

The Influence of Robotics Technology on Library Services Delivery in Academic Libraries in Lagos State, Nigeria

Isiaka Mashood Ishola¹

¹University of Ilorin

Publication Date: 2026/10/16

Abstract: This study examined the influence of robotics technology for library services delivery in selected academic libraries in Lagos state, Nigeria. It investigate the types of robot currently in use, the perception of librarians' on it relationship to users satisfaction and services efficiency, and the obstacles facing the implementation. The study adopted descriptive survey research design with a population of sixty (60) librarians from the three selected academic libraries in Lagos state. All 60 librarians were included through total enumeration. Data were collected through a structured questionnaire and analysed using frequencies, percentages, means, and standard deviations. Humanoid or interactive robots were the most commonly reported robot identified by 90% of respondents and other technologies, including telepresence, shelf-reading, and autonomous delivery robots, were less widely available. Respondents generally perceived robotics as improving service accessibility, user experience, and operational accuracy. However, perceived benefits in reducing waiting times and enabling staff to focus on complex user needs were comparatively modest. Major implementation challenges included acquisition costs, difficulties integrating robotic systems with existing library infrastructure, maintenance requirements, unreliable electricity or internet connectivity, and limited technical support. The findings suggest that robotics can support more accessible and efficient library services, but wider adoption will depend on sustained funding, reliable infrastructure, system integration, and staff training. Implementation should also preserve access to human assistance.

Keywords: Robotics Technology, Library Services Delivery, Academic Libraries.

How to Cite: Isiaka Mashood Ishola (2026) The Influence of Robotics Technology on Library Services Delivery in Academic Libraries in Lagos State, Nigeria. *International Journal of Innovative Science and Research Technology*, 11(10), 661-669. <https://doi.org/10.38124/ijisrt/26oct559>

I. INTRODUCTION

Academic library are libraries established in higher institution of higher learning, such as universities, polytechnics, college of education and college of technologies, that supports teaching learning and research. Academic libraries play a crucial role in shaping student learning and development of higher institutions, as it contributes to academic success by providing access to wide range of print and electronic resources, facilitating independent learning, offering research support services, and promoting critical thinking through library-based instruction (Oladele & Nweke, 2025). Librarians are now progressively function as research assistance involves in data management, scholarly communication and publication processes (Abrizah & Rabasa, 2024). In the same vein, Tano and Cajala (2024) argue that the digital transformation has placed academic library as nerve centre that integrate technological innovation to meet the information needs of its users and parent institution.

In library and information science parlance, Robotics technology has been expressed as a transformative innovation

that keeps modifying how library services are delivery. Robotics involves the development and use of machines capable of executing tasks automatically, often incorporating artificial intelligence and sensory capabilities to enable interaction with the environment (Britannica, 2026). According to De Sarkar (2023), Robotics technology encompasses artificial intelligence driven machine capable of performing task such as, circulation services, shelf management, document retrieval and reference assistance which transform traditional library services into automated and user centred process. Dudek and Jenkin (2024) posit that robotics can supports tasks such as retrieval of books, navigation assistance and user interaction which improve the quality and efficiency of library services. the author further assert that robotics are capable of integrating AI, sensors, and autonomous navigation to deliver services with minimal human intervention. This technology commits to reduce human error, increased safety, flexibility in production and cost optimisation across industries such as healthcare, manufacturing, logistics and services (Javaid, 2021). Robotics is still an emerging topic in the field of library and information science (LIS) with most development, which was originated from the field of computer science and engineering

discipline. These technologies are currently used in the libraries most especially in the area of providing answer to user query in asking for direction, frequently asked questioned and supporting reference services. they are also used for security and monitoring, and while some of them are used for outreach tour and interactive learning experience (Wojcik, 2023). In essence, the adoption of these robotics technologies improves library operational productivity, expand services capabilities and remains relevant in this information landscape.

Librarians generally perceived Robotics technology as beneficial instruments for improving the efficiency of library services delivery and automation of routine tasks. Deborah et al (2025) asset that these technologies are transforming library services by improving operational efficiency, enhancing user experience and redefining the role of library professionals. They also support inclusive services through telepresence and assistive technology, allowing remote users and individuals with disabilities to have access to the library resources easily as these development position libraries as technologically advanced hub capable of meeting modern information demands. Similarly, Sanjay (2023) posits that these technologies are increasingly being used to enhanced services delivery, especially for distance users, individuals with disabilities and users who are unable to physically access the library resources. They also expand outreach services, improve users' engagement and provide more inclusive access to information resources.

