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# Awareness and Use of Cloud Computing Services and Technologies by Librarians in Selected Universities in Edo State

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## ABSTRACT

This study examined the awareness and use of cloud computing services by librarians in selected universities in Edo State. A descriptive survey research design was employed and the instrument used was questionnaire. The population of the study was 132 professional and Para-professional librarians. The total enumeration technique was used to select the entire population because the size was manageable. Simple percentage, frequency count, and mean were used to analyze the data collected. From the analysis of data gathered, it was found that the librarians are aware of the use of OCLC, world cat, and Google docs to a very high extent. It was found that the librarians used cloud computing services and technologies for collection development functions and cataloging. Based on the findings it was recommended that management of the libraries should support librarians by providing adequate funding to the library in order to support the acquisition and maintenance of infrastructure for cloud computing.

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## 1. Introduction

Libraries in Nigerian Universities have remained the heart of the institutions they serve; supporting research and learning using resources and tools that are available. In many cases, the Nigerian Universities have used only tools and technologies that the librarians are aware of, and that are readily available and accessible. It should be noted that, in the modern library scene, libraries are beginning to adopt the interactive, collaborative, and user-centered features embedded in “Web 2.0” into traditional library services, and this has led to the creation of what is now regarded as “Library 2.0” (Farkas, 2007; Zimmer, 2015). The advent of these new technological tools in library service delivery has also enabled the provision of platforms that allow users and librarians to back up critical data for reuse. As a matter of fact, libraries have been known not just as

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early adopters but also early users of emerging technological tools, as far as the librarians are aware of it and perceive it as effective in information service delivery. Sabiti, Sarika, and Bulu (2015) rightly noted that modern technologies have instigated tremendous transformation in almost all disciplines and sectors, and library science is not an exception. In fact, libraries are adopting new technologies to ensure that the mandate of meeting every user is met within the shortest period of time.

In the recent past, many changes have taken place in libraries, part of which includes the adoption of new technologies such as cloud computing. The cloud computing provides people the way to share distributed resources and services that belong to the library. Cloud computing system enables the library to provide services to a larger amount of users. Cloud computing service is the practice of storing regularly used computer data on servers that can be accessed through the internet. As a matter of fact, Library professionals are being offered opportunities of taking advantage of Information and Communication Technology facilities to advance in their efforts to making library clientele connected to information resources in the cloud, by utilizing computer and its associative gadgets (Ademodi & Adepoju, 2009; Wada, 2014). The concept of cloud computing has been established as a lasting technological innovation and not just a transitory technology that will become obsolete in the nearest future (Yuvaraj, 2013a). In today's libraries "cloud-based services are set to transform the way libraries work, unleashing librarians from the admin burden to focus on services for students and researchers (JISC, 2011)"

According to Tuncay (2010), Libraries benefit from cloud computing service in increasing computing performance, universal accessibility, cost reduction, save time, and storage capacity is massively scalable and elastic. With cloud computing service, it becomes easier to access data with several devices (PC or mobile device), the only thing needed is the internet connection. Cloud computing enables Uninterrupted Service to its stakeholders, once a user is connected to the internet, he will be able to access or retrieve an ample amount of resources continuously. Cloud computing suitable, simple to integrate, flexible, and innovative. Cloud-based services are set to transform the way libraries work, unleashing librarians from the admin burden to focus on services for students and researchers (JISC, 2011)".

Cloud computing prevent financial waste and avert technology problems such as computer viruses, system crashes, and loss of data.

The common usage of cloud computing within libraries can be the development of digital libraries corporate cataloging, acquisition, storage, and sharing the resources on the virtual environment on the web. The need for cloud computing may occur due to the information explosion, problems in accessing the information, save the time of the users and staff, resource sharing problems. For effective use of cloud computing service, there is a need for librarians to be adequately aware of the services and this has been a great challenge.

While many studies have examined the concept and uses of cloud computing in developed countries little research has been in the Nigerian library space. Particularly, no empirical evidence on the level of awareness and use of cloud computing by librarians in universities in Edo State. The aim of this study, therefore, is to investigate the awareness and use of cloud computing by librarians in selected universities in Edo State.

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The general objective of this study is to examine the awareness and use of cloud computing by librarians in selected universities in Edo State. Specifically, the study sought to:

- (a) Ascertain the extent of awareness of cloud computing services by librarians
- (b) Determine the type of cloud computing services used by librarians in universities in Edo State
- (c) Find out the purpose of the use of cloud computing services in the library
- (d) Ascertain the benefits of the use of cloud computing services in the library
- (e) Find out the challenges facing the use of cloud computing services in the library

## 2. Literature Review

### 2.1 Cloud Computing

The use of the term “cloud” has been an issue of contention among researchers. Yet understanding the concept of cloud is critical to grasp the issue of cloud computing. Over the past couple of years, various scholars have offered different viewpoints in a bid to define the concept of cloud and cloud computing. However, all the propositions more or less account for a single ideology. Some scholars trace the origin of the term “cloud” to the concealing nature of this technology’s framework where the system works for users yet they really have no idea about the inherent complexities that the system utilizes. What they do not realize is that there is a massive amount of data being pushed globally in real-time to make these applications work for them, the scale of which is simply amazing (Blokdiik & Menken, 2009).

Omwansa, Waema, and Omwenga (2014) reviewed the adoption state of cloud computing across the African continent and reported that South Africa, Kenya, and Nigeria are the leading countries in the use of cloud computing in Sub-Saharan Africa as of the year 2013. They further analyzed the report of a survey carried out by Cisco and World Wide Worx (2013) which found that 50% of South Africa’s medium and large businesses were using cloud services, compared to 48% in Kenya and 36% in Nigeria. (Susanto, Almunawar, & Kang, 2012) also reviews that 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.

Ahmed and Othman (2013) highlighted that cost reduction, relief from managing complex IT infrastructure, flexibility, and scalability as some of the