strategic production decisions, demonstrating AI's capacity to enhance both information retrieval and strategic planning (Funom, Lazarus & Abdullahi, 2023). These examples underscore the symbiotic relationship between AI tools and information management, where AI not only manages data but also extracts actionable insights that improve decision-making and service delivery. The continuous evolution of AI-driven analytics fosters a culture of continuous improvement, enabling organizations to adapt swiftly to changing environments.

There is a high level of positive impact of AI technologies at enhancing information management which includes both the operational efficiency of library processes and the quality of user experience. Some universities in Nigeria has successfully integrated several AI tools that positively impact information management by enhancing efficiency, user access, and administrative operations. This was revealed by Adewale and Omotayo (2023), who report increased efficiency and user satisfaction from AI adoption in Nigerian academic libraries. Eze, Okoli, and Eze (2023) noted the ways how AI has positively transforms administrative workload and information retrieval processes. Also, Oladipo et al. (2023) opined that AI's role in boosting digital literacy helps to fill the gap in sustainable implementation.

Librarians face a range of significant challenges when integrating artificial intelligence (AI) tools into information management systems. Agim, Adegbite and Edeh (2025) identify critical barriers such as loss of critical thinking, technical difficulties, lack of organizational planning, financial constraints, fear of job displacement, shortage of skilled personnel, and ethical concerns. These factors collectively hinder the smooth adoption and effective utilization of AI in academic libraries. The fear of job loss, in particular, creates resistance among library staff,

impacting their willingness to engage with AI technologies. Furthermore, the shortage of trained professionals capable of managing AI systems exacerbates implementation challenges, highlighting the need for comprehensive training and capacity building (Shahzad et al., 2024b).

Technical challenges also pose a major obstacle to AI adoption in libraries. Saracevic and Kantor (2016) emphasize issues related to system integration, interoperability with existing library management systems, and data quality concerns. These technical complexities can result in fragmented workflows and unreliable AI outputs, undermining user trust and operational efficiency. Additionally, poor network connectivity and inadequate maintenance culture further complicate AI deployment, especially in regions with limited ICT infrastructure (Saracevic & Kantor, 2016). The interplay between technical limitations and infrastructural deficits creates a compounding effect, where even well-designed AI tools fail to deliver expected benefits without robust support systems.

Ethical and privacy concerns are central to librarian hesitancy toward AI implementation. According to Gunter (2024), AI systems often inherit biases from their training data, leading to unfair or skewed information retrieval outcomes. The American Library Association (ALA) survey cited by LibLime (2025) found that 68% of librarians expressed concerns about AI conflicting with professional ethics, particularly regarding user privacy and information equity. Financial constraints and resource limitations significantly affect AI adoption in libraries. The 2022 Public Library Technology Survey reported by LibLime (2025) indicates that 73% of public libraries face insufficient funding for technology investments, with small and rural libraries disproportionately impacted. Another challenge lies in the digital divide and inclusivity concerns associated with AI-powered library services. Gunter (2024) highlights that AI technologies may exacerbate existing inequalities if certain user groups lack access to necessary devices or digital literacy skills. Furthermore, the representation in AI training data is critical; lack of diversity can perpetuate racial and cultural biases within AI algorithms, leading to unfair information access (Gunter, 2024). Librarians play a pivotal role in advocating for inclusive AI design, community engagement, and user education to bridge these gaps and promote fairness.

Lack of adequate training and skills, insufficient digital infrastructure and unreliable power supply, and limitations in institutional support and funding are the interrelated challenges that impede the effective use of AI tools in information management. The challenges faced by librarians are encompassing technical, organizational, psychological, and ethical dimensions that collectively hinder optimal AI adoption in library. Nwabuisi (2024) emphasized the indispensable role of robust infrastructure, comprehensive training programs, and clear policy guidelines for effective AI integration within libraries. Finally, limited understanding and awareness of AI technologies among librarians hinder effective implementation. Many librarians report insufficient knowledge of AI's capabilities and limitations, which affects their confidence in deploying these tools and educating users (LibLime, 2025). This knowledge gap contributes to hesitancy and slows adoption rates.