Robotics are now increasingly part of library operation worldwide, performing tasks such as shelving, guiding user, assisting with reference services and supporting information retrieval processes (Tella, 2020). He further asserts that some librarians think this technology are coming to take their job, but rather to compliment what they are doing by improving the efficiency and services quality, emphasising the impact of robot in libraries. Another benefit of these technologies in libraries is fetching items from storage based on RFID data, reducing manual labour for staff and enabling fast item delivery and also shift the role of librarians from routine task toward higher-level services and enabling data collection management (Egamberganova, 2025). Therefore, this study aims to examine the impact of Robotics Technology on library services delivery in academic libraries in Lagos state.

➤ *Objectives of the Study*

The broad objectives of this study is to examines the influence of robotics technology on library services delivery in academic libraries in Lagos state. The specific objectives are:

- Identify the type of robotics technology currently used for library services delivery in academic libraries in Lagos state;
- Access the influence of robotics technology on user's satisfaction with library services in academic libraries in Lagos state;
- Determine the impact of robotics technology on the efficiency of library services delivery in academic libraries in Lagos state; and

- Identify the challenges facing the implementation of robotics technology for library services delivery in academic libraries in Lagos state.

➤ *Research Questions*

- What type robotics technology are currently utilises for library services in academic library in Lagos state.?
- What is the influence of robotics technology on user's satisfaction with library services in academic library in Lagos state?
- What is the impact of robotics technology on the efficiency of library services delivery in academic libraries in Lagos state?
- What are the challenges faced in the implementation of robotics technology for library services delivery in academic library in Lagos state?

II. LITERATURE REVIEW

➤ *The Concept of Robotics Technologies in Academics Libraries*

Robotics technologies is a branch of computer science and engineering that deal with the design, construction, operation and application of robots. Robots are programmable machines that are able to perform tasks autonomously or semi-autonomously, often in environments that are inaccessible or dangerous to humans. Robots also often perform tasks in industry and in the production process that are too monotonous, difficult or repetitive for humans (Robco GmbH, 2026). Dube et al., (2020) posit that robotics is one of the emerging information technologies in academic libraries which transform library operation and services, which can be applied to automate or perform library routine activities, improve efficiency and enhanced the delivery of services to library users. Th authors also emphasise that the adoption or the utilisation this robotics technologies will not only replace or serve as a means of replacement to librarians but also compliment what they are doing, and improvement of services delivery. According to Echedom and Okuonghae (2021) assert that, the application of this robotics technologies enhances the librarian's activities by reducing repetitive task, conducting library tour, answer reference queries, shelve reading, locating information resources, recording the statistics of library user and circulation services. These technologies increase the accuracy and efficiency of library services and allowing librarians to focus on more complex responsibilities citing the university of Lagos and university of Pretoria as the practical example of these technologies in Africa where robotics perform most of routine task such as shelving, attending to reference queries and helping users' in locating information resources. Robotics technologies has a reasonable potential in the improvement of library services in academic libraries in Nigeria. The successful adoption of these technologies largely depends on institutional and government support, strategic planning, adequate infrastructure and positive engagement with librarians (Oladokun et al., 2023).

➤ *Types of Robotics Technology*

There are different types of robotics currently accommodate by academic libraries in delivering effective and efficient services which are: Humanoid robot, telepresence, chatbots, shelf reading or inventory robot, and autonomous delivery or transport robot.

Humanoid robot, as the name implies, it an automaton that resemble a human being. Humanoid robots are robot that look or behave like human and can interact socially, which was also useful performing task such as teaching coding, giving direction, telling stories, leading tours and welcoming of visitors or library users in to the library (Tella, 2020). Telepresence robot are robot that interact with user in the library remotely (De sarkar, 2023). Autonomous delivery or transport robot helps in transporting or retrieving of books that are requested and other material to library user as well as delivering books to different sections in the library. Automated storage and retrieval system help to store library resources compactly and bring them out when requested and helping academic library use their space more effectively (Oladokun et al., 2023). Shelf reading robot are robot that helps in scanning of RFID tag in books, which helps in finding, locating and replacing of misplace library material as well as updating collections in the library catalogue which make it easier to retrieve by library users. Chatbots are text base tools or messaging platform, which help users to search library website, locating of resources, answer ready reference question and refer more complex task to librarians (Tella, 2020)

