



EMERGING TECHNOLOGIES AND SERVICE DELIVERY IN FEDERAL UNIVERSITY LIBRARIES IN SOUTH-SOUTH NIGERIA

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Abstract

Purpose – This study examined the relationship between emerging technologies and library service delivery in federal university libraries in South-South Nigeria. Specifically, the study determined the relationships between digital repositories, cloud computing, chatbots and library service delivery.

Design/methodology/approach – The study adopted a correlational research design. The population comprised 135 librarians in ten federal university libraries in the South-South geopolitical zone of Nigeria. Census sampling was used, and 124 completed copies of the questionnaire were returned and found usable for data analysis. Data were collected using a self-structured questionnaire titled Emerging Technology and Library Services Delivery (ETLSD), which was validated by experts for face and content validity. Data were analyzed using Pearson Product Moment Correlation (PPMC) with SPSS version 25.

Findings – The findings revealed significant positive relationships between digital repositories and library service delivery, cloud computing and library service delivery, and chatbots and library service delivery. The study established that the application of these emerging technologies is associated with improved accessibility, efficiency, responsiveness and effectiveness of library service delivery in federal university libraries.

Practical implications – The study recommends that federal university libraries should strengthen their digital repositories, invest in reliable cloud computing infrastructure and integrate chatbot technology into library services

Originality/value – The study provides empirical evidence on the relationships between selected emerging technologies and library service delivery in federal university libraries in South-South Nigeria, thereby providing useful insights for library administrators, policymakers and librarians seeking to improve the quality and effectiveness of technology-driven library services.

Keywords: Emerging technologies, digital repositories, cloud computing, chatbots, library service delivery.



Introduction

The rapid development in technologies and its integration into the operations of the library has greatly transformed the traditional roles of libraries especially academic libraries from a mere physical repository of books into technology-driven hubs for information resource preservation, teaching and learning support and knowledge dissemination. Contemporary library users increasingly require services that are accessible, timely, flexible and responsive to their changing information needs. Academic libraries are adopting emerging technologies to improve the management of information resources and enhance the effectiveness of service delivery.

Consequently, service delivery in the library refers to the different processes and way the library assists in ensuring that information needs of users are satisfied, it is a systematic delivery of information resources, facilities, humanly and technologically for users' satisfaction, these may cover different critical areas such as reference, circulation, user education among others (Igbokwe, 2023). Among these technologies, digital repositories, cloud computing and chatbot technology are increasingly relevant because they support different dimensions of library r services.

Digital repositories have become important components of modern university libraries because they provide structured platforms for collecting, organizing, preserving and disseminating scholarly and institutional information. Bharath, (2024) holds that it facilitate access to research outputs such as journal articles, theses, dissertations and research data while increasing the visibility and accessibility of institutional knowledge. By enabling users to discover and access scholarly resources remotely, digital repositories can reduce barriers associated with physical access to library collections and consequently strengthen library service delivery. In pursuance of preservation of resource of libraries digital technology has the capacity to support preservation,



knowledge sharing and uninterrupted access that makes electronic resources particularly valuable in an increasingly digital academic environment. It is pertinent to note that most digital repositories are hold on cloud for unlimited access (Ojobor, et al, 2025).

Cloud computing which also involve the storage of information resources in the cloud has also introduced significant possibilities for improving university library operations. Through internet-based access to computing resources, storage, software and databases, cloud computing enables libraries to manage and share information resources more efficiently while supporting remote access to library services. Aminikpo, et al., (2024) pointed those librarians perceived cloud computing to be of immense benefit because it allows librarians to manage activities such as cataloguing, circulation, user records, and resource sharing through cloud-based systems which is easy and fast. It can facilitate information storage, organization, retrieval and dissemination without requiring users to depend entirely on locally installed systems. The integration of cloud computing can therefore enhance the efficiency and accessibility of library services, although challenges such as inadequate ICT infrastructure, poor internet connectivity, unreliable power supply and information security concerns may affect its effective application in Nigerian university libraries (Omehia & Tom-George, 2020).