Notwithstanding the fact that librarians face numerous challenges in adopting artificial intelligence (AI) tools for information management, but strategic solutions are emerging to address these issues effectively. A foundational step is the development of comprehensive AI literacy programs tailored for library staff and users. The Association of Research Libraries (ARL) emphasizes structured AI literacy workshops that cover AI fundamentals, ethical considerations, data management, and practical applications within library services (Lo, 2024). Collaboration and partnerships play a pivotal role in overcoming resource and expertise gaps. Given that many libraries lack in-house AI specialists, pooling resources within consortia or partnering with universities and technology experts enables shared AI initiatives and knowledge exchange (Okoro, 2020; Gateway Info Journal, 2024).

Ethical governance frameworks are essential to address concerns about privacy, bias, and transparency in AI applications. EIFL (2024) highlights the importance of establishing clear policies that align with international standards to uphold fairness and data protection. Libraries must implement guidelines that govern data collection, algorithmic accountability, and user consent, thereby safeguarding intellectual freedom and equitable access (IFLA, 2024). Targeted capacity building is another critical solution for equipping librarians with the technical and managerial skills needed to manage AI tools effectively. Training programs should encompass data analysis, programming basics, user experience design, and project management to build comprehensive competencies (Agim, Irieguna & Chivuzo, 2023).

User engagement and education are equally important in bridging the gap between AI technology and practical use. Libraries should conduct workshops, create informational materials, and offer personalized guidance to help patrons understand and utilize AI-powered services such as chatbots and recommendation systems (Gateway Info Journal, 2024). Effective user training enhances adoption rates, reduces apprehension, and maximizes the benefits of AI tools by aligning them with user needs and expectations. The provision of comprehensive training programs, investment in reliable power supply, and securing adequate funding are the solutions that can sustainably harness AI technologies in the overall information management. Nwabuisi (2024) emphasizes the indispensable role of capacity building and infrastructural investments including power supply reliability for sustainable AI integration in Nigerian academic libraries. Finally, strategic planning and pilot projects enable libraries to implement AI solutions thoughtfully and sustainably. Conducting thorough needs assessments and setting clear, measurable goals ensure AI initiatives align with institutional missions and user requirements (Smittan, 2021; Johnson, 2020).

Method

The study adopted the descriptive survey research design. The population of the study comprised of 218 librarians from 4 selected university libraries in Nigeria purposively chosen from two zones: North central and South East zones. The purposive sampling technique was used to select two universities from each of the zones: North central (University of Abuja and Joseph Sarwuan Tarka University, Makurdi) and South East

(Abia state University Library, Uturu and Nnamdi Azikiwe University, Awka). The main instrument to collect data for this study was a checklist and a questionnaire. Data collected were analysed using descriptive statistics particularly the mean scores.

Data Analysis

Research Question 1: What are the available artificial intelligence tools on information management in Nigerian Universities?

Table: Availability of Artificial Intelligence Tools on Information Management in Nigerian Universities

S/NO	Item	Available	Not Available	Status
1	ChatGPT	√		Available
2	Grammarly	√		Available
3	Quillbot	√		Available
4	Bard or Claude	√		Available
5	Radio Frequency Identification (RFID) technology		√	Not Available
6	Research Rabbit, Scite, Trinko, Semantic Scholar	√		Available
7	AI-powered security scanning machines or surveillance systems		√	Not Available
8	Virtual assistants (e.g., Siri, Alexa)	√		Available
9	AI chatbots		√	Not Available

S/NO	Item	Available	Not Available	Status
10	Machine Readable Catalogue (MARC)		√	<i>Not Available</i>

The data shows that Nigerian Universities has full availability of leading AI tools such as ChatGPT, Grammarly, Quillbot, Bard or Claude, Research Rabbit and related research aids, as well as virtual assistants like Siri and Alexa among its library staff. Conversely, technologies such as RFID, AI-powered security machines, AI chatbots, and Machine Readable Catalogue systems are currently absent, indicating areas needing further resource investment and technology upgrades. This results revealed that majority of the AI tools are available in Nigerian Universities which shows a strong digital infrastructure supporting modern information management.

