AWARENESS AND ADOPTION OF CLOUD COMPUTING IN LIBRARY SERVICES IN BAYERO UNIVERSITY LIBRARY, KANO

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Abstract

The study investigated awareness and adoption of cloud computing in library services in Bayero University Kano. Four (4) research questions and research objectives were formulated for the study. Quantitative research methodology using survey research design was used. The population of the study comprised of 122 professional librarians drawn from Bayero University library. Total enumeration was used to include all the 122 professional librarians because the population was not much and was conveniently managed by the researcher. Questionnaire was the instrument used for data collection. A total of 122 questionnaires were administered and 101 were returned and found useful. The data collected was analysed using descriptive statistics (frequency and percentages). The findings revealed that the librarians in Bayero University are well aware of cloud computing. It also revealed that the library has adopted cloud-based services, indicating that database management, e-resources and storage of sensitive documents are rendered through loud computing. The findings revealed ICT skills, availability of the technology, compatibility of the technology with library system and services, attitude of librarians towards cloud computing and perceived ease of use and usefulness could facilitate adoption of Cloud Computing in library service. Furthermore, the findings also showed that challenges associated with adoption of Cloud Computing in library services are: insufficient funding, poor internet connectivity and inadequate training among others. It was recommended that the University library should diversify the scope of cloud-based services to include other types of cloud-based services such as library management systems, cloud-based digital preservation, virtualised services, etc. Relevant funding authorities should adequately fund the library so as to tackle the challenges associated with the adoption of cloud computing in library services.

Keywords: Awareness, Adoption, Cloud Computing, Library Services, University Library

Introduction

Libraries play a crucial role in supporting academic institutions by providing access to a vast range of resources, fostering research, and meeting the information needs of users. Over the years, technological advancements have significantly transformed library operations which has changed the roles and operations of traditional libraries. This shift has been driven by the rapid development of information and communication technologies (ICT), which have introduced innovative technology such as cloud computing that has emerged as a powerful technology with transformative potential for libraries (Hussin and Rohani, 2015). According to Mell and Grance (2011), Cloud computing is a transformative paradigm that leverages the power of the internet to deliver computing services such as servers, storage, databases, networking, software, and analytics that can be rapidly provisioned and released with minimal management effort or service provider interaction. In this regard, Cloud computing could be regarded as a platform for offering or delivering computing services over the internet, where resources are paid for as they are being used.

Organizations keep striving to adopt new technologies to improve their activities and cloud computing is not an exception. Cloud computing is a new technology of computing services offered over the internet. It provides a shared pool of resources that helps people to access their personal or specialized corporate use of the information such as emails services, social networking, file storage, and sharing, online image storage etc theses are all provided by cloud computing service providers such Amazon, Google, Microsoft, Oracle. etc. (Zubairu, Akiola and Hamzat, 2021). In libraries, cloud computing provides access to computing resources such as servers, storage, applications and services via the internet, eliminating the need for physical infrastructure and enabling libraries to operate more efficiently. Unlike traditional IT systems that require substantial capital investment in hardware and maintenance, cloud computing offers a cost-effective, scalable and flexible solution. These features make it particularly appealing for libraries in resource constrained environments (American Library Association, 2010).

The awareness of cloud computing in libraries and among library users grew through digital transformation and technological advancements presented librarians with varying technology proficiencies and the ability to access and use technologies and related services that might otherwise be beyond their reach. Consequently, many librarians are considering the adoption of these third-party tools in their work to improve access, storage and collaboration. For example, cloud-based integrated library systems (ILS) have replaced traditional cataloguing systems, enabling seamless access to digital and physical resources. Digital repositories hosted on the cloud facilitate the storage and sharing of scholarly content, while cloud-based collaboration tools enhance communication and teamwork among librarians and users. By adopting these technologies, libraries can improve service delivery, reduce costs, and expand access to resources for users regardless of their physical location. Therefore, it has become inevitable for academic libraries to tap into the opportunities offered by cloud computing that could necessitate the adoption of cloud based services for improved service delivery to the library user. On this note, this study is aimed at providing insights for leveraging cloud computing to improve library operations and overall information service delivery in the library.

