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Deployment of Smart Library Services in University Libraries in the Delta State in Nigeria During the Post Covid – 19 Era

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ABSTRACT
The study examines the deployment of smart library services in university libraries in the Delta State, Nigeria in the Post Covid –19 era. The population for this study is ninety – five (95). This number consisted of the total population of librarians and paraprofessional librarians in five (5) University Libraries. The data collected from the respondents were analyzed using descriptive statistics. The findings from the research showed that there is existence of smart library services. However, the deployment is low. Consequently, the study recommends that university libraries should expand the utility of smarter library services and that university libraries should step up the deployment of smart library services for improved services in the Post Covid -19 pandemic era since deployment is low.

Keywords: Smart library, Covid-19, Pandemic, Advanced technologies, artificial intelligence

1. INTRODUCTION

Smart library is a library that leverages modern technology to improve its operations and services. In a journal article, the term "smart library" might refer to a library that has implemented various digital tools, such as online databases, e-books, and mobile applications, to enhance its offerings and streamline its processes. The concept of a smart library represents a shift towards a more digital and technology-driven approach to library management and services. According to Wang, Chen, Xu, and Wang (2019) and Zhang, Xu & Wang (2021). A smart library is another kind of library that takes on present day innovations, for example, artificial intelligence, machine learning, man-made consciousness, the Web of Things, distributed computing, and huge information to upgrade the administration of library assets, work on the nature of library administrations, and increment client fulfillment. Another age of libraries coordinates conventional library assets with computerized assets and furnishes clients with a more helpful and customized library experience.

Given the various definitions above, a smart library is a modernized library that incorporates technology to enhance the experience of library users and optimize the library's resources. It provides access to a vast collection of resources in various formats, such as books, journals, and multimedia materials, using digital technology.

1.1 Problem Statement

The Post Covid-19 pandemic era has brought about a significant shift in the way academic activities are conducted, particularly in university libraries. With the need to maintain social distancing and reduce physical contact, traditional library services have become limited and insufficient for meeting the increasing demand for academic resources. In response to these challenges, there is a growing need for the deployment of smart library services that leverage technology to enhance access to resources, improve service delivery and ensure safety in university libraries. However, despite the potential benefits of smart library services, there are several challenges that must be addressed to ensure their successful deployment and adoption in university libraries. Some of the key issues include the lack of infrastructure and funding, inadequate technical expertise, resistance to change, and concerns about privacy and security. Therefore, the problem this study seeks to address is the deployment of smart library services in university libraries in the post Covid-19 pandemic era. In particular, the study focused on the challenges and opportunities that came with the deployment smart library services, determine the most important factors that influences the adoption, and suggest ways to get around the obstacles that prevent their successful implementation.

1.2 Objectives of the Study

The main objective of the study was to examine the deployment of smart library services in university libraries in the Delta State, Nigeria in the Post Covid –19 era. Explicitly, the research will investigate:

i. To determine Smart library services in university libraries in Delta State, Nigeria in Post Covid-19 era.
ii. To investigate the extent of deployment of smart library technologies in university libraries in Delta State, Nigeria in Post Covid-19 era.

1.3 Research Questions

(i) What are the smart library services in university libraries in Delta State, Nigeria in Post Covid-19 era?
(ii) What is the extent of deployment of smart library technologies in university libraries in Delta State, Nigeria in Post Covid-19 era?

2. LITERATURE REVIEW

Smart library services refer to the use of advanced technologies, such as artificial intelligence, machine learning, automation, and data analytics, to enhance library services and operations. These technologies can streamline library processes, improve access to information, and enhance user experiences in various ways. In the context of university libraries in Delta State, Nigeria, the deployment of smart library services may have been impacted by the Covid-19 pandemic. The pandemic has forced many institutions, including universities and libraries, to adapt to new ways of operating to ensure the health and safety of staff and users. This may have resulted in changes in how smart library services are deployed and utilized. The deployment of smart library technologies in academic libraries has become increasingly important in the post-covid-19 era. According to a study by Kari, Abdullah, and Zainab (2021), the pandemic has accelerated the adoption of digital technologies in academic libraries, and smart libraries are emerging as a crucial tool for improving user experience and meeting the changing needs of library patrons. Smart libraries utilize technologies such as artificial intelligence, machine learning, and the Internet of Things to enhance library services, automate tasks, and provide personalized recommendations to users (Afolabi & Popoola, 2021).