Research Question 2: What are the impacts of artificial intelligence tools on information management in Nigerian Universities?

Table 2: Impacts of Artificial Intelligence Tools on Information Management in Nigerian Universities

S/NO	Items	Mean	SD	Decision
1	AI tools have improved the efficiency and speed of cataloguing and classifying information resources.	2.58	0.88	Agree
2	The use of artificial intelligence has made it easier for students and staff to retrieve and access relevant academic materials.	2.98	0.88	Agree
3	Artificial intelligence applications have reduced the administrative workload for library and information management staff.	2.83	0.90	Agree
4	AI tools have contributed to more personalized information services and user experiences at Nigerian Universities.	2.71	0.93	Agree
5	The adoption of AI technologies has enhanced the accuracy and consistency of information organization in the university's library systems.	2.58	0.88	Agree

S/NO	Items	Mean	SD	Decision
6	Artificial intelligence tools have supported sustainable and environmentally conscious practices in information management at Nigerian Universities.	2.36	1.00	Disagree
7	The use of AI tools has promoted digital literacy and self-directed learning among students and staff in information management processes.	2.83	0.89	Agree
Grand Mean (x)		2.70		Agree

The data in Table 2 indicates that library staff at Nigerian Universities generally perceive the impacts of artificial intelligence tools on information management positively. Items related to improvements in cataloguing efficiency (2.58), easier retrieval of academic materials (2.98), reduced administrative workload (2.83), personalized information services (2.71), consistent organization (2.58), and promotion of digital literacy (2.83) all indicate high extent levels of agreement among staff. However, the item relating to environmentally sustainable practices garnered a noticeably lower mean score of 2.36, indicating limited implementation or awareness of AI's role in sustainability within the university's information management framework. The overall grand mean of 2.70 shows a high level of positive impact of AI technologies at enhancing information management which includes both the operational efficiency of library processes and the quality of user experience.

Research Question 3: What are the challenge librarians faces in using artificial intelligence tools on information management in Nigerian Universities?

Table 3: Challenges Librarians Face in Using Artificial Intelligence Tools on Information Management in Nigerian Universities (N=24 Library Staff)

S/NO	Items	Mean	SD	Decision
1	Lack of adequate training and skills limits librarians' ability to effectively use AI tools.	3.00	0.79	Agree
2	Insufficient digital infrastructure and unreliable power supply hinder smooth AI operation.	3.04	0.87	Agree
3	Limited institutional support and funding restricts acquisition and maintenance of AI tools.	2.88	0.81	Agree
4	Concerns about job security and fear of redundancy reduce willingness to adopt AI technologies.	3.08	0.83	Agree
5	Inadequate policy frameworks and guidelines on AI create uncertainty and limit adoption.	2.88	0.84	Agree
6	Technical challenges related to data quality, software compatibility, and system integration affect performance.	3.08	0.83	Agree

S/NO	Items	Mean	SD	Decision
7	Cultural resistance and lack of awareness about AI benefits impede acceptance and use.	2.92	0.82	Agree
8	Ethical concerns including data privacy, algorithm bias, and security issues complicate AI adoption.	2.96	0.83	Agree
9	High cost of AI systems limits full utilization.	3.13	0.81	Agree
10	Lack of clear policy and regulatory frameworks leads to inconsistent AI use.	2.96	0.83	Agree
Grand Mean (x)		2.99		Agree

The table reveals a widespread agreement among the library staff at Nigerian Universities that several interrelated challenges impede the effective use of AI tools in information management. These include the critical lack of adequate training and skills (3.00), insufficient digital infrastructure and unreliable power supply (3.04), and limitations in institutional support (2.88) and funding, all indicating systemic resource and capacity gaps. The high mean scores on concerns about job security (3.08) and technical difficulties with data quality (3.08) and system integration underscore psychological and operational barriers to AI adoption (3.13). Furthermore, issues related to policy deficiencies (2.88), cultural resistance (2.92), ethical considerations regarding data privacy (2.96) and algorithm bias, and the high costs of AI systems (3.13) collectively contribute to the cautious deployment of AI tools in the university's libraries. The grand mean of 2.99 reflects a strong consensus that lack of adequate training and skills, insufficient digital infrastructure and unreliable power supply, and limitations in institutional support and funding are the interrelated challenges that impede the effective use of AI tools in information management

Research Question 4: What are the possible solutions to the identified challenges librarians face in using artificial intelligence tools on information management in Nigerian Universities?