Statement of the Problem

Cloud computing is important for library services as it enables improved and continuous accessibility to digital resources, enhances operational efficiency, meets fluctuating demands and saves cost. It also provides cost-effective and scalable solutions to libraries. Despite these potentials and benefits to libraries, it has been observed that, there is limited literature on awareness and adoption of cloud computing in Northern institutions. In addition, there is also dearth of knowledge on awareness and adoption of cloud computing in Bayero University library Kano. Consequently, this may impede the library's ability to modernise its services and effectively meet the needs of its users. It is in view of the above-mentioned problem that the researcher aims to investigate the awareness and adoption of cloud computing in Library services in Bayero University Library, Kano in order to fill this gap.

Research Questions

The following research questions of the study are guide the conduct of the study as follows:

1. To what extent are the librarians in Bayero University, Kano aware of cloud computing for library services?
2. What types of services are rendered through the adoption of cloud computing in the library under study?
3. What factors facilitate the adoption of cloud computing service in the library under study?
4. What are the challenges associated with the adoption of cloud computing in Bayero University Library, Kano?

Literature Review

Cloud computing is a major breakthrough in information technology that enables access to computing resources such as storage, processing power, and software applications over the internet instead of local servers or personal computers (Mell & Grance, 2011). According to Yaduh and Geoffrey (2019), cloud computing is generally used to describe data centres that are available to many users over the Internet, this is because it provides a shared pool of resources, including data storage space, network, computer processing power, and specialized corporate and user applications. In another definition Kutty (2019) referred to Cloud computing as advancement in technology allows the delivery of software, infrastructure, and services over the Internet.

Cloud computing has been identified as an affordable option which creates efficiency and effectiveness, reduction of costs involving electricity, bandwidth, operations, and hardware which does not require functional staff, in-house expertise, space, power, and infrastructure to perform. Cloud computing has transformed the way information systems are built and services delivered, thus, this is an opportunity for the library to extend its impact to its users anywhere. In libraries, cloud computing enhances service delivery, reduce operational costs, and improve access to knowledge resources. Thus, library can benefit from using cloud computing technology by increasing computing performance, storage capacity, universal accessibility, and cost reduction in the IT investment of both hardware and software as well as computer services (Tuncay,2010)

The awareness of cloud computing is critical to its adoption and use, as many studies have been conducted in this regard. In Dar es Salaam, Idhalama and Fidelis (2020) investigated librarian's perspectives on cloud computing. The results revealed that librarians are enthusiastic about the usage of cloud computing solutions. In a similar study on awareness and use of cloud computing services and technologies by librarians, Aiyebelehin, Makinde, Odiachi, Mbakwe (2020) found that librarians in the selected universities in Edo State are aware of the types of cloud computing services used in the Library. Njoku and Ken- Agbiriogu (2021) in a study found that libraries in the selected academic libraries in Imo State are not unaware of or alien to this new technology.

Mahalakshmi and Sornam (2012) who conducted a study to identify the awareness of cloud computing services by librarians, and observed that most librarians are aware of the use of CCS in the library. The study of Idahosa and Eireyi-Edewede (2023) showed that awareness of cloud computing technology among librarians in university libraries in South-South Nigeria is low. This may be because of technological advancement presently influencing librarians as a profession. The opinion of librarians at university libraries in India were examined by Majhi, Meher and Maharama (2015) to see how much they were acquainted with, using, and knowledgeable about cloud computing in libraries. The result revealed that while librarians' usage of cloud computing services was only minimal and their familiarity with it was poor.

A study by Oduwole and Salami (2020) found that although cloud computing is becoming increasingly popular among businesses in urban centres, its adoption in rural and non-tech sector remains limited due to a lack of awareness and understanding. In a related study by Adewoye and Adebayo (2018), findings showed that many Nigerian organizations are not fully aware of the potential advantages of adopting cloud-based solutions, such as reduced operational costs and improved scalability. This lack of awareness can be attributed to limited exposure to digital resources, insufficient training, and the complexity of cloud services, which may seem daunting to non-technical individuals. Also, many library professionals have not received formal training on cloud computing and its implications for library services (Obi & Nwosu, 2020).

Through cloud computing, libraries in Nigeria could transform the delivery of library service by leveraging on cloud computing services. Wasike and Njoroge (2015) observed that like the OCLC (Online Computer Library Centre) libraries can chose to share their cataloguing tools, and indeed any other library resources via the Internet for other member-libraries to access and use. With cloud computing, libraries in Nigeria can have a kind of union catalogue, hosted over the Internet; this can ease the process of inter-library cooperation among libraries. Swapna and Biradar (2017) researched on application of cloud computing technology in libraries.