➤ *Application of Robotics Technology in Academic Libraries*

De Sarkar (2023) described different ways in which robotics can be applied for library activities such as: circulation services, document retrieval, shelving and shelf management, shift or transformation of material and reference services. On the circulation services, it mostly uses in support of the circulation workflows, such as attending to user and all other activities performing in circulation section which are lending services and management of library material. On the transporting services, robotics can be used in moving books and other library material from one section to another. It was very useful in retrieving of document most specifically in academic libraries that house too much of collections. It also provides reference services to users on their various information needs showcasing the importance of application of these technology in academic libraries. Wójcik (2024) identified collection-related and operational activities as important areas in which robotics technologies can be applied in libraries, revealing that robotic solutions differ considerably in their technical complexity and functionality. Echedom and Okuonghae (2021) point out that AI-based technologies, including robotic and expert systems, have potential to improve information service delivery in academic libraries. The application of such systems is particularly relevant for repetitive enquiries which does not require complex professional judgement.

Another ways in which robotics can be applied is shelf scanning and inventory management. Robotic systems can

assist in scanning shelves, identifying misplaced materials, and monitoring the status and location of library collections. This application can reduce the amount of manual effort required from librarians and improve the efficiency of collection management. Robotics can also support book retrieval and transportation by assisting in locating and moving library materials within the library environment. Such applications can improve the speed with which materials are retrieved and made available to users (Tella, 2020).

Robotics can handle user guidance and navigation within academic libraries. A mobile or humanoid robot can direct users to particular sections, identify the location of collections, provide information about library facilities and assist new students during orientation. This application can be useful especially in large academic libraries where users may experience difficulties in locating collections, service points or study facilities. Shahzad et al. (2025) point out that personalised services and technological innovation are among the factors encouraging robotic adoption and utilisation.

➤ *Influence of Robotics Technology on Library Services Delivery*

Robotics possess positive influence on academic library because it performs diverse array of activities and provide interactive, addressing space related challenges and personalised services to library users. These technologies also boost automation, and diffuse services delivery in academics library (Shahzad et al, 2025). The authors further posit that these technologies influences are in connection with innovation and library services delivery. Similarly, Demir (2025) argue that these technologies improve efficiency, effectiveness, support routine task, automation and collection management, education activities and user satisfaction. In the same vain, Abdulhakeem and Tella (2026) noted that robotics has a transformation influence on library services delivery mainly seen through increased operational efficiency, improve user interaction and reduction of repetitive manual work, and user centre library services. In essence, it enabling librarians to concentrate on higher level professional and user-centred activities.

➤ *Challenges of Robotics Technology on Library Services Delivery in Academic Libraries*

In spite of these benefit, the integration of robotics technologies in academic libraries hinder by some challenges. Their introduction and deployment will inaugurate fear of job misplacement among librarians who perceive automation as a threat to their professional roles or can replace their role in library (Tella, 2020).

One of the major challenges facing the integration and application of robotics technologies in libraries is technical problem. Shahzad (2025) argues that these technologies depends on sophisticated software, hardware, artificial intelligence and reliable technological infrastructure. System incompatibility, technical failure, maintenance provision and difficulties in operating robotics technology can therefore limit their effective and efficient use in academic libraries .

Another critical challenges facing the utilisation is cost, because the acquisition and implementation require a lot of money, and academic libraries invest not only on robotics equipment but also related technologies infrastructure for academic effective operation. Academic libraries running within limited financial resources such expenditure may establish to the utilisation and adoption of these technologies (Demir, 2025)

Staff competencies and training is another challenges hindered the integration of robotics technologies in academic libraries. Abdulkareem and Tella (2026) point out that the successful implementation of these technologies require staff who have the knowledge and technical skills to operate the robotic systems therefore emphasise staff training as a crucial tools for successful adoption.

III. METHODOLOGY

This study adopts a descriptive survey design to examine the influence of robotics technology on library services delivery in academic libraries in Lagos state. The descriptive survey is aimed at collecting data on and systematically describing the characteristics, features, or facts about a given population. The descriptive survey design is

considered appropriate because the study seeks to obtain information from library professionals concerning their awareness, use, perceived influence, applications, and challenges associated with robotics technology in the delivery of library services. This design will enable the researcher to collect data from librarians regarding their experiences and perceptions of robotics technology and its influence on the delivery of library services.