Similarly, chatbot technology is creating new opportunities for interactive and user-centered library services. Chatbots, as artificial intelligence applications capable of simulating conversations with users, can provide answers to frequently asked questions, guide users to library resources, provide information about library services and assist users beyond conventional service hours. Their ability to provide rapid and continuous responses can reduce repetitive enquiries handled by librarians and improve users' interaction with library resources and services (Nguyen,



2020). Thus, chatbot technology has the potential to make library services more responsive, accessible and convenient.

The increasing adoption of digital repositories, cloud computing and chatbots reflects the broader transformation of university library service delivery. However, the availability of these technologies does not automatically guarantee effective services, particularly where infrastructural, technical and security challenges persist. There is therefore a need for empirical evidence on how these emerging technologies relate to service delivery within the Nigerian university library environment. This study therefore, examines the relationships between digital repositories, cloud computing, service delivery, and chatbot technology and service delivery in federal university libraries in South-South Nigeria. By focusing on these relationships, the study provides evidence that can inform technological adoption and strategies for improving the quality, accessibility and effectiveness of university library services.

Problem Statement

The rapid integration of emerging technologies into service delivery process of academic libraries has created new opportunities for improving the quality, accessibility and efficiency of library service. These technologies are increasingly being used to support information storage, retrieval, preservation, dissemination, user assistance and more. Ideally, these technologies should enable federal university libraries to provide faster, more accessible, flexible and user-centred services. Ordinarily, the mere adoption of emerging technologies does not necessarily translate into effective service delivery. The extent to which digital repositories, cloud computing and chatbots actually contribute to improved library services remains an issue that requires indebt investigation, particularly within the Nigerian university library environment.



The problem of the study therefore, is to ascertain the relationship between digital repositories, cloud computing, chatbot technologies and library services. This evidence will help library managers and policymakers determine which technologies contribute meaningfully to improved services and where interventions are most needed.

Research Questions

The study was guided by the following research questions

1. What is the relationship between digital repositories and service delivery in federal university libraries in South South Nigeria?
2. What is the relationship between cloud computing and service delivery in federal university libraries in South South Nigeria?
3. What is the relationship between chatbots service delivery in federal university libraries in South South Nigeria?

Hypotheses

The following hypotheses were formulated and tested at 0.5 level of significant

1. There is no significant relationship between digital repositories and service delivery in federal university libraries in South South Nigeria
2. There is no significant relationship between cloud computing and service delivery in federal university libraries in South South Nigeria.
3. There is no significant relationship between chatbots and service delivery in federal university libraries in South South Nigeria.



Literature Review

Three main variables serve as the framework for this literature review: digital repositories, cloud computing and smart library services

Digital Repositories and Services Delivery

Digital repositories are organized digital collections that store, manage, and provide access to various types of digital content, including research data, scholarly articles, multimedia files, and institutional records. They serve as a vital infrastructure for preserving and disseminating knowledge in the digital age. According to a study by Kari and Orji, (2022) digital repositories facilitate an array of services such as long-term preservation of digital assets while promoting open access to research outputs. This accessibility not only enhances the visibility of scholarly work but also fosters collaboration and knowledge sharing among researchers, educators, and the general public. Institutional repositories serve as vital information sources for academics and policymakers. In a similar study Bharath, (2024) affirmed that there is a positive correlation between institutional repositories and provision of services in library. This assertion is true because effective teaching and learning heavily rely on access to documented materials, which academic libraries can offer through their repositories. Institutional repositories significantly enhance visibility and citation rates for their contents, as evidenced by an empirical evaluation of thirteen studies. This indicates that the academic community frequently engages with these repositories, helping institutions and libraries increase their visibility and contribute to knowledge (Björk, et al., 2021).



