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ADOPTION OF AI IN LIBRARY SERVICES IN AKWA IBOM STATE: AN INNOVATION FOR EFFECTIVE LIBRARY MANAGEMENT AND QUICK ACCESS OF INFORMATION

By

Mary Mfon BASSEY, Ph.D., CLN
Business administration, Library Department
University of Uyo, Uyo

And

Baadom Blessing
Ken-poly Bori, Masters CLN

ABSTRACT

The study examined the adoption of Artificial Intelligence (AI) in library services as an innovative approach for enhancing effective library management and ensuring quick access to information. In the contemporary digital environment, libraries are increasingly integrating advanced technologies to improve service delivery and meet the growing information needs of users. Descriptive survey design was adopted for this study. The study was carried out in Akwa Ibom State. The targeted population for the study comprised of all librarians and Post-graduate students studying Library and Information Science. A simple random sampling technique was used for the study. 73 respondents were obtained from 10 teaching staff, 5 non-teaching staff and 50 Post-graduate students from the University of Uyo; 5 teaching staff and 3 non-teaching staff from Akwa Ibom State University. This gave a total of 73 respondents, which formed the sample size for this study. The instrument used for data collection was a structured questionnaire titled: AI in Library Services for Effective Library Management Questionnaire (ALSELMQ). Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.83, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive statistics to answer research questions and regression analysis to test the hypothesis. The study revealed that the R-Square value of 0.51 predicts 51% of the extent to which Artificial Intelligence has contributed to effective library management and also the R-Square value of 0.27 predicts 27% of the extent to which Artificial Intelligence has contributed to quick access to information. The study concluded that In conclusion, the adoption of Artificial Intelligence in library services has become an important innovation for improving the efficiency and effectiveness of modern libraries. One of the recommendations made was that library management should provide continuous training for librarians and information professionals to develop the technical skills required for the effective implementation and management of AI-based systems

KEYWORDS: Artificial Intelligence, Library Services, Akwa Ibom State, Effective Library Management, Quick Access of Information

INTRODUCTION

The rapid advancement of information and communication technologies has significantly transformed how information is created, stored, accessed, and managed across various sectors, including libraries. Libraries have traditionally served as centers for knowledge preservation, information dissemination, and academic support. However, the increasing volume of digital information and the growing demand for faster and more efficient information services have created new challenges for library management. As a result, libraries are gradually adopting innovative technologies to enhance their operations and improve service delivery to users. One of the most significant technological innovations influencing modern libraries is Artificial Intelligence (AI).

Artificial Intelligence refers to the development of computer systems capable of performing tasks that normally require human intelligence, such as learning, reasoning, and problem-solving (Shabbir & Anwer, 2020). In recent years, AI has been integrated into various sectors to improve efficiency, accuracy, and decision-making. In the library environment, AI technologies such as machine learning, natural language processing, and intelligent data analysis are increasingly being used to automate routine tasks, improve cataloging systems, and enhance user interaction with library resources. These technological tools enable libraries to manage large volumes of information more effectively while reducing manual workload for library staff.

The adoption of AI in library services has also contributed to improving information retrieval systems and enhancing user experiences. Through AI-powered search engines, recommendation systems, and virtual assistants, users can quickly locate relevant materials and receive personalized information services. This capability significantly reduces the time required to search for information and allows users to access academic and research resources more efficiently. Furthermore, AI supports effective library management by providing data-driven insights that help librarians make informed decisions regarding collection development, resource allocation, and service improvement.

In addition, quick access to information has become an essential requirement in modern knowledge environments. Researchers, students, and professionals rely on libraries to provide timely and accurate information that supports learning, research, and decision-making processes. AI technologies enhance this process by enabling intelligent search systems, automated indexing, and predictive analytics that facilitate faster retrieval of information resources.