➤ Population of the Study

The population for this study consist of all professional librarians working in the three selected academic libraries in Lagos state, Nigeria. Based on information obtained from the administrative offices of the libraries, the population include: University of Lagos Library with 25 librarians, Lagos state University Library with 20 librarians, and Yaba college of Health Technology Library with 15 librarians. Thus, the total population for the study is 60 librarians, all of whom are potential respondents for the study. These libraries were selected because they operate within academic environments where emerging technologies, including robotics technology, have potential applications in areas such as circulation, shelving, information retrieval, security, and other library service activities.

Table 1 The Distribution of the Study Population is Presented

S/N	University Library	Population	Percentage (%)
1	University of Lagos	25	41.7
2	Lagos State University	20	33.3
3	Yaba college of Health College Technology	15	25
	Total	60	100

Source: Researcher Field Survey, 2026

➤ Sampling Size and Sampling Techniques

The sample size for this study comprise of 60 respondents. Since the total population of the study is relatively small and manageable. The study adopt census or total enumeration sampling technique. Census sampling involves including every member of the identified population in the study. All the 60 respondents was included in the study. This approach is considered appropriate because it provides

an opportunity to obtain information from the entire identified population and eliminates the possibility of excluding relevant respondents from the study.

The table shows that the entire population of 60 respondents was used as the sample for the study. Thus, the sample size represents 100% of the study population.

Table 2 Distribution of Sample Size.

S/N	University Library	Population	Sampling Size
1	University of Lagos	25	25
2	Lagos State University	20	20
3	Yaba college of Health College Technology	15	15
	Total	60	60

Source: Researcher Field Survey, 2026

IV. ANALYSIS, INTERPRETATION AND DISCUSSION

➤ Demographic Profile of the Respondents

Table 3 Distribution of Respondent by Gender

S/N	Gender	Frequency	Percentage (%)
1	Male	45	75.0
2	Female	15	25.0
	Total	60	100

Table 3 shows that 45(75.0%) of the respondent are male while 15(25.0%) of the respondents were female indicating that there were more male than female in the study.

Table 4 Distribution of Respondent by Designation

S/N	Cadre	Frequency	Percentage (%)
1	Asst. Librarian	12	20.0
2	Librarian I	24	40.0
3	Librarian II	16	26.7
4	Principal Librarian	2	3.3
5	Senior Librarian	6	10.00
	Total	60	100

Table 4 show that 12(20.0%) hold the title of Asst. Librarian, 24(40.0%) hold the position of Librarian I, 16(26.7%) were Librarian II, follow by principal librarian

2(3.3%) and 6(10.0%) hold the position of Senior librarian. This implies that the majority of the respondent are Librarian I.

Table 5 Distribution of Respondent by Years of Working Experience

S/N	Years of work experience	Frequency	Percentage (%)
1	1-5 years	26	1.7
2	6-10 years	11	18.3
3	11-15 years	13	21.7
4	16-20 years	7	11.7
5	21 years and above	2	3.3
	Total	60	100

Table 5 revealed that 26(1.7%) of the respondents have 1-5 years of work experience, 11(18.3%) fall under the 6-10 years of working experience, 13(21.7%) Of the respondents have 11-15 years of work experience, 7(11.7%) have 16-20

years of working experience and 2(3.3%) of the respondent have 21 years and above in service. This shows that majority of the respondents have 1-5 years of work experience.

Table 6 Distribution of Respondent by Educational Qualification

S/N	Educational qualification	Frequency	Percentage (%)
1	BLIS/BSC	34	56.7
2	MLIS	13	21.7
3	ND/HND	8	13.3
4	PhD	5	8.3
	Total	60	100

Table 6 reveal that 34(56.7%) of the respondent hold a bachelor's degree (BLIS/BSC). A significant portion of the respondent hold a master's degree(MLIS), reflecting a good level of advanced academic qualification among the group. Meanwhile 8(13.3%) of the respondent have a National Diploma or Higher National Diploma (ND/HND) and 5(8.3%) in library and information science. This shows that majority of the respondent are BSC/BLIS holder. This indicate that the majority of the respondents are BLIS/BSC holder

➤ Presentation of Results Base on Research Questions

- Research question 1: What type robotics technology are currently utilises for library services in academic library in Lagos state.?