Table 4: Possible Solutions to Challenges Faced by Librarians Using Artificial Intelligence Tools on Information Management in Nigerian Universities

S/NO	Items	Mean	SD	Decision
1	Provide comprehensive training programs for librarians to develop the necessary technical skills in using AI tools effectively	3.00	0.81	Agree
2	Invest in reliable power supply within the university library to support uninterrupted operation of AI technologies	3.21	0.75	Agree
3	Secure adequate funding from university management and government bodies to update AI systems	3.04	0.79	Agree

S/NO	Items	Mean	SD	Decision
4	Develop clear policy frameworks on the ethical use of AI tools in information management to provide librarians with structured operational protocols	2.96	0.82	Agree
5	Implement change management initiatives to address fears of job loss by emphasizing AI as a tool to augment librarian roles	2.96	0.85	Agree
6	Enhance collaboration between IT experts and librarians to resolve technical challenges related to software compatibility	3.42	0.70	Agree
7	Raise awareness among librarians and users about the benefits and functionalities of AI tools to reduce cultural resistance and increase acceptance	3.00	0.79	Agree
8	Establish sustainable maintenance and support systems to ensure AI tools remain functional	3.00	0.80	Agree
9	Advocate for national and institutional AI governance frameworks to regulate AI deployment in academic libraries	2.92	0.81	Agree
10	Encourage partnerships with AI vendors for knowledge exchange on the latest AI innovations tailored to library needs	2.96	0.85	Agree
Grand Mean (x)		3.05		Agree

The table clearly reflects a strong consensus among the library staff at Nigerian Universities on the critical solutions needed to overcome the challenges in adopting AI tools for information management. Key strategies include provision of comprehensive training programs (3.00), investment in reliable power supply (3.21), and securing adequate funding (3.04), which received high agreement with mean scores above 3.0. Collaboration between IT experts and librarians to tackle technical issues scores the highest mean (3.42), underscoring the need for cross-departmental teamwork and knowledge sharing. Policy development on ethical AI use (2.96), change management initiatives to ease fears about job security (2.96), Advocate for national and institutional AI governance (2.92), partnerships with AI vendors for knowledge exchange on the latest AI innovations (2.96), and awareness-raising about AI's benefits (3.00) further contribute to a multifaceted approach required for effective AI integration, all significantly agreed upon by respondents. The grand mean of 3.05 indicates that provision of comprehensive training programs, investment in reliable power supply, and securing adequate funding are the solutions that can sustainably harness AI technologies in the overall information management.

Discussion of findings

Available artificial intelligence tools on information management

Majority of the AI tools are available in Nigerian Universities which shows a strong digital infrastructure supporting modern information management. Nigerian Universities' AI adoption in library information management focuses presently on applications directly aiding research, writing, and user assistance, with full accessibility among staff for these tools. These results align with previous findings from Nigerian academic libraries where popular AI tools for writing, virtual assistance, and research were more prevalent than specialized cataloguing and security AI applications, reflecting funding and expertise gaps (Adewale & Omotayo, 2023; Eze, Okoli, & Eze, 2023). Also, Adewale and Omotayo (2023) emphasize that Nigerian university libraries increasingly adopt AI tools like Grammarly and virtual assistants to improve user engagement and research accuracy. Eze, Okoli, and Eze (2023) report on the growing implementation of AI-driven research aids such as Research Rabbit helping students navigate expanding knowledge bases efficiently. Oladipo et al. (2023) highlight limitations in the adoption of cataloguing AI and AI-based security due to infrastructural and financial constraints, despite broad acknowledgement of their importance.