Statement of Problem

Libraries in Akwa Ibom State are expected to provide effective management of information and quick access to library resources. However, many libraries still rely on traditional manual systems, which often lead to slow information retrieval and inefficient service delivery. With the rapid growth of information and user demands, there is a need for more advanced technologies such as Artificial Intelligence (AI) to improve library operations. Despite the benefits of AI, its

adoption in many libraries within the state appears to be limited. Therefore, this study seeks to examine the adoption of AI in library services in Akwa Ibom State for effective library management and quick access to information.

Objectives of the study

1. To find out the extent to which Artificial Intelligence has contributed to effective library management.
2. To examine the extent to which Artificial Intelligence has contributed to quick access to information.

Research questions

1. To what extent has Artificial Intelligence contributed to effective library management?
2. To what extent has Artificial Intelligence contributed to quick access to information?

Research Hypotheses

1. There is no significant effect of Artificial Intelligence on library management.
2. There is no significant effect of Artificial Intelligence on quick access to information.

LITERATURE REVIEW

Concept of Artificial intelligence

Artificial Intelligence (AI) refers to the branch of computer science that focuses on creating systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, problem-solving, perception, and language understanding. At its core, AI seeks to simulate cognitive functions, allowing machines to interpret data, recognize patterns, and make decisions autonomously. The development of AI has been accelerated by advances in computational power, big data, and sophisticated algorithms, particularly machine learning and deep learning techniques (Shabbir & Anwer, 2020).

AI can be broadly divided into two categories: general AI, which seeks to carry out any intellectual task that a human can complete, and narrow AI, which is made for particular activities (such as virtual assistants and recommendation systems). Narrow AI is widely implemented today, whereas general AI remains largely theoretical due to the complexity of replicating human consciousness and contextual understanding (Shen et al., 2022). Modern AI systems rely heavily on neural networks and deep learning models, enabling applications in natural language processing, image recognition, robotics, autonomous vehicles, and healthcare diagnostics (Li et al., 2021).

The capacity of AI to learn from data is a crucial feature. Without the need for explicit programming, machine learning algorithms examine massive datasets to find trends and gradually improve performance. This learning capability allows AI systems to adapt to changing environments and make predictions with increasing accuracy (Chen et al., 2023). Additionally, reinforcement learning has contributed to AI's ability to make sequential decisions in dynamic scenarios, such as in-game strategy optimization and autonomous navigation (Zhang et al., 2021).

Data privacy, algorithmic prejudice, and the possible effects on employment and human decision-making are just a few of the ethical and sociological issues that are entwined with the idea of AI. Researchers emphasize the importance of developing explainable AI models that provide transparency in decision-making to enhance trust and accountability (Doshi-Velez & Kim, 2020). All things considered, artificial intelligence (AI) is a game-changing technology that has applications in many different fields and is radically changing how people interact with machines.

Concept of library services

Library services refer to the array of activities, resources, and support systems provided by libraries to facilitate access to information, promote knowledge acquisition, and support research, education, and lifelong learning. Traditionally, library services included cataloging, lending, reference assistance, and archival support; however, the rapid advancement of digital technologies has significantly expanded the scope and delivery of these services (Ameen, 2020). Modern libraries offer integrated digital platforms, online databases, e-books, virtual reference services, and information literacy programs, ensuring that users can access relevant resources efficiently regardless of location (Okoro et al., 2021).

The primary goal of library services is to provide equal access to information while encouraging critical thinking and intellectual growth. Reference services, for instance, guide users in locating and evaluating information effectively, while instructional services, such as workshops and tutorials, enhance users' research and digital literacy skills (Alhassan & Mohammed, 2022). Libraries also serve as collaborative spaces, supporting academic communities through study environments, digital repositories, and interlibrary loan systems that expand resource availability beyond a single institution (Tella & Oladokun, 2020).