Table 7 Types of Robotics Technology Currently Used for Library Services in Academic Libraries in Lagos State.

S/N	Types of robot	Available	Not available	Not sure	Mean	S D
1	Humanoid or interactive service robot	54(90.0%)	5(8.3%)	1(1.7%)	2.82	0.57
2	Telepresence robot	17(28.3%)	40(66.7%)	3(5.0%)	1.62	0.9
3	Shelf-reading or inventory robot	19(31.7%)	37(61.7%)	4(6.7%)	1.7	0.93
4	Library chatbot or conversational virtual assistant	19(31.7%)	33(55.0%)	8(13.3%)	1.77	0.91
5	Automated storage and retrieval system	16(26.7%)	35(58.3%)	9(15.0%)	1.68	0.87
6	Autonomous delivery or transport robot	19(31.7%)	34(56.7%)	7(11.7%)	1.75	0.91

Source: Researcher Field Survey, 2026

Table 7 shows the type of robotics technology used for library service. It reveal that the most available type of robot is humanoid or interactive robot (mean=2.82, SD=0.57), which shows that the robot used by these and available for library services is humanoid or interactive robot. Other type of robot such as shelf-reading or inventory robot (mean=1.7, SD=0.93), Telepresence robot is (mean=1.62, SD=0.9), library chatbot or conversational virtual assistant (mean=1.77,

SD=0.91), autonomous delivery or transport robot (mean=1.75, SD=0.91) and automated storage and retrieval system (mean=1.68, SD=0.91).

- Research question 2: What is the influence of robotics technology on user's satisfaction with library services in academic library in Lagos state?

Table 8 Influence of Robotics Technology on User's Satisfaction with Library Services in Academic Library in Lagos State.

S/N	Item	SA	A	D	SD	Mean	SD
1	Robotics technology makes library services easier to access	33 (55.0)	21 (35.0)	5 (8.3)	1 (1.7)	3.43	0.72
2	Robotics services reduce the times I spend waiting for library services	21 (35.0)	28 (46.7)	5 (8.3)	6 (10.0)	3.07	0.92
3	Robotics services are easy to learn and use	18 (30.0)	34 (56.7)	5 (8.3)	3 (5.0)	3.12	0.76
4	Robotic services provide accurate and reliable results	24 (40.0)	24 (40.0)	10 (16.7)	2 (3.3)	3.17	0.83
5	I am satisfied with the library services provided through robotics technology	22 (36.7)	28 (46.7)	6 (10.0)	4 (6.7)	3.13	0.85
6	robotics technology has improved my experience of using the library	25 (41.7)	25 (41.7)	8 (13.3)	2 (3.3)	3.22	0.8

Source: Researcher Field Survey, 2026

Table 8 show the influence of robotics technology on user's satisfaction with library services. Respondents generally agree that robotics technology improved their experience on using the library (mean=3.22, SD=0.8). The strongest rating was to make services easier to access (mean=3.43, SD=0.72), with 54b Of 60 response in combination of both strongly agree and agree. Robotics services reduce the time I spend waiting for library services

recorded the lowest mean in the section (mean=3.07, SD=0.92)

- Research question 3: What is the impact of robotics technology on the efficiency of library services delivery in academic libraries in Lagos state?

Table 9 The Impact of Robotics Technology on the Efficiency of Library Services Delivery in Academic Library

S/N	Item	SA	A	D	SD	M	SD
1	Robotics technology helps library staff complete routine tasks faster	30 (50.0)	21 (35.0)	6 (10.0)	3 (5.0)	3.3	0.85
2	Robotics technology improves the speed of borrowing and returning materials	22 (36.7)	30 (50.0)	6 (10.0)	2 (3.3)	3.2	0.75
3	Robotics technology helps users locate library materials more quickly	25 (41.7)	27 (45.0)	6 (10.0)	2 (3.3)	3.25	0.77
4	Robotics technology improves the accuracy of library operations	26 (43.3)	30 (50.0)	3 (5.0)	1 (1.7)	3.35	0.66
5	Robotics technology helps the library manage its collections more effectively	26 (43.3)	24 (40.0)	9 (15.0)	1 (1.7)	3.25	0.77
6	Robotics technology allows staff to spend more time helping users with complex needs	16 (26.7)	28 (46.7)	12 (20.0)	4 (6.7)	2.93	0.86
7	Technical problems with robotic systems sometimes disrupt library services	23 (38.3)	22 (36.7)	10 (16.7)	5 (8.3)	3.05	0.95

