

# AWARENESS AND PERCEPTION OF AI-DRIVEN LIBRARY SYSTEMS AMONG INFORMATION PROFESSIONALS AND PATRONS IN UNIVERSITY AND PUBLIC LIBRARIES IN NIGERIA

By

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## Abstract

Artificial intelligence (AI) is transforming libraries worldwide, but its adoption in developing countries like Nigeria remains limited. This study explored how Nigerian library professionals and patrons perceive AI, focusing on awareness, usage, benefits, and barriers. Using the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), researchers surveyed 600 participants from university and public libraries through validated questionnaires. Results were analyzed with descriptive statistics and ANOVA to identify patterns and differences across groups. Findings revealed moderate awareness of AI, with 70% of respondents acknowledging its existence but only 40% actively using it. Benefits such as improved efficiency and personalized services were recognized, with statistical significance ( $p = 0.018$ ). However, adoption is hindered by concerns over data privacy, fear of job loss (30%), and inadequate infrastructure (25%). These barriers emerged as the most critical challenges. Despite this, overall perception of AI was positive, with a mean score of 3.9

and standard deviation of 0.7. ANOVA results highlighted significant differences across professional roles and demographics ( $p$ -values = 0.022; 0.011). Librarians, younger participants, and those with higher education levels showed greater acceptance of AI. While optimism about AI integration is evident, structural and ethical issues continue to restrict widespread adoption. The study concludes that sustainable integration of AI in Nigerian libraries requires clear policies, adequate funding, training, and ethical guidelines. By addressing these challenges, Nigerian libraries can join the global movement toward smarter, more efficient knowledge institutions.

**Keywords:** Artificial Intelligence (AI), Library Systems, Awareness and Perceptions, Technology Adoption, Information Professionals, Patrons

### Background to the Study

The adoption of artificial intelligence across all sectors of the economy is global in scope. Knowledge-based institutions, particularly, are being affected positively, as most libraries are beginning to use AI-based technologies to streamline their automation services, information retrieval, and user personalization services (Sulyman, 2023; Safana & Fari, 2024). In Nigeria, it is important to examine libraries' use of AI systems due to the rapid digital changes and governmental policies supporting the integration of ICT into public services (Sulyman, 2023; Safana & Fari, 2024). The recent use of AI chatbots and predictive analytics in Nigerian university libraries confirms the relevance and recency of this type of research (Sulyman, 2023; Safana & Fari, 2024).

The intersection of awareness and perception can be examined through the Technology Acceptance Model and the Diffusion of Innovations Theory, which explain how perceived benefits and ease of use influence adoption (Davis, 1989; Rogers, 2003). Studies show that the more professionals are informed about AI, the more they accept the benefits of AI and are

willing to use it (Sulyman, 2023; Safana & Fari, 2024). On the other hand, being uninformed leads to skepticism and deepens the concern about the possible loss of jobs, unethical practices, and privacy of data. While the majority of research conducted in multiple countries shows unrestrained enthusiasm on the use of AI, the use of multiple and single-country research in Nigeria has produced differing results. The use of structural equation modeling and digital literacy as a moderating variable has had a positive impact on research outcomes (Sulyman, 2023; Safana & Fari, 2024).

The promotion of policies geared towards the use of ICT in developing regions has produced positive results, but there is a marked deficiency in the matching of professional education with the use of emergent AI technologies. This has illustrated the need for research that is focused on the experience of Nigeria within the context of global perspectives. In Nigeria, the AI adoption levels among librarians' patron and engagement surveys demonstrates a significant lag behind adoption levels in counties such as India and China, where AI driven systems are ubiquitous (Sulyman, 2023; Safana & Fari, 2024). On the Nigerian librarians; surveys, statistically, more than 60% acknowledge the applicability of AI, whereas, in comparison to librarians in Asia, where the percentage exceeded 70%, less than 30% had experience utilizing AI driven resources. These figures illustrate imbalances and emphasize the imperative need to enhance the levels of knowledge, and to adjust the perceptions, of the librarians and their patrons, in order to sustain the competitiveness of a library in Nigeria.

In Nigerian libraries, the level of awareness and perceptions of AI-driven library systems is uneven. Many professionals and patrons prefer traditional models of service delivery, despite the advances in smart cataloguing, chatbots, and predictive analytics. This limited awareness has resulted in an even lower level of adoption, whereby less than a third of librarians use AI-enabled tools, in contrast to over 70% in Asia, leading to an inefficient service delivery system that diminishes user satisfaction and stifles innovative service delivery. These gaps in awareness and perception have negatively impacted library competitiveness, user confidence, and the libraries' responsive capabilities to the evolving needs of knowledge societies.