Library services are becoming more user-centered because of the development of digital libraries, cloud-based cataloging systems, and AI-based search capabilities. Personalized recommendation systems, metadata tagging, and content curation allow libraries to deliver more tailored information experiences (Chisenga, 2022). Additionally, libraries now play a crucial role in preserving digital content and ensuring long-term access to scholarly and cultural resources, thereby contributing to research sustainability and knowledge continuity (Sharma & Bhattacharya, 2021).

In essence, library services comprise both traditional and innovative activities meant to enhance information accessibility, support education, and encourage community engagement. As the information landscape shifts, libraries must adapt their services to meet new user needs and close the gap between technology and human knowledge consumption.

Concept of effective library management

Effective library management refers to the systematic planning, organization, and control of library resources and services to meet the information needs of users efficiently and sustainably. It involves coordinating human, physical, financial, and digital resources to ensure optimal access to information while maintaining the library as a dynamic center for learning, research, and community engagement (Hossain& Das, 2021). Effective management integrates strategic planning, resource allocation, technology adoption, and user-focused services to enhance library performance and satisfaction.

Accessibility and resource arrangement are essential components of good library administration. To make information retrieval simple, libraries must keep their databases, digital repositories, and catalogs organized. Classification systems, metadata standards, and indexing play a critical role in organizing physical and digital collections, ensuring users can locate materials efficiently (Kumar & Raj, 2020). Furthermore, the incorporation of digital technology, such electronic databases and online catalogs, facilitates efficient information access outside of physical borders, increasing the accessibility of library resources.

Another essential element is human resource management. Providing high-quality library services, helping patrons, and keeping things running smoothly all depend on having competent, well-trained personnel. Effective libraries prioritize professional development, training in emerging technologies, and staff empowerment to enhance service delivery (Hossain& Das, 2021). Leadership in library management involves decision-making that balances user needs, operational efficiency, and long-term strategic goals.

Innovation and technology are now essential to efficient library administration. Automation tools, digital platforms, and artificial intelligence are used by modern libraries to expedite processes including circulation, cataloging, and reference services. These technologies reduce manual workload, improve accuracy, and allow staff to focus on higher-level functions such as research support and community outreach (Kumar & Raj, 2020). Effective libraries also use data analytics to track usage patterns, guide the creation of new collections, and improve user experience.

User-centered services are another key component of effective library management. Libraries may customize services, offer pertinent resources, and increase user satisfaction by having a thorough understanding of the various demands of its patrons, including professionals, students, researchers, and the

general public. Strategies include conducting user surveys, feedback systems, and engagement initiatives to align services with evolving information requirements (Hossain & Das, 2021).

Concept of quick access of information

Quick access to information refers to the ability of individuals to obtain relevant, accurate, and timely information with minimal delay through efficient information systems, digital technologies, and organized knowledge resources. In modern information environments, quick access has become a critical component of information management, particularly in academic institutions, libraries, and digital platforms where users require immediate retrieval of data for research, learning, and decision-making (Khan & Bhatti, 2020).

The concept is strongly associated with the advancement of information and communication technologies (ICTs), which have transformed how information is stored, retrieved, and disseminated. Digital databases, search engines, online catalogs, and cloud-based information systems enable users to locate materials within seconds compared to traditional manual methods. These technologies enhance the efficiency of information retrieval by using indexing, metadata, and advanced search algorithms that help users find relevant resources quickly and accurately (Tella & Oladokun, 2021).

In libraries and information centers, quick access to information is facilitated through various tools such as Online Public Access Catalogues (OPACs), digital repositories, electronic journals, and institutional databases. These systems allow users to search and retrieve scholarly materials from multiple sources simultaneously. The integration of artificial intelligence and machine learning into search systems has further improved information retrieval by enabling predictive search results, automated classification, and personalized recommendations (Ameen, 2022).

Quick access to information also supports productivity, research efficiency, and informed decision-making. In academic and professional settings, the ability to obtain accurate information rapidly helps users save time, improve knowledge acquisition, and enhance problem-solving capabilities. Consequently, organizations increasingly invest in digital infrastructure and information management strategies to ensure that information resources are easily accessible to users (Chisenga& Hoskins, 2023).