Source: Researcher Filed Survey, 2026

Table 9 suggest that rating respondents generally perceived operational benefit. Improve the accuracy of library operation has the highest mean (mean=3.35, SD=0.66). Robotics technology allows staff to spend more time helping users with complex needs had the lowest mean (m=2.93, SD=0.86), while technical problems with robotic systems sometimes disrupt library services has the mean (m=3.05,

SD=0.95). This indicates that perceived benefit coexist with meaningful services continuity concerned.

- Research question 4: What are the challenges faced in the implementation of robotics technology for library services delivery in academic library in Lagos state?

Table 10 Challenges Faced in the Implementation of Robotics Technology for Library Services Delivery

S/N	Item	SA	A	D	SD	M	SD
1	High cost of purchasing robotic systems	34 (56.7)	23 (38.3)	2 (3.3)	1 (1.7)	3.5	0.65
2	High costs of maintenance and repairs	31 (51.7)	24 (40.0)	4 (6.7)	1 (1.7)	3.42	0.7
3	Unreliable electricity or internet connectivity	31 (51.7)	24 (40.0)	4 (6.7)	1 (1.7)	3.42	0.7
4	Lack of staff training or technical expertise	27 (45.0)	26 (43.3)	7 (11.7)	0 (0.0)	3.33	0.68
5	Limited technical support	29 (48.3)	28 (46.7)	3 (5.0)	0 (0.0)	3.43	0.59
6	Resistance to adopting new technology among staff or users	26 (43.3)	28 (46.7)	6 (10.0)	0 (0.0)	3.33	0.66
7	Difficulty integrating robotics with existing library systems	34 (56.7)	20 (33.3)	6 (10.0)	0 (0.0)	3.47	0.68
8	Concerns about the reliability or accuracy of robotic systems	29 (48.3)	21 (35.0)	10 (16.7)	0 (0.0)	3.32	0.75
9	Concerns about reduced staff roles or job security	28 (46.7)	28 (46.7)	4 (6.7)	0 (0.0)	3.4	0.62

Source: Researcher Field Survey, 2026

Table 9 present the challenges faced by librarians in utilisation of robotics technology for library services in academic library in Lagos state. High costs of maintenance and repairs (mean=3.42, SD=0.7) and Unreliable electricity or internet connectivity (mean=3.42, SD=0.7) was the most strongly challenges uphold the implementation and utilisation of robot by librarians. Limited technical support with the mean (m=3.43, SD=0.59) was also widely endorsed.

V. FINDINGS

➤ *Types of Robotics Technology Currently Used for Library Services in Academic in Academic Libraries in Lagos State.*

The findings on the types of robotics technology used for library services reveal that humanoid or interactive robots are the most common among librarians in academic libraries in Lagos State. This suggests that current applications of robotics are primarily focused on user engagement and direct assistance, including providing library orientation, promoting services, and answering basic enquiries. The popularity of these robots may reflect their ability to communicate with users in a familiar and accessible way, making them suitable for welcoming visitors and guiding them to relevant resources or service points. This finding is consistent with Igbintovia and Adigun (2026), who observed that humanoid robots can engage users, promote library services, conduct orientation, and provide basic information. Their use may therefore help libraries improve access to routine assistance and create a more interactive service environment. However, the prevalence of humanoid or interactive robots does not necessarily mean that other forms of robotics are absent rather, it may indicate that these robots are currently more visible or practical for user-facing tasks. Libraries could build on this application by exploring how robots might support additional services, while ensuring that users who prefer human assistance continue to have access to it.