The researchers found that cloud computing technologies can be applied in the library in the following areas: building digital library/repository; searching scholarly contents; file storage; library automation; library website hosting; building community power; searching library data. Solomon and Bakare (2022) found the areas where cloud computing is applied in libraries include library automation system; search for scholarly materials; cloud computing serve as frameworks for repositories and digital libraries; cloud computing is used for hosting websites of libraries; storage of sensitive documents; building up community strength; searching or browsing library data.

According to Luo (2013), virtual reference services and research guides can be provided in libraries through software such as LibChat, Question Point and Lib Guides which are all

hosted on the cloud. Libraries worldwide have also started using cloud computing to handle e-resources usage, hosting web applications, cataloguing online public access, managing digital libraries, hosting various statistical tools and data sets, etc (Salam & Ali, 2020). In a study of Dime and Okeji (2023) the findings revealed librarians use CC technologies to store and share files, for sharing videos related to library orientations/other video contents, to collaborate with other librarians for research projects, to survey users level of satisfaction with library services, online document editing services, and provision of virtual/online reference services.

Majhi, Meher, and Maharana (2015) conducted a study on "awareness and usage of cloud computing application among LIS professionals" The result revealed that usage of cloud in library operations and services was not significant. A total of 75 % of the library professionals used basic cloud services for personal purposes such as store files online, store personnel videos, and photographs online and as well for collaborative writings and 42 % used this technology for providing library services.

An understanding of the literature reveals that in addition to awareness, other factors are relevant for the adoption of cloud computing in library services. A number of studies have been conducted in this regard, Alghushimi, Zakari, and Aji (2020) investigated factors influencing cloud computing adoption in higher education institutions of least developed countries: evidence from republic of Yemen. They formulated hypothesis that relative advantage, compatibility and complexity has a positive effect on cloud computing adoption, after examining the influence of relative advantage, compatibility and complexity on cloud computing adoption the result revealed a significant positive relationship ($\beta = 0.131$, $t = 4.392$, $p < 0.000$).

In another study of Yuvraj (2016), the findings validate the fact that perceived ease of use, usefulness and ubiquitous availability of the enabling technology are strong drivers of the adoption of cloud computing in the libraries. Also, attitude is significantly correlated with behavioural intention to adopt cloud computing services. In Portuguese manufacturing firms, Oliveira et al. (2014) found that complexity and compatibility were not significant whereas relative advantage had significant positive influence on cloud adoption intention. In another study, related to the Taiwanese high-tech industry, complexity and compatibility were not significant and relative advantage had a significant negative effect on cloud adoption (Low et al, 2011). Studies also showed that libraries with well-trained staff who understand cloud technologies have a higher adoption rate than those lacking ICT-proficient personnel (Adeyemi, 2020).

The adoption of cloud computing particularly in libraries of developing countries like Nigeria is evidently faced with a pool of challenges. Many studies have been conducted to prove this; Alabi, Omekwu and Martins (2024) in a study found identified challenges librarians and IT staff face in implementing cloud computing technology for effective library service delivery, including poor subscription of internet, power supply issues, fear of staff elimination, economic situation, inexperience, and resistance to change. Idahosa and Eireyi-Edewede (2023) studied university libraries in South-South, Nigeria.

The findings revealed drawbacks to cloud computing adoption in the libraries studied are internet connectivity, power failure and data integrity. In a related study, Efevberha-Ogodo and Ivwighreghweta (2023) discovered that epileptic power supply, slow internet and lack of

technical skills were the challenges associated with the use of cloud-based technology as indicated by the librarians in South-South, Nigeria.

Methodology

For the conduct of the study, quantitative research methodology using survey research design was used. The population comprises of one hundred and twenty-two (122) professional librarians who provide library services to users. Total enumeration was used to include all the 122 professional librarians because the population is not much and could be managed effortlessly by the researcher. The instrument for data collection was a structured questionnaire, designed into sections covering the research questions of the study. Data collected was analysed using descriptive statistics (frequency distributions and percentages). The Statistical Package for Social Sciences (SPSS) software was used for data processing and interpretation.