One example of a smart library deployment in the post-covid-19 era is the implementation of virtual assistants or Chabot to assist users in finding and accessing library resources remotely. This technology has become increasingly important as more students and faculty rely on remote access to library services due to the pandemic (Kari et al., 2021). In addition, the use of sensors and data analytics can help libraries to better understand user behavior and optimize the use of physical library spaces (Afolabi & Popoola, 2021). In a research conducted by Ali and Mahmood (2021), that concentrated on the challenges faced by libraries during the pandemic and how they have responded with smart library services such as contactless checkout, online book reservations, and virtual programming. The study concluded by proposing future directions for the deployment of smart library technologies, including the integration of artificial intelligence, machine learning, and natural language processing to enhance virtual reference services and recommendation systems. There has been a significant increase in the deployment of smart library technologies in academic libraries in the post-covid-19 era. According to a recent survey conducted by the Association of College and Research Libraries (ACRL), 76% of academic libraries are planning to invest in smart library technologies in the next few years (ACRL, 2021). One of the most widely adopted smart library technologies is the use of artificial intelligence (AI) and machine learning (ML) algorithms to improve library services. These technologies can help academic libraries personalize their services to meet the specific needs of their patrons. For example, AI-powered chatbots can help patrons with reference questions or provide personalized reading recommendations based on their reading history and RFID (Radio Frequency Identification) technology for contactless check-in and check-out of library materials. (Sethi & Sharma, 2021 and Kumar & Kumar, 2021).

There is evidence of deployment of smart library services in a global scale. However, in Africa, several university libraries also deployed smart library services in the post covid-19 pandemic era. The University of Cape Town Libraries also implemented smart library services, such as automated book retrieval systems, virtual reference services, and digital lending platforms, to enhance access to library resources and services during the pandemic (University of Cape Town Library, 2021). Makerere University Library have introduced smart library services, such as online catalog search, e-book lending, and digital document delivery, to facilitate remote access to library materials for students and faculty during the pandemic. The University of Lagos Library may have implemented smart library services, such as self-checkout kiosks, online renewals, and personalized recommendation systems, to promote contactless interactions and improve user experience in the library during the post-pandemic period (Adekunle, Ojo, & Mohammed (2020). The University of Nairobi Library may have introduced smart library services, such as mobile apps for accessing library resources, virtual library tours, and online research consultations, to adapt to the changing needs of users in the post covid-19 era (University of Nairobi Library, 2021).

3. RESEARCH METHODOLOGY

The study employed a quantitative methods research design, using structured questionnaires to collect data from librarians in university library in the Delta Region. The population for this study is ninety-five (95) Librarian. This number consisted of the total population of librarians and paraprofessional librarians in five (5) University Libraries, two (2) public universities libraries (3) private University Libraries in Delta State, Nigeria. However, it should be noted that though there were seven (7) university libraries, at the time of this research three (3) are newly established and may be regarded as post Covid-19 era universities. The data collected from the respondents were analyzed using descriptive statistics such as mean, frequency and percentage. The researcher employed four-point Likert scale questionnaire with a criterion mean of 3.00 for the mean, agreed and disagreed was used for the frequency/percentage. While the mean was used to analyze research question.

4. PRESENTATION OF THE FINDINGS

This section focuses on analysis of data and a discussion based on the objectives of the study.

4.1 Smart Library Services in University Libraries

What are the smart library services in university libraries in Delta State?

Data in Table 1 is used to answer this research question.

Table1: Smart library services in university libraries in Delta State in post covid-19 era.

Library Services	**A**		**D**	
	Freq.	**%**	**Freq.**	**%**
Blogs	70	68	33	32
Really simple syndicate (RSS)	40	39	63	61
Electronic mail service (E-mail)	84	82	19	18
Institutional repositories	68	66	35	34
Short message services (SMS)	97	94	6	6
Google drive/google books	48	47	55	53
QR code	25	24	78	76
Gate register through biometrics	54	52	49	48
Kiosk in the library	65	63	38	37
Virtual library tour	61	59	42	41
Mobile alerts of new books	54	52	49	48
Library portals	79	77	24	23
5G library services	59	57	44	43
Library marketing and promotion service	39	38	64	62
E-document/E-journals	64	62	39	38
Google news	61	59	42	41

Text reference service	74	72	29	28
My library	69	67	34	33
Metadata schemas	49	49	51	51
Internet based ask-a-librarian service	62	60	41	40
OPAC services	52	51	51	49
Electronic document delivery (EDD)	63	61	40	39
Online instruction/User education	72	70	31	30
Online readers advisory services	70	68	33	32

Table 1 reveals the information on the existing smart library services in the university libraries in Delta State. As shown in the Table, majority of the respondents agreed that short message services (97, 94%), electronic mail service (84, 82%), library portals (79, 77%), text reference service (74, 72%), online instruction/user education (72, 70%), blogs and online readers advisory services (70, 68%) respectively, my library (69, 67%), institutional repositories (68, 66%), kiosk in the library (65, 63%), e-document/e-journals (64, 62%), electronic document delivery (63, 61%), internet based ask-a-librarian service (62, 60%), virtual library tour (61, 59%), Google news (61, 59%), 5G library services (59, 57%), gate register through biometrics and mobile alerts of new books (54, 52%) respectively, and OPAC services (52, 51%) are the existing smart library services in the university libraries under this study.