➤ *Influence of Robotics Technology on User's Satisfaction with Library Services in Academic Library in Lagos State.*

On the Influence of robotics technology on user's satisfaction with library services in academic library in Lagos state. The result that indicate that robotics technology has a

positive influence on users' satisfaction with library services in academic libraries in Lagos State. Respondents generally perceived robotic services as making library services easier to access and improving their overall experience of using the library. The findings further indicate that robotic services provide accurate and reliable results, which can enhance users' confidence in library services. The findings reveal that robotics technology has a positive influence on users' satisfaction with library services in academic libraries in Lagos State. Respondents generally perceived robotic services as making library services easier to access and improving their overall experience of using the library. The findings further indicate that robotic services provide accurate and reliable results, which can enhance users' confidence in library services. Respondents also perceived robotic services as relatively easy to learn and use, suggesting that user-friendly robotic systems can contribute to a more satisfactory library experience. The findings show that users are generally satisfied with library services provided through robotics technology. However, the use of robotics appears to have a lesser influence on reducing the time users spend waiting for library services. Overall, the findings suggest that robotics technology contributes to improved accessibility, convenience, reliability, and user experience, thereby enhancing users' satisfaction with library services.

➤ *The Impact of Robotics Technology on the Efficiency of Library Services Delivery in Academic Library*

On the impact of robotics technology on the efficiency of library services delivery in academic library. The findings suggest that robotics technology contributes to more efficient library service delivery by supporting routine tasks, circulation, resource retrieval, and operational accuracy. This is consistent with Tella (2020), who discusses the potential of robots to assist with routine library activities and improve service delivery, while emphasising that librarians' readiness is important for successful integration. Similarly, De Sarkar (2023) identifies circulation, document retrieval, shelving, and materials handling as areas where robotics can support library operations.

➤ *Challenges Faced in the Implementation of Robotics Technology for Library Services Delivery in Academic Library*

On the challenges facing the implementation of robotics technology on library services delivery in academic libraries in Lagos state. The findings revealed that high cost of purchasing robotic systems, difficulty integrating robotics with existing library systems, high cost of maintenance and repair and unreliable electricity or internet connectivity were the major challenges facing the implementation of robot. This findings is consistent with Demir (2025), who identified cost as a significant barrier to the adoption of robotics and artificial intelligence in libraries. Similarly, The need for staff training and technical expertise also aligns with Tella (2020), who emphasised librarians' readiness and the importance of upskilling and also concerns about job security that librarians may fear replacement, although robotics is intended to complement their work. This findings is also supported by Oladokun et al. (2023), who recognised robotics' potential to improve library services while drawing attention to implementation demands.

VI. CONCLUSION

The findings demonstrates that humanoid robot was mostly used and available in academic libraries in Lagos state and is mainly use for interactive, including orientation and provision of basic enquiries to users. It benefit is associated with improve accessibility, reliability, convenience, and user satisfaction, while also supporting the accuracy and efficiency of routine task. However, it effect on reducing waiting times appears limited and adoption is constrained by high acquisition and maintenance costs, integration difficulties, unreliable infrastructure, and the need for staff training and technical expertise. Therefore, robotics can strengthen library service delivery when implementation is supported by adequate resources and staff capacity, while preserving access to human assistance.

RECOMMENDATIONS

The following recommendation are made base on the findings of the studying:

- Academic should increasingly expand the integration of robotics technology for library services humanoid robot which function to support routine task such as circulation, shelving, retrieval of information resources and handling of library material.
- Library management should assess the cost and expand benefit of adoption of this technologies for library services, and allocate adequate funding for purchase, repair and maintenance.
- Institution should strengthen electricity and internet infrastructure to support the reliable operation of robotic services.
- Librarians' and other relevant staff should receive training to operate, maintain, and effectively integrate robotics into library services.
- Libraries should regularly assess users' experiences with robotic services, including ease of use, accuracy,

reliability, accessibility, and waiting times, and use the feedback to improve implementation.