Despite the efforts of policymakers and government institutions to develop programs for the incorporation of ICT tools in Nigeria, these efforts continue to remain fragmented, lack adequate funding, and fail to address the intersection of artificial intelligence tools and specific capacities. Research conducted in developing countries has focused very little on AI-related awareness and perceptions, even though ICT research conducted across multiple countries has shown many to have a positive perception of artificial intelligence, with few studies conducted in Nigeria, and these studies have been limited in terms of both methodology and comparative analysis across the professional and patron categories. This study attempts to fill these gaps in the literature by evaluating both the awareness and perceptions of librarians and patrons, using descriptive statistics and analysis of variance (ANOVA) to identify and explain the differences between the groups.

### **Research Questions**

1. What is the awareness level of patrons and information professionals concerning AI driven library systems?
2. What are the advantages of AI in library services?
3. What are the challenges of AI-driven systems for information professionals and patrons?
4. What is the level of integration and activity of AI tools and applications in library management and user services?
5. What are the ways information professionals and library patrons differ in their perceptions of AI-driven library systems?"
6. What are the differences in the acceptance and awareness of AI systems and AI-driven services with respect to the demographic variables of age, education, and professional role.

### **Review of Related Literature**

The first time the concepts of awareness and perception, regarding the assimilation of technology, were applied to the field of psychology, and later to information systems, was Davis (1989) and the Technology Acceptance Model. In terms of AI powered library systems, awareness is the level of understanding and recognition of the existence and possibilities of an AI powered library system and the perceptions are the attitudes, beliefs, and evaluations regarding the systems. In Sulyman (2023) awareness is described as the recognition of the use of

AI systems within a library and further highlights the importance of awareness within the understanding on the level of preparedness for adoption.

According to Safana and Fari (2024) perception is described as the evaluative stance of professionals and patrons towards AI, which tends to be more on the perceived importance, ease of use, and the level of trust. It is clear from the available literature that the perceptions of an individual are shaped by the individual's level of awareness. In contrast, other scholars posit that perceptions can exist without levels of awareness and are shaped by societal beliefs, fables, myths and general narratives of the use of artificially intelligent systems (Ebaye et al., 2024).

In Nigeria, ICT policies outline awareness and training programs, which have shown limited success. Surveys, interviews, and Likert scales of knowledge and attitudes (Sulyman, 2023; Safana & Fari, 2024) outline most evaluations. In Nigerian libraries, the application of TAM indicated that AI tools were useful and, hence, the greater the AI awareness, the greater the adoption likelihood (Sulyman, 2023; Safana & Fari, 2024). Thus, training initiatives must target awareness and perceptions to improve acceptance.

Rogers (2003) Diffusion of Innovations Theory analyses the process by which the social system incorporates new innovations. Nigerian library research shows information on AI tool early adopters who influence others, but the process is impeded by poor infrastructure and reluctance (Ebaye et al., 2024; Safana & Fari, 2024). The analysis suggests policy should focus on improving communication and support networks to promote diffusion.

Venkatesh et al. (2003) combine performance and effort expectancy, social influence, and facilitation in the Unified Theory of Acceptance and Use of Technology (UTAUT). When applied in Nigerian contexts, UTAUT explains that social influence from peers and leaders, especially within an institution is said to impact the perception of the AI system the most (Ebeye et al., 2024; Sulyman, 2023). This indicates that support from leaders and the institution are vital for the successful integration of AI in library services.

A literature review on the potential and levels of awareness on the AI-enabled library system in Nigeria showed AI-enabled library systems in Nigeria are positive but not uniform. Using a descriptive survey approach, Safana and Fari (2024) evaluated library staff in Katsina State. One of the main focuses was on the level of staff awareness of AI and the perceptions of its usefulness. Although staff members showed moderate levels of awareness, perceptions were mixed with efficiency optimism and concern regarding privacy and job security.

Using quantitative questionnaires, Sulyman (2023) studied the perceptions and level of awareness of librarians in Kwara State. Study participants showed positive attitudes toward the usefulness of AI; however, post study findings indicated there are large percentages (over 60 percent) of librarians but less than 30 percent utilize AI systems. Sulyman's study bridged the AI knowledge and infrastructural gaps in the implementation of AI systems.