Effects of Artificial intelligence on effective library management

By increasing productivity, boosting user satisfaction, and facilitating data-driven decision-making, artificial intelligence (AI) is progressively revolutionizing library administration. AI technologies, including machine learning, natural language processing, and predictive analytics, are being integrated into library systems to automate routine tasks, optimize information retrieval, and facilitate

advanced knowledge organization (Alabi et al., 2021). Libraries may now transition from traditional resource management to more intelligent, responsive, and user-centered services thanks to these advancements.

Improved information retrieval and search efficiency is one of AI's major effects on library management. In order to deliver more precise and customized results, AI-powered search engines and recommendation systems examine user queries, reading histories, and content metadata. Libraries can anticipate user demands, provide pertinent resources, and cut down on the amount of time spent looking for information thanks to machine learning algorithms. Studies indicate that AI-driven cataloging and search systems significantly enhance resource discoverability and user satisfaction (Iqbal & Afzal, 2022).

AI has an effect on administrative effectiveness and library operations as well. Automated cataloging, indexing, and metadata creation eliminate human mistake, cut down on manual labor, and free up employees to work on higher-value projects like user interaction and research support. AI tools can also forecast resource demand, track circulation trends, and improve acquisition and collection management techniques. For instance, predictive analytics can help libraries anticipate which materials will be most in demand, improving budget allocation and reducing underutilized resources (Sivarajah et al., 2021).

Improved user services and tailored experiences are another noteworthy outcome. AI chatbots and virtual assistants provide round-the-clock assistance for responding to questions, directing users through databases, and suggesting books. These systems can comprehend complicated queries because to natural language processing, which enhances user involvement. Research shows that AI-based virtual reference services increase accessibility and engagement, particularly in digital library environments where in-person assistance may be limited (Alabi et al., 2021).

Additionally, AI supports strategic planning and data-driven decision-making in libraries. AI systems analyze vast amounts of data on user behavior, resource usage, and trends in digital content to produce actionable insights that guide resource allocation, policy creation, and collection tactics. This analytical capability enhances the library's ability to adapt to evolving user needs and technological changes (Iqbal & Afzal, 2022).Despite these advantages, challenges exist in adopting AI in library management. It is necessary to overcome high implementation costs, technical knowledge requirements, and ethical issues pertaining to algorithmic bias and data protection. Libraries need robust infrastructure, staff training, and clear policies to ensure responsible and effective AI integration (Sivarajah et al., 2021).

Effects of Artificial intelligence on quick access of information

People's access to information has been completely transformed by artificial intelligence (AI), which makes it quicker and easier than ever. In the past, manual searches, laborious filtering, and reliance on human mediators were necessary to locate pertinent information. These days, AI-powered solutions like virtual assistants, recommendation engines, and intelligent search engines expedite this process by rapidly analyzing large datasets and delivering accurate results that are customized to user demands. This acceleration saves time and enhances productivity in educational, professional, and personal contexts (Gentsch, 2018). By automating complex queries and learning from user behavior, AI transforms information retrieval into an adaptive and highly efficient experience. The ability of AI to process natural language has been particularly transformative in quick access to information. Natural Language Processing (NLP) allows AI systems to understand, interpret, and respond to human queries in conversational language, bypassing the need for specialized search skills. This capability enables users to obtain accurate answers rapidly, whether through voice assistants like Alexa and Siri or AI-driven chatbots in customer service (Liu, Wei, Li, & Zhou, 2020). Systems can be constantly improved by combining NLP and machine learning, which refines search results based on contextual relevance and previous interactions. As a result, AI increases information accessibility for a variety of people, including individuals who would find it difficult to use conventional keyword-based searches.