Institutional repository is a web based technique that will be easy for users to access or make their work visible, preserve their research output or scholarly content in a systematic way, to exhibit the research and to establish a simple mechanism for accessing scholarly content, to analyze the major research activities ongoing in the institution, to facilitate uninterrupted access to the scholarly content, it saves the time of the users and also it enable a wider visibility Bharath, (2024) affirmed that institutional repositories (IRs) are critical infrastructures in university libraries for collecting, organizing, preserving, and disseminating the intellectual outputs of an institution. They provide open access to scholarly resources while enhancing global visibility of research and long term preservation.

Cloud computing and Smart Library Services

Onwubiko, et al. (2021) described cloud computing as a seamless process of storing and sharing of data, it is the delivery of computing services such as network, platform, software, infrastructure among others over the internet which if adequately carried out is congruent to promoting satisfactory services in organization. Also, in a related study conducted by Dumbiri (2024) cloud computing as process of providing computer system resources and services on demand delivery is user friendly and enhance work turnovers. These findings are true and obvious because cloud computing involves the delivery of databases, software, storage, networking, resources sharing and others internet enabled-services which is positively related to service delivery.

Cloud computing allows users to access resources on a central physical data that is in fact shared among many other users. This is in agreement with the opinion of cloud computing as a network model that enable convenient scaled network access to a pool of configured electronic resources such as network, servers, and storage applications to aid services delivery. This implies that instead



of relying on local servers of the agency involve to handle these services, cloud computing allows users to access and utilize computing resources remotely through a network connection.

Activities of libraries and information centers involve the management of large volume of data especially the processing, organizing, storing, and sharing of information resources. However, cloud computing in library allows librarians to provide information service to her patron without time or distance barrier. This functionality promotes knowledge sharing, dissemination of information, effectively storage which can completely enhance service delivery of library services. Integrating cloud computing into delivery of library services can impact on the productivity of the library positively, basic library routines such as classification, organization, storing, security and dissemination using software, network and infrastructure provided in the cloud and delivered on demand saves time, and ensure security (Omehia & Tom-George, 2020; Ajani, et al., 2022).

Chatbot Technology and Library Services Delivery

Adetayo (2023) specifically, viewed chatbot as a piece of software or application that uses artificial intelligence (AI) to simulate a discussion or chat with a human via a messaging service, a weblog, a website, a smartphone app, or an android smartphone. Similary, Ukaegbu and Aminikpo (2026) in a related study on librarians' perception on the use of chatbots and robotic technology for service delivery in Academic Libraries in Rivers State reviled that librarians perceived that chatbot is essential for on a library website to feature easily accessible content to facilitate access to library resources and showcase services and events. They added that it is effective tool for getting acquainted with staff, location, resources and schedule thereby enhance library services to users even outside the location of the library



Chatbots can be used in providing 24/7 user services by answering complex and diverse queries, navigating the library website provides personalized feedbacks and assisting with research by responding to questions from library users and directing them to specific library resources. Chatbots can enable library professionals to increase their efficiency and productivity by responding to difficult questions and save time answering repetitive queries (Mckie & Narayan, 2019; Rodriguez & Mune, 2022; Sanji, et al., 2022).

Methodology

This study adopted a correlational research design. Correlational research design is a design used in determining the degree of relationship or extent of strength that exist between two or more variables. The population of the study comprised of all the one hundred and thirty-five (135) librarians that are working in the ten Federal University Libraries in South-South Geopolitical zone of Nigeria. The breakdown is as contained on Table 3.1 below.

Table 1.0: Population distribution table.

S/N	Name of Institution	Librarians
1	Admiralty University of Nigeria (ADUN)	13
2	University Of Benin Nigeria (UNIBEN)	11
3	University of Calabar, Cross Rivers State	29
4	Federal University of Petroleum Resources Effurun (FUPRE)	8
5	Federal University Otueke Bayelsa State (FUO)	12
6	Federal University of Technology, Ikot Abasi (FUTIA)	9
7	Nigerian Maritime University Okerenkoko	10
8	University of Port Harcourt	18
9	University of Uyo	24
10	Federal University of Environment and Technology Tai Ogo	1
Total		135



Source: (*Office of the University Librarians in Universities under study, July 2026*).