Findings and Discussion

Table 1: Response Rate

Questionnaire	Frequency	Percentage
Administered	122	100%
Returned	101	82.7%
Not returned	21	17.3%

Table 1 shows that 122 (100%) copies of questionnaires were administered to the respondents of which 101 (82.7%) were returned and found useful while 21 (17.3%) were not returned. The high rate of returned copies of questionnaire was attributed to the fact that the respondents are within the reach of the researcher.

Table 2: Awareness of Cloud Computing

Response	Very Aware	Aware	Not Sure	Not Aware	Total
Frequency	46	52	3	0	101
Percentage	45.5%	51.5%	3%	0%	100%

Table 2 presents the awareness of cloud computing. It shows that 46(45.5%) and 52(51.5%) of the respondents indicated various levels of awareness of cloud computing. The finding on awareness of cloud computing cannot be detached from its increasing popularity and its adoption by libraries across the globe. Further justification is that cloud computing is convenient to use in library operation.

Table 2.1 Source of Awareness of Cloud Computing

Source	Frequency	Percentage
Through training such as workshop, webinars, conferences on cloud computing	55	54.5%
Through colleagues	56	55.4%
Through the Internet	33	32.7%
Others	0	0%

Table 2.1 reveals the various sources through which librarians became aware of cloud computing. The findings show that 55(54.5%) of the respondents gained awareness through training sessions such as workshops, webinars, and conferences, 56(55.4%) of the respondents cited colleagues as their source of awareness, 33(32.7%) respondents became aware through the internet. The finding on source of awareness of cloud computing reveals that cloud computing is widely discussed at various levels among colleagues in conferences, workshops, etc.

Table 2.2: Awareness of Cloud Computing for Library Services

Response	Yes	No	**Total**
Frequency	101	0	101
Percentage	100%	0%	100%

Table 2.2 shows respondents' awareness on the adoption of cloud computing in the delivery of library services. It shows that all 101(100%) of the respondents are aware that cloud computing could be used to render library services. Such a high level of awareness is significant as it indicates that the concept of integrating cloud technology into library operations is well understood within the respondent group.

Table 3: Adoption of Cloud-based Library Services

Response	Yes	No	**Total**
Frequency	94	7	101
Percentage	93%	7%	100%

In Table 3, respondents were asked to indicate if their library has adopted cloud-based services. Findings from table 4.9 revealed that majority 94(93%) of the respondents indicated that their library has adopted cloud-based information services. This finding implies a shift from traditional mode of service delivery to digital transformation. It also shows that the librarians are technology inclined and prepared to ensure global best practice in information service delivery.

Table 3.1 Adoption of Cloud-based Services

Cloud-based Services	**Frequency**	**Percentage**
OPAC	34	33.7%
E-resources	52	51.5%
Virtual reference service	35	34.7%
Database management	54	53.4%
Storage of sensitive documents	52	51.5%
Library Automation	32	31.7%

Respondents were asked to indicate the cloud-based services preferred to be adopted by the library in table 3.1. It shows that more than half 52(51.5%) of the respondents indicated database management, e- resources and storage of sensitive documents. The finding shows that there is a growing need for cloud-based storage and organisation of vast amount of information in the library. It also suggests that the library has much interest on e-resources. This is because most of the e-resources are current and up-to-date which the library may not be able to purchase the print copy as a result of cost and dwindling library budget.

Table 4: Factors Facilitating Adoption of Cloud Computing

Factors	Frequency	Percentage
Availability of the technology	66	65.3%
Compatibility of the technology with library system and services	51	50.5%
Attitude of librarians towards the adoption of cloud computing	54	53.5%
ICT skills	35	34.5%
Perceived usefulness and ease of use	67	66.3%

Table 4 presents the factors facilitating adoption of cloud computing in library services. It shows that majority of the respondents 67(66.3%), 66(65.3%), 54(53.5%) and 51(50.5%) indicated factors such as perceived usefulness and ease of use, availability of the technology, attitude of librarians towards adoption of cloud computing and compatibility of the technology with library system and services. The analysis shows that the provision of the above factors would go a long way to facilitate effective and efficient cloud-based services delivery in the library.