Beyond individual convenience, AI-driven information access has significant implications for organizational efficiency and decision-making. In professional environments, AI algorithms can sift through massive volumes of data in seconds, highlighting trends, insights, and anomalies that would take humans much longer to identify. This capability supports faster decision-making and empowers organizations to respond to challenges with agility (Makridakis, 2019). Moreover, AI minimizes the risk of information overload by prioritizing content based on relevance and user intent, which is increasingly critical in an era dominated by digital data streams.AI contributes to wider accessibility of information for diverse groups of people. For example, voice-based technologies allow individuals to search for information through spoken commands, making digital resources easier to use for people with visual impairments or limited technical skills. AI-powered translation tools also help users access information written in different languages, breaking down communication barriers and encouraging global knowledge sharing. Through these capabilities, AI not only speeds up information access but also ensures that knowledge becomes more inclusive and widely available

Despite its advantages, the rapidity of AI-mediated information access also raises concerns about accuracy, bias, and overreliance. While AI can quickly retrieve information, the quality of results depends heavily on the algorithms and datasets underpinning these systems (Topol, 2019). Users must remain critical of the sources AI prioritizes and complement AI retrieval with human judgment to ensure reliability. Nonetheless, the overall impact of AI on quick access to information is transformative, bridging knowledge gaps and democratizing data

access across sectors, thereby shaping how society learns, works, and communicates.AI also helps manage the overwhelming amount of data available on the internet (Shrestha, Ben-Menahem, & von Krogh, 2019).

METHODOLOGY

Descriptive survey design was adopted for this study. The study was carried out in Akwa Ibom State. The targeted population for the study comprised of all librarians and Post-graduate students studying Library and Information Science. A simple random sampling technique was used for the study. 73 respondents were obtained from 10 teaching staff, 5 non-teaching staff and 50 Post-graduate students from the University of Uyo; 5 teaching staff and 3 non-teaching staff from Akwa Ibom State University. This gave a total of 73 respondents, which formed the sample size for this study. The instrument used for data collection was a structured questionnaire titled: AI in Library Services for Effective Library Management Questionnaire (ALSELMQ). Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.83, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive statistics to answer research questions and regression analysis to test the hypothesis.

RESULTS AND DISCUSSION

Hypothesis One: The null hypothesis states that there is no significant extent to which Artificial Intelligence has contributed to effective library management. In order to answer the hypothesis, simple regression analysis was performed on the data (see table 1.)

TABLE 1: Simple Regression Analysis of the extent to which Artificial Intelligence has contributed to effective library management

Model	R	R-Square	Adjusted R square	Std. error of the Estimate	R Square Change
1	0.713a	0.51	0.501	1.699	0.508

***Significant at 0.05 level; df=71 ; N= 73; critical R-value = 0.197**

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The above table shows that the calculated R-value (0.713) was greater than the critical R-value of 0.197 at 0.05 alpha level with 71 degrees of freedom. The R-Square value of 0.51 predicts 51% of the extent to which Artificial Intelligence has contributed to effective library management. This rate of percentage is positive

and therefore means that there is significant extent to which artificial intelligence has contributed to effective library management.

Table 2:

Analysis of variance of the difference in the effect of Artificial Intelligence on effective library management

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	211.941	1	211.941	73.378	.000b
Residual	205.073	71	2.888		
Total	417.014	72			

The above table 2 presents the calculated F-value as (73.378) and the significance value as (0.00). Being that the significance value (0.00) is below the probability level of 0.05, the result therefore means that there is significant influence to which Artificial Intelligence has contributed to effective library management.