The sample of the study consisted of all the 135 librarians drawn from the ten federal university libraries in south south geopolitical zone of Nigeria. The sample of the study was obtained using census sampling method, however only 124 respondents successfully returned their questionnaire and was used for the analysis of the data. A self-structured questionnaire titled "Emerging Technology and Library Services Delivery" (ETLSD) was used to elicit information for the study. The questionnaire for this study was subjected to both face and content validity by two experts, two from the department of Library and Information Science Ignatius Ajuru University of Education (IAUE) Port Harcourt, face arrangement and the contents of the questionnaire items were checked to be in-line with the objectives of the study. Data collected was analyzed using Pearson Product Moment Correlation (PPMC) with the aid of Statistical Package for Social Sciences (SPSS) version 25. The "r" coefficient of the PPMC were used to answer the research questions, while the p.-value were used in testing the null hypotheses at 0.05 level of significance on the same table. Where the p-value is equal to or less than the level of significance ($p \leq 0.05$), the null hypotheses was rejected, but where it is higher than the significance level ($p \geq 0.05$), the null hypotheses were accepted.



Results

Research question 1: What is the relationship between digital repositories library service delivery in federal university libraries in South-South Nigeria?

Hypothesis 1: There is no significant relationship between digital repositories and smart library services in federal university libraries in South-South Nigeria.

Table 1: Summary of Pearson Product Moment Correlation on the relationship between digital repositories and library service delivery in the Federal university libraries in South-South Nigeria.

Variables	Digital Repositories	Library Service Delivery
Digital Repositories Pearson Correlation	1	.842**
Sig. (2-tailed)		.001
N	119	119
Library Services Pearson Correlation	.842**	1
Sig. (2-tailed)	.001	
N	119	119

**. Correlation is significant at the 0.05 level (2-tailed).

Table1 shows the summary of Pearson Product Moment Correlation strength of relationship between digital repositories and library services delivery which indicates a very strong positive relationship between the two construct with a correlation coefficient value of ($r=.842$). Also, the null hypothesis which states that there is no significant relationship between digital repositories and library service delivery was rejected and the reverse upheld. This is because the p-value is less than the significant value ($p=.001 < 0.05$), this implies that there is a significant relationship between digital repositories and library service delivery.



Research question 2: What is the relationship between cloud computing and library service delivery in federal university libraries in South-South Nigeria?

Hypothesis 2: There is no significant relationship between cloud computing and library service delivery in federal university libraries in South-South Nigeria

Table 2: Summary of Pearson Product Moment Correlation on the relationship between Cloud Computing and library service delivery in the Federal university libraries in South-South Nigeria.

Variables		Cloud Computing	Smart Library services
Cloud Computing	Pearson Correlation		.751**
	Sig. (2-tailed)		.000
	N	119	119
Library Services	Pearson Correlation	.751**	1
	Sig. (2-tailed)	.000	
	N	119	119

**. Correlation is significant at the 0.05 level (2-tailed).

Table 2 presents the summary of Pearson Product Moment Correlation on the relationship between cloud computing and library service delivery in the Federal university libraries in South-South Nigeria. The result indicates a strong positive relationship between the two construct with a correlation coefficient value of ($r=.751$). Also, the null hypothesis which states that there is no significant relationship between cloud computing and smart library services was rejected and the reverse hypothesis upheld. This is shown in the p-value which is .000 is less than the sig-value of 0.05 ($p=.000<0.05$). Hence, the null hypothesis which states that there is no significant relationship between cloud computing and library service delivery was rejected and the reverse hypothesis upheld.



Research question 3: What is the relationship between Chatbots and library service delivery in federal university libraries in South-South Nigeria?