Table 5: Challenges Associated with Adoption of Cloud Computing in Library Services

Challenges	Frequency	Percentage
Lack of technical knowledge and skills	46	45.5%
Insufficient funding	56	55.4%
Poor internet connectivity	59	58.4%
Security and privacy concerns	21	20.8%
Resistance to change	25	24.8%
Inadequate training	55	54.5%
Lack of management support	48	47.5%

In table 5 respondents were asked to indicate challenges associated with the adoption of cloud computing in library services. It shows the most pressing challenge were poor internet connectivity 59(58.4%), insufficient funding 56(55.4%) and inadequate training 55(54.5%). The analysis shows that when these pressing challenges are addressed, all other challenges highlighted would be taken care of thereby ensuring effective adoption of cloud-based library services

Discussion of Findings

On awareness of cloud computing, the study found that librarians in the library studied are aware of cloud computing. The study also found that the librarians' sources of awareness were through conferences, seminars and workshops and colleagues. The findings further revealed that the librarians are aware that cloud computing could be adopted to render library services. The findings on awareness contradicts the study of Idahosa and Eireyi-Edewede (2023), Njoku and Ken-Agbiriogu (2021) Adewoye and Adebayo (2015), Oduwole and Salami (2020) who concluded on librarian's low awareness of cloud computing. The finding is also not in tandem with study of Obi and Nwosu (2020) who found that many library professionals have not received formal training on cloud computing and its implications for library services.

On adoption of cloud computing services, the study found that the library under study has adopted cloud-based services indicating that database management, e-resources and storage of sensitive documents are the preferred types of services offered through cloud adoption. This finding support the study of Dime and Okije (2023), Solomon and Bakare (2022), Salam and Ali (2020) who found cloud computing could be adopted in various library operations and services. It contradicts the findings of Adegoke et al (2018) who reported that many are unaware of the practical application of cloud-based services and are hesitant to adopt these technologies.

In an attempt to identify the factors facilitating adoption of cloud computing in the library, the findings revealed ICT skills availability of the technology, compatibility of the technology with library system and services, attitude of librarians towards cloud computing and perceived usefulness and ease of use. Thus, reaffirming the findings of Alghushimi, Zakari and Ali (2020), Yuvraj (2016) and Adeyemi (2020) on factors influencing adoption of cloud computing where they indicated availability, compatibility attitude, perceived usefulness, ease of use and skills.

In investigating the challenges associated with adoption of cloud computing, the findings revealed the most pressing challenges are insufficient funding, poor internet connectivity and inadequate training. Although the respondents go through training, the level of training may not be sufficient enough for the librarians to adopt cloud computing in the library. This reaffirmed the findings of Alabi, Omekwu and Martins (2024), Idahosa and Eireyi-Edewede (2023) on challenges associated with cloud based technology implementation.

Conclusion

The study established that Bayero University Library, Kano has adopted cloud-based library services. Several challenges were identified which if addressed would facilitate maximum utilization of cloud computing in library services.

Recommendations

Based on the findings of the study the following recommendations were made:

1. The University library should diversify the scope of cloud-based services to include other areas such as cloud-based digital preservation, digital library/repository, OPAC, virtual reference service, library automation etc This would not only change the face of library services but would also ensure best practice in library services.

2. There is need for relevant funding authorities to adequately fund libraries. This would go a long way in tackling the challenges associated with adoption of cloud computing services in libraries. Adequate funding would ensure reliable internet connectivity, provision of state-of-the-art ICT facilities and adequate training of staff on cloud computing related issues as well as other emerging technologies.

References

Adewoye, J. O., & Adebayo, T. S. (2018). Cloud computing adoption and its impact on the Nigerian economy. International Journal of Computing and ICT Research, 12(2), 30-42.

Aiyebelehin, A. J., Makinde, B., Odiachi, R., & Mbakwe, C. C. (2020). Awareness and use of cloud computing services by librarians in selected universities in Edo State. *International Journal of Knowledge Content Development & Technology*, *10*(3). Retrieved from https://journals.sfu.ca/ijkcdt/index.php/ijkcdt/article/view/295

Alabi, C. O. Omekwu, C.O. & Martins, O. Y (2024). Adoption of cloud computing in Nigerian university libraries: Challenges and strategies. *Niger Delta Journal of Library and Information Science,* 5(1).