4.2 Extent of Deployment of Smart Library Services

In table 2 below, the respondents were asked to indicate the extent to which they have deployed smart library technologies in their university libraries. This was measured by use of VHE (Very High Extent) HE (High Extent) ME (Moderate Extent) LE (Low Extent) NE (No Extent).

Table 2: Extent of Deployment of Smart Library Services

Smart Library Services	**VHE**	**HE**	**ME**	**LE**	**NE**	$\bar{x}$
Blogs	14	26	28	15	20	2.99
Really simple syndicate (RSS)	2	10	46	18	27	2.44
Electronic mail service (E-mail)	19	44	24	5	11	3.53
Institutional repositories	10	28	31	26	8	3.06
Short message services (SMS)	29	42	13	10	9	3.70
Google drive/google books	17	22	21	25	18	2.95
QR code	14	12	1	30	46	2.20
Gate register through biometrics	25	23	13	4	38	2.93
Kiosk in the library	24	25	7	19	28	2.98
Virtual library tour	24	28	21	9	21	3.24
Mobile alerts of new books	5	22	17	22	37	2.38
Library portals	29	22	24	2	26	3.25
5G library services	26	19	18	9	31	3.00
Library marketing and promotion service	10	15	8	42	28	2.39
E-document/E-journals	17	24	25	25	12	3.09
Google news	11	10	14	41	27	2.39
Text reference service	9	37	27	9	21	3.04
My library	29	25	15	9	25	3.23
Metadata schemas	16	20	31	19	17	2.99
Internet based ask-a-librarian service	15	23	24	26	15	2.97
OPAC services	18	10	37	14	24	2.84
Electronic document delivery (EDD)	13	10	30	33	17	2.70
Online instruction/User education	11	37	26	12	17	3.13
Online readers advisory services	2	39	22	15	25	2.79
Aggregate Mean = 2.93 Criterion Mean = 3.00						

Data presented in Table 2 revealed that the aggregate mean of 2.93 is lower than the criterion mean of 3.00, which implies that the extent of deployment of smart library services in university libraries in Delta State is low. Therefore, it was concluded that short message services ($\bar{x}$ = 3.70), electronic mail service ($\bar{x}$ = 3.53), library portals ($\bar{x}$ = 3.25) virtual library tour ($\bar{x}$ = 3.24), my library ($\bar{x}$ = 3.23), online instruction/user education ($\bar{x}$ = 3.12), E -document/E-journals ($\bar{x}$ = 3.09) institutional repositories ($\bar{x}$ = 3.06) text reference service ($\bar{x}$ = 3.04), 5G library services ($\bar{x}$ = 3.00) are the deployed smart library services in university libraries in Delta State.

5. DISCUSSION OF FINDINGS

The findings of this study shed light on several important aspects of the Smart library services and deployment in University Libraries in Post Covid- 19 pandemic in Delta State. Overall, the results support the research question that there are existing smart library services in university libraries in Delta State in Post Covid-19 era. Firstly, our findings showed that there are existing smart library services in university libraries in Delta State, Nigeria. This is consistent with previous research that focused on the existing smart library services in university libraries in Delta State in Post Covid-19 era.

Secondly, the study disclosed that extent of deployment of smart library services in university libraries in Delta State is low. However, short message services, electronic mail service library portals, text reference service, online instruction/user education, blogs and online readers advisory services, my library, institutional repositories, kiosk in the library, e-document/e-journals, institutional repositories, text reference service, 5G library services are majorly services rendered in the post covid-19 pandemic era. The above findings agrees with University of Cape Town Library (2021). University of Cape Town Libraries that also deployed smart library services, such as automated book retrieval systems, virtual reference services, and digital lending platforms, to enhance access to library resources and services during the pandemic. This finding agrees with Chang (2021) that library also used data analytics as a typology of smart library technology to improve its services and optimize its collections in the post Covid- 19 pandemic era.

6. CONCLUSION AND RECOMMENDATIONS

Conclusively, the study focused on deployment smart library services in University Libraries in Post Covid-19 era in Delta State, Nigeria. The research exposed that that there are existing smart library services in university libraries in Delta State and that the extent of deployment of smart library services in university libraries in Delta State is low. It recommends that university libraries step up the deployment of smart library services for improved services in the post covid -19 pandemic era since deployment is low.

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