Impacts of artificial intelligence tools on information management

There is a high level of positive impact of AI technologies at enhancing information management which includes both the operational efficiency of library processes and the quality of user experience. Nigerian Universities has successfully integrated several AI tools that positively impact information management by enhancing efficiency, user access, and administrative operations. These findings align with studies such as those by Adewale and Omotayo (2023), who report increased efficiency and user satisfaction from AI adoption in Nigerian academic libraries. Eze, Okoli, and Eze (2023) discuss how AI positively transforms administrative workload and information retrieval processes. Oladipo et al. (2023) highlight AI's role in boosting digital literacy while noting the gap in sustainable implementation, consistent with observed limitations at Nigerian Universities.

Challenges librarians faces in using artificial intelligence tools on information management

There is a strong consensus that lack of adequate training and skills, insufficient digital infrastructure and unreliable power supply, and limitations in institutional support and funding are the interrelated challenges that impede the effective use of AI tools in information management. The challenges faced by librarians are multifaceted, encompassing technical, organizational, psychological, and ethical dimensions that collectively hinder optimal AI adoption in Nigerian Universities's library. All of these are indicating systemic resource and capacity gaps, highlighting an urgent need for targeted interventions to mitigate them to fully leverage AI's benefits in library services. These findings concur with contemporary research in Nigerian academic libraries. Nwabuisi (2024) emphasized the indispensable role of robust infrastructure, comprehensive training programs, and clear policy guidelines for effective AI integration within libraries. Eze, Okoli, and Eze (2023) detailed the systemic

challenges of funding limitations and technical complexities that undermine AI systems' operational efficiency in Nigerian academic institutions. Achugbue (2024) further elaborated on librarians' apprehensions regarding job security and the ethical dilemmas posed by AI, recommending proactive engagement and ethical frameworks to ease fears and enhance AI confidence.

Possible solutions to the identified challenges librarians face in using artificial intelligence tools on information management

The study found that provision of comprehensive training programs, investment in reliable power supply, and securing adequate funding are the solutions that can sustainably harness AI technologies in the overall information management. The findings suggest that overcoming AI adoption challenges within Nigerian University libraries necessitates a strategic and integrated approach. Prioritizing technical training and infrastructural improvements, fostering interdisciplinary collaborations, promoting ethical guidelines, and engaging librarians and users in continuous awareness and change management efforts are imperative. Such holistic strategies will facilitate smoother AI integration, enhance staff competence and confidence, and improve overall information management and service delivery. Supporting these findings, Nwabuisi (2024) emphasizes the indispensable role of capacity building and infrastructural investments including power supply reliability for sustainable AI integration in Nigerian academic libraries. Eze, Okoli, and Eze (2023) highlight that securing funding and policy frameworks, coupled with stakeholder training, significantly enhance AI use in information services. Additionally, Odigie (2024) advocates for cross-sector partnerships and continuous awareness programs aimed at reducing resistance and increasing effective AI utilization.

Conclusion

The study conclusively illustrates that Nigerian Universities, has successfully established a robust digital infrastructure with the availability of most leading AI tools, strengthening its position as a modern academic institution equipped for advanced information management. This widespread availability facilitates operational efficiency and significantly enhances the user experience through personalized services and streamlined access to academic materials. However, the use and benefit of these AI tools are impeded by challenges such as inadequate skills and training, infrastructural deficits including unreliable power supplies, and limitations in institutional support and funding. These intertwined challenges create barriers to optimal AI integration and effective utilization. With a view to addressing these challenges, there is a need to prioritize comprehensive capacity-building programs, reliable infrastructural investments, and sustained funding commitments from university management and external stakeholders. Also, providing continuous training for library staff, investing in dependable power solutions, and securing strategic funding will foster an enabling environment to harness the full transformational potential of AI technologies in information management.

Recommendations

Based on the findings of the work, it was recommended that:

1. Nigerian Universities should maintain and upgrade its digital infrastructure regularly to keep pace with emerging AI technologies and ensure uninterrupted service delivery.
2. Continuous user engagement programs should be introduced to educate library users and staff on effectively utilizing AI tools, maximizing benefits across academic activities.
3. Develop and implement ongoing professional development and training workshops for library staff focusing on AI skills and best practices.
4. Formulate a comprehensive AI integration policy that highlights training requirements, infrastructure standards, and continuous funding mechanisms to institutionalize AI adoption sustainably.

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