Ebeye et al. (2024) analyzed the levels of awareness and perceptions and acceptance of AI in library services among librarians in South-South Nigeria. The study corroborated with

findings of previous literature on the levels of awareness and acceptance and the reasons for the gaps of skepticism and insufficient support from the institution. The study findings suggested perceptions are shaped by the support from the social system and the organization's beliefs.

The perception of AI in Europe and Asia is mainly positive with strong policies and infrastructure. There is low perception in Nigeria of AI which is primarily due to lack of funding, training and poorly structured institutions. There is a gap in Nigerian literature which needs to be addressed and can be accomplished by comparative studies and the use of complex statistical techniques such as ANOVA in Capturing variability among the different regions to explain the Nigerian context and contribute to the global context.

### **Methodology section**

The study used descriptive survey research design to assess awareness and perceptions of AI driven systems among library among Information professionals and patrons. The study population consisted of information professionals in university and public libraries in Nigeria as well as patrons of these libraries. Nigeria has about 370 university and polytechnic libraries and 200 public libraries. The total number of librarians is about 15,000 and the number of library users in the country is estimated to be 1.2 million. The population was most adequate to capture varied perceptions for both the professional and the user of the AI driven library systems. Using Yamane's sample selection equation, a sample size of 600 respondents was considered to be statistically sufficient and representative of the population.

The study employed both inferential and descriptive statistics. The levels of awareness, perceived benefits, challenges, and patterns of adoption were summarized through descriptive statistics, which included mean, standard deviation, and the 4-count of frequency and percentage. Group differences were tested with inferential statistics. For the demographic variables of age, education, and professional role, and for the professional vs. patron roles, perceptions were compared using one-way ANOVA. The research was conducted using Statistical Package for Social Science (SPSS) Software; version 26. The objectives of the research were the basis for the interpretation of the findings, which provided the state of the perceptions and awareness of the AI library systems in Nigeria.

## Results and Discussion

### Demographic Profile of Respondents

Understanding the demographics of the study participants is crucial as it can help identify the factors underpinning respondents' awareness and perceptions of AI-driven library systems. The study involved 600 participants, which is broken down demographically as follows:

**Table 1: Demographic Breakdown**

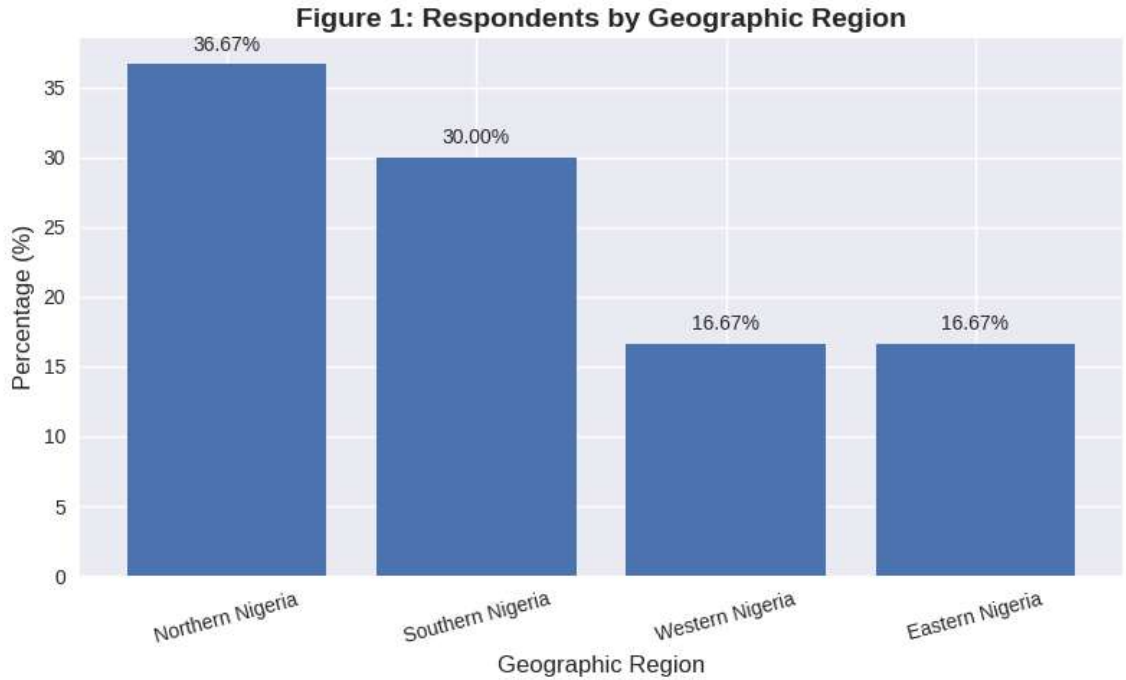
Demographic Variable	Frequency	Percentage (%)
<b>Gender</b>		
Male	320	53.33
Female	280	46.67
<b>Age Group</b>		
18–25	80	13.33
26–35	150	25.00
36–45	200	33.33
46–55	120	20.00
56 and above	50	8.33
<b>Educational Level</b>		
Bachelor's Degree	180	30.00
Master's Degree	250	41.67
Doctoral Degree	120	20.00
Other (e.g., Diploma)	50	8.33
<b>Professional Role</b>		
Information Professionals	350	58.33