REFERENCES

- [1]. Abdulkareem, A. K., & Tella, A. (2026). Robots in the stacks: Automation, service innovation and emerging case applications in libraries. *Library Hi Tech News*, 1–4. <https://doi.org/10.1108/LHTN-03-2026-0066>
- [2]. De Sarkar, T. (2023). Implementing robotics in library services. *Library Hi Tech News*, 40(1), 8–12. <https://doi.org/10.1108/LHTN-11-2022-0123>
- [3]. Demir, G. (2025). Artificial intelligence (AI) and robotic technologies implementation in libraries: An integrative literature review. *Bilgi Yönetimi*, 8(1), 77–98. <https://doi.org/10.33721/by.1645554>
- [4]. Dube, T. V., Rammutloa, M. W., & Matatiele, R. (2024). Skills and competencies of academic librarians to use information technology tools in the digital era: A systematic literature review. *Information Development*, 42(4), 2127–2150. <https://doi.org/10.1177/02666669241302054>
- [5]. Dudek, G., & Jenkin, M. (2024). *Computational principles of mobile robotics*. Cambridge university press.
- [6]. Echedom, A. U., & Okuonghae, O. (2021). Transforming academic library operations in Africa with artificial intelligence: Opportunities and challenges: A review paper. *New Review of Academic Librarianship*, 27(2), 213–230. <https://doi.org/10.1080/13614533.2021.1906715>
- [7]. Egamberganova, Z. (2025). Integrating RFID with smart shelves and robotic retrieval systems for the autonomous library. *European Review of Contemporary Arts and Humanities*, 1(4) 45–50. <https://claritaslumen.org/index.php/ercah/article/view/23>
- [8]. Ezekwibe Deborah Uzoma, Okafor Ngozi Goodness, Ezeibe Ozioma Ebuka, Modili Amarachi Chigozie (2025), Implication of Artificial Intelligence and Robotics in Library and Information Services. *Library and Information Science Digest*, 19(1), 46–59. <https://doi.org/10.70118/LISD0202501901.4>
- [9]. Igbinoia, M. O., & Adigun, G. O. (2026). *RoboScholar: Pioneering robotic library services in Nigeria*. *Library Hi Tech News*. <https://doi.org/10.1108/LHTN-07-2026-0156>
- [10]. Javaid, M., Haleem, A., Singh, R. P., & Suman, R. (2021). Substantial capabilities of robotics in enhancing Industry 4.0 implementation. *Cognitive Robotics*, 1, 58–75. <https://doi.org/10.1016/j.cogr.2021.06.001>
- [11]. Jha, S. K. (2023). RETRACTED: Application and use of telepresence robots in libraries and information center services: prospect and challenges. *Library Hi Tech News*, 40(10), 9–13. <https://doi.org/10.1108/lhtn-10-2023-0184>
- [12]. Moravec, H.P. (2026, January 27). robot. Encyclopedia Britannica. <https://www.britannica.com/technology/robot-technology>

- [13]. Oladele, S. O., & Nweke, L. N. (2025). Role of academic libraries in supporting student learning and research (a case study of federal polytechnic ilaro, ogun state. *Interdisciplinary Journal of Educational Practice (IJEP)*, 12(3), 43–52. <https://doi.org/10.5281/zenodo.17099258>
- [14]. Oladokun, B. D., Owolabi, K. A., Aboyade, M. A., Wiche, H. I., & Aboyade, W. A. (2023). Emergence of robotic technologies: Implications for Nigerian academic libraries. *Library Hi Tech News*, 40(6), 15–18. <https://doi.org/10.1108/LHTN-02-2023-0031>
- [15]. RobCo GmbH. (2026). *RobCo: Autonomous industrial robotics*.
- [16]. Shahzad, K., Khan, S. A., & Iqbal, A. (2025). Factors influen<https://www.robco.de/>ing the adoption of robotic technologies in academic libraries: A systematic literature review (SLR). *Journal of Librarianship and Information Science*, 57(3), 687–704. <https://doi.org/10.1177/09610006241231012>
- [17]. Talatu Rabasa, & A. Abrizah. (2024). The academic librarians' empowerment and engagement as research partners: a qualitative study. *Malaysian Journal of Library and Information Science*, 29(1), 75–89. <https://doi.org/10.22452/mjlis.vol29no1.4>
- [18]. Tano, I. M., & Cajala, V. (2024). *Revolutionizing librarianship: Navigating the digital transformation in academic libraries*. *Pedagogy Review: An International Journal of Educational Theories, Approaches and Strategies*, 2(1), 159–175. <https://doi.org/10.62718/vmca.pr-ijetas.2.1.SC-0724-014>
- [19]. Tella, A. (2020). Robots are coming to the libraries: Are librarians ready to accommodate them? *Library Hi Tech News*, 37(8), 13–17. <https://doi.org/10.1108/LHTN-05-2020-0047>
- [20]. Wójcik, M. (2023). Areas and contexts of the use of robotics in libraries: An overview of the applied solutions and a discussion of prospects. *Library Hi Tech*, 42(5), 1443–1456. <https://doi.org/10.1108/LHT-10-2022-0487>