Alghushami, A. A., Zakaria, N. H. & Aji, H. M. (2020). Factors influencing cloud computing adoption in higher education institutions of least developed countries: Evidence from republic of Yemen. *Applied Sciences,* 10(22), 8098. Retrieved from https://doi.org/10.3390/app10228098

Dime, I. A., & Okeji, C. C. (2023). Use of cloud computing technologies for library services delivery: A Survey of librarians in university libraries in Africa. *Informology,* 2(2), 61-82

Efevberha-Ogodo, O. & Ivwighreghweta O. (2023). Cloud computing technologies: Awareness and attitude toward usage by librarians in university libraries in South- South, Nigeria. *Trans Eng Comput Sci,* 4(1),130

Idahosa, M. & Eireyi-Edewede, S. (2023). Librarians' awareness and attitude towards deployment of cloud computing technologies in university libraries in South-South Nigeria. *International Journal of Librarianship, 8(1)*, 82-95. Retrieved from https://doi.org/10.23974/ijol.2023.vol8.1.269

Idhalama, O.U., & Fidelis, A. (2020). Perception and attitude of librarians towards cloud computing in the University of Dar es Salaam Library. *Library Philosophy and Practice* (e-journal).4023. Retrieved from https://digitalcommons.unl.edu/libphilprac/4023

Kutty, Ali A. (2019). Cloud computing in libraries. *Library Philosophy and Practice* (e-journal). 2883, Retrieved from https://digitalcommons.unl.edu/libphilprac/2883

Low, C., Chen, Y. and Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management and Data Systems*, 111(7), 1006-1023

Luo, L. (2013). Reference librarians' adoption of cloud computing technologies: An exploratory study. *Internet Reference Services Quarterly,* 17 (3/4), 147-166

Mahalakshmi, K. & Sornam, S. A. (2012). Awareness and application of cloud computing in Indian libraries: A study among librarians of engineering colleges of Coimbatore district. In 2012 International Conference on Cloud Computing Technologies, Applications and Management (ICCCTAM), 114-118. Retrieved from http://dx.doi.org/10.1109/ICCCTAM.2012.6488083

Majhi, S., Meher, S., & Maharana (2015). Awareness and usage of cloud computing application among LIS Professionals: A case study of 17 Indian University Libraries. *Library Philosophy and Practice* (e-journal), 1280.

Mell, P., & Grance, T. (2011). The NIST definition of cloud computing. Gaithersburg, MD: Computer Security Division, Information Technology Laboratory, National Institute of Standards and Technology. Retrieved from http://purl.fdlp.gov/GPO/gpo17628

Oduwole, A., & Salami, A. S. (2020). Cloud computing awareness in Nigeria: A study on the adoption and challenges in rural sectors. *International Journal of Information Technology and Management, 14(2), 102-116.*

Oliveira, T. T. M. & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information and Management*, 51(5), 497-510

Salam, N. R. A., & Ali, S. (2020). Determining factors of cloud computing adoption: A study of Indonesian local government employees. *Journal of Accounting and Investment,* 21(2), 312–333.

Swapna, G. & Biradar, B. S. (2017). Application of cloud computing technologies in libraries. International Journal of Library and Information Studies; 7(1), 52 – 61. Retrieved from www.ijlis.org

Solomon, A. O. & Bakare, O.D. (2022). Application of cloud computing to library processes: The Nigerian perspective. *Quest Journals Journal of Research in Humanities and Social Science,* 10(7), 01-07

Tuncay, E. (2010). Effective use of cloud computing in educational institutions. *Proscenia-Social and Behavioral Sciences,* 2,938-942

Wasike, J. M. & Njoroge, L. (2015). Opening libraries to cloud computing: A Kenyan perspective. *Library Hi Tech News;* 32(3), 21 – 24. Retrieved from dx.doi.org/10.1108/LHTN-09- 2014-0072

Yaduh, O. A. & Geoffery, M. (2019). Cloud computing in Libraries: Prospects and challenges from Kenyan perspective. International Journal of Science and Research; 8(6), 1292 – 1295. Retrieved from www.ijsr.net

Yuvraj, M. (2016). Determining factors for the adoption of cloud computing in developing countries: A case study of Indian academic libraries. *The Bottom Line,* 29(4), 259-272. Retrieved from https://doi.org/10.1108/BL-02-2016-009

Zubairu, A. N. Akiola, John, O. M. & Hamzat, S. A. (2021). Awareness and adoption of cloud computing in Nigerian Libraries: An Aid to Library Services. *Library Philosophy and Practice* (e-journal). 4973. Retrieved from https://digitalcommons.unl.edu/libphilprac/4973