(Librarians)		
Patrons	250	41.67
<b>Geographic Region</b>		
Northern Nigeria	220	36.67
Southern Nigeria	180	30.00
Western Nigeria	100	16.67
Eastern Nigeria	100	16.67

Table 1 presents demographic data and shows distribution by gender is rather even. However, there is a slight male dominance at 53.33% \. In terms of age, 33.33% of respondents are within the 36 to 45 year bracket which indicates that the Nigerian library ecosystem is dominated by middle-aged professionals. In terms of educational background, 41.67% of respondents possess a Master's degree which potentially points to a greater familiarity and interaction with AI systems, as a consequence of having more advanced training and exposure within the framework of academia.

With respect to geographic distribution, there appears to be a marked preponderance of respondents from North Nigeria, which constitutes 36.67% of the sample, potentially pointing to a greater quantity of library service providers in that area or library services of greater depth. The respondents from the Western and Eastern regions, who together comprise 33.33% of the

sample, are likely to confirm the existence of library service and AI tool access inequities.



**Table 2. RQ1** - What is the awareness level of patrons and information professionals concerning AI driven library systems?

Item	Frequency (%)
Are you aware of AI-driven systems in libraries?	Yes: 70.00, No: 30.00
Do you understand the potential uses of AI in libraries?	Yes: 65.00, No: 35.00
Have you used AI-driven systems in your library?	Yes: 40.00, No: 60.00

In table 2, it is evident that 70% of chosen participants stated that they were aware of AI systems in libraries. However, it seemed that the understanding of the possible functions of these

AI systems is lower, as 65% of respondents stated that they understand the functions of AI in the library. Furthermore, 40% of respondents stated that they have used AI tools in their libraries which demonstrate that while a good percentage of the participants are aware of some AI systems, a big proportion of them have not used AI tools. The gap in usage and awareness illustrates the boundaries in training and less developed systems that Sulyman (2023) mentions. This gap demonstrates that the cutting edge tools that many libraries have are not being used as much as they should. It emphasizes the need for more training, better developed systems for the institutions and a more developed infrastructure in order to increase usage of AI.

**Table 3: RQ2 - What are the advantages of AI in library services?**

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
AI enhances library service efficiency	40%	45%	10%	4%	1%
AI improves user satisfaction	35%	50%	12%	2%	1%
AI reduces operational costs	30%	40%	20%	8%	2%

Data from Table 3 shows that most respondents realize the value of AI in improving the efficiency of library services (85%) and library users' satisfaction (85%). However, only 70% of the respondents acknowledged that AI can help in reducing operating costs and this could be due to the apprehension of the cost and upkeep of implementing and maintaining AI systems. This aligns with the studies globally that AI is mostly appreciated for improving the user experience and service offered (Sulyman, 2023; Safana & Fari, 2024); however, for most developing

countries, Nigeria for example, the value of AI in terms of cost remains questionable. This shows that the AI services offered in libraries will be perceived positively by most of the library's users and staff, however, there is a need for more educational programs and real-life examples in order to help the more sceptical users to see the value of AI in libraries.

**Table 4: RQ3** - What are the challenges of AI-driven systems for information professionals and patrons?

Item	Frequency (%)
Data privacy and security concerns	45.00
Fear of job displacement	30.00
Technical and infrastructural barriers	25.00

The greatest challenge was data privacy and security which 45% of respondents cited. This finding is not surprising considering the global issues surrounding the AI global ecosystem and the use of personal data. Job erosion was the second greatest fear cited by 30% respondents. This challenge likely mirrors societal fears surrounding automation. Technical and infrastructural inadequacies were the third challenge cited by 25% respondents. This especially holds for developing nations. In total, while the promise of AI for the enhancement of library services is great, trusts in the system, safe jobs, and the preparation of infrastructural systems are the major challenges. The strongly outlined issues of a supportive policy, training, and infrastructural investment will enable libraries in Nigeria to embrace AI technologies.