Hypothesis 3: There is no significant relationship between Chatbots and library service delivery in federal university libraries in South-South Nigeria

Table 3: Summary of Pearson Product Moment Correlation on the relationship between Chatbots and library service delivery in the Federal university libraries in South-South Nigeria.

Variables		Chatbots	Library Service
Chatbots	Pearson Correlation	1	.875**
	Sig. (2-tailed)		.003
	N	119	119
Library delivery	ServicePearson Correlation	.875**	1
	Sig. (2-tailed)	.003	
	N	119	119

** . Correlation is significant at the 0.05 level (2-tailed).

The result from table 3 shows the summary of Pearson Product Moment Correlation on the strength of relationship between chatbots and library service delivery in the Federal university libraries in South-South Nigeria. The result indicates a strong positive relationship between the two constructs with a correlation coefficient value of ($r=.875$). It further suggests that, there is a significant relationship between chatbot and library service delivery. The p-value which is statistically significant at 0.003 which is less than 0.05 level of significant ($p=.003<0.05$). Therefore, the null hypothesis is rejected and the alternative accepted.

Discussion of Findings

There is a very strong positive and significant relationship between digital repositories and library service delivery in federal university libraries in South-South Nigeria. This indicates that effective use of digital repositories is associated with improved library service delivery. This finding is in agreement with Bharath (2024) who in their study reported that institutional digital repositories



enhance access to scholarly information and support improved academic library services. Similarly, Kari and Orji (2022) found that digital technologies, including institutional repositories, contribute significantly to the effectiveness and accessibility of academic library services.

The finding on the second research question showed a strong positive and significant relationship between cloud computing and library service delivery. This implies that greater adoption of cloud computing is associated with better library service delivery in federal university libraries in South-South Nigeria. This finding is consistent with Onwubiko, et al (2021) who noted that cloud technologies improve accessibility, resource management and the delivery of technology-driven library services. It also agrees with Aminikpo, et al. (2024), who observed that emerging technologies enhance the efficiency, accessibility and responsiveness of academic library services. Also, finding on the third research question revealed a very strong positive and significant relationship between chatbots and library service delivery. This indicates that the integration of chatbot technology is strongly associated with improved library service delivery in federal university libraries in South-South Nigeria.

Chatbots can provide users with prompt responses to routine enquiries, assist in locating library resources, provide basic reference assistance and offer support beyond conventional service hours. Consequently, their application can reduce delays in responding to users and enable librarians to devote more attention to complex information and research needs. This finding supports Wagwu, et al., (2024) who reported that artificial intelligence applications can improve the accessibility, responsiveness and efficiency of academic library services. Similarly, Sanji, et al., (2022) found that AI-powered conversational technologies have considerable potential to support user enquiries and enhance the delivery of library and information services.



Conclusion and Recommendations

The study concludes that emerging technologies have significant positive relationships with library service delivery in federal university libraries in South-South Nigeria. Digital repositories, cloud computing and chatbots were all found to contribute positively to the effectiveness of library services. This implies that the integration of these technologies can enhance access to information resources, improve the efficiency and responsiveness of library services, support remote access, and provide timely assistance to library users. The findings therefore demonstrate that emerging technologies are important tools for transforming traditional library services into more accessible, efficient and user-centered services.

Based on the findings of the study, the following recommendations are made:

1. Federal university libraries should strengthen their digital repositories by providing adequate infrastructure, regularly updating repository contents, and digitizing relevant institutional resources.
2. Federal university libraries should invest in reliable cloud computing infrastructure to improve remote access to information resources and enhance the efficiency of library service delivery.
3. Library management should integrate chatbot technology into library services to provide timely responses to routine users' enquiries and improve the accessibility and responsiveness of library services.
4. Librarians should be provided with regular training and retraining on the effective use and management of digital repositories, cloud computing and chatbot technologies for improved service delivery.



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