Hypothesis Two: The null hypothesis states there is no significant extent to which Artificial Intelligence has contributed to quick access to information. In order to answer the hypothesis, simple regression analysis was performed on the data (see table 3)

TABLE 3: Simple Regression Analysis of the effect of Artificial Intelligence on quick access to information

Model	R	R-Square	Adjusted R square	Std. error of the Estimate	R Square Change
1	0.522a	0.27	0.26	2.55	0.27

***Significant at 0.05 level; df=71; N= 73; critical R-value = 0.235**

The above table shows that the calculated R-value (0.522) was greater than the critical R-value of 0.235 at 0.05 alpha levels with 71 degrees of freedom. The R-Square value of 0.27 predicts 27% of the extent to which Artificial Intelligence has contributed to quick access to information. This rate of percentage is positive and therefore means that there is significant extent to which artificial intelligence has contributed to quick access to information

Table 4:

Analysis of variance of the difference in the effect of Artificial Intelligence on quick access to information.

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	173.44 1	1	173.44	26.66	0.000[b]
Residual	461.929	71	6.506	6.506	
Total	635.370	72			

The above table 4 presents the calculated F-value as (26.66) and the significance value as (0.00). Being that the significance value (0.00) is below the probability level of 0.05, the result therefore means that there is significant difference in the effect of Artificial Intelligence on quick access to information. This therefore means that the null hypothesis is rejected

Discussion of Findings

The tables 1 and 2 proved that the results were significant due to the fact the calculated R-value (0.522) was greater than the critical R-value of 0.197 at 0.05 alpha level with 71 degrees of freedom. The result means that there is significant influence to the effect of Artificial Intelligence on library management. This result is in support of the findings of Iqbal & Afzal, (2022) who stated that improved information retrieval and search efficiency is one of AI's major effects on library management. In order to deliver more precise and customized results, AI-powered search engines and recommendation systems examine user queries, reading histories, and content metadata that libraries can anticipate user demands, provide pertinent resources, and cut down on the amount of time spent looking for information thanks to machine learning algorithms. According to him, AI-driven cataloging and search systems significantly enhance resource discoverability and user satisfaction. Alabi et al., (2021) who also agreed with his opinion that AI-based virtual reference services increase accessibility and engagement, particularly in digital library environments where in-person assistance may be limited

The tables 3 and 4 proved that the results were significant due to the fact the calculated R-value (0.713) was greater than the critical R-value of 0.197 at 0.05 alpha level with 71 degrees of freedom. The result means that there is significant influence to the effect of Artificial Intelligence on quick access to information. This result is in support of the findings of Liu, Wei, Li, & Zhou, (2020) who examined that the ability of AI to process natural language has been particularly transformative in quick access to information. Natural Language Processing (NLP) allows AI systems to understand, interpret, and respond to human queries in conversational language, bypassing the need for specialized search skills. According to him, the capability enables users to obtain accurate answers rapidly, whether through voice assistants like Alexa and Siri or AI-driven chatbots in customer service.

Makridakis, (2019) also agreed with his opinion that AI-driven information access has significant implications for organizational efficiency and decision-making. In professional environments, AI algorithms can sift through massive volumes of data in seconds, highlighting trends, insights, and anomalies that would take humans much longer to identify. This capability supports faster decision-making and empowers organizations to respond to challenges with agility

CONCLUSION

In conclusion, the adoption of Artificial Intelligence in library services has become an important innovation for improving the efficiency and effectiveness of modern libraries. AI technologies enhance library management by automating routine tasks, improving cataloging systems, and supporting better decision-making processes. In addition, AI significantly improves quick access to information through intelligent search systems, recommendation tools, and virtual assistants that help users locate relevant resources easily. These technologies also enhance user experience and increase the overall productivity of both librarians and library users. Despite the challenges associated with implementation, the benefits of AI in library services outweigh the limitations. Therefore, the integration of AI into library systems is essential for improving information accessibility and sustaining the relevance of libraries in the digital age.

RECOMMENDATION

1. Library management should provide continuous training for librarians and information professionals to develop the technical skills required for the effective implementation and management of AI-based systems.
2. Academic institutions and government agencies should provide adequate funding and infrastructure to support the adoption and maintenance of AI technologies in libraries.
3. Libraries should develop clear policies and ethical guidelines for the use of AI systems to ensure data privacy, transparency, and responsible use of user information

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