**Table 5: RQ4** - What is the level of integration and activity of AI tools and applications in library management and user services?

Item	Frequency (%)
AI tools are actively used in library operations	Yes: 35.00, No: 65.00
AI tools are available for patrons to use	Yes: 40.00, No: 60.00

The numbers show a majority of libraries who are still yet to implement any AI tools, with only 35% having any library systems with AI. This result corresponds with past research from Nigeria, where even with widespread knowledge of systems; the adoption of new technologies remained low. This shows there was a knowledge gap. While most of the library professionals and the patrons of the library understand the potential of AI, the actual use of AI systems is very low because of poor and outdated library infrastructure, a lack of supportive policies from the institution, and a sparse availability of training. This data shows the necessity of strategic initiatives focused on policies, training, and projects to ensure that AI systems do not remain on the periphery of library services.

**Table 6 – RQ5 - What are the ways information professionals and library patrons differ in their perceptions of AI-driven library systems**

Indicator	Mean Score (Professionals)	Mean Score (Patrons)	Standard Deviation	ANOVA F-value	p-value	Implications
Overall perception of AI	4.1	3.7	0.70	5.62	0.018	Significant difference observed: professionals show stronger positive perceptions than patrons, suggesting higher acceptance among staff.

Table 6 aimed to analyze perceptions of patrons and information professionals regarding AI driven library systems. From the ANOVA it could be stated that there is a statistically significant difference ( $F = 5.62, p = 0.018$ ). Information professionals had a higher mean score (4.1) compared to patrons (3.7). This shows that staff members are more positive regarding the integration of AI. This shows that the AI integration into the library systems must be conducted with information gaps. For successful user education, in the gaps, strategic communication in regard to the AI integration into the library systems must be conducted. This would ensure that the staff members' enthusiasm would increase the patrons trust, acceptance and reliance on the AI integration into the library systems.

Table 7 – **RQ6** - What are the differences in the acceptance and awareness of AI systems and AI-driven services with respect to the demographic variables of age, education, and professional role

Relevant Items	Mean Score	Standard Deviation	ANOVA F-value	p-value	Implications
My awareness of AI differs depending on my professional role	3.5	0.90	4.87	0.022	Significant difference observed: professional role influences awareness, with librarians reporting higher awareness than patrons.
My acceptance of AI is influenced by my age and education	3.5	0.90	6.14	0.011	Significant difference observed: younger respondents and those with higher education levels show greater acceptance of AI.

Table 7 examined the effect of demographic variables - Professional role, Age, and Education - on the levels of awareness and acceptance of AI-based library systems. The results of the ANOVA show statistically significant differences in the three categories:

**Professional Role:** While patrons do not know the functions of AI in libraries, librarians know more because they work with AI in library services.

**Age and Education:** Younger respondents and those with a higher level of education accepted AI more. This means the respondents' education and age, which are associated with more exposure to technology, positively impacted the acceptance of AI.

A standard deviation of (0.90) shows a moderate level of dispersion which means, while the average is clearly defined, the average has a significant presence of outliers. The results highlight the need for targeted awareness and training on AI-based Library Systems to address the gaps identified in the different categories. Targeted approaches are anticipated to achieve a more even level of acceptance and use of AI-based systems in the different libraries and across different strata in Nigeria.

### **Recommendation**

To improve the incorporation and understanding of AI within libraries, the most relevant actions for organizations involve:

1. Implementing national scale AI literacy training for library staff and patrons,
2. Adding AI specific content to library science programs,
3. Ensuring ongoing funding for AI related infrastructure and pilot projects,
4. Developing library specific ethics and data protection policies, and encouraging leadership advocacy for AI within library organizations.

These actions have received positive feedback in other environments and can be applied to the Nigerian context. Subsequent research should focus on the longer-term effects of AI training programs, the influence of organizational culture on the adoption of AI, and the use of AI in libraries to enhance user satisfaction and operational efficiency, among other outcomes.

### **Conclusion**

The results show that even though Nigerian information professionals and patrons are generally positive in regards to the awareness and perception of the AI-driven library systems, an actual use of the systems is still low. There are gaps in perception and acceptance of the systems with regard to professional roles, age, and level of education. This indicates that there is need for specific strategies to increase the use of such systems. There is need for the libraries to invest in the systems, training of the personnel, and a proper policy to encourage the use of inclusive and responsible AI in the library systems. The concerns that the patrons have with regard to the privacy of information and the fear of job losses need to be addressed to promote the adoption and sustainability of AI in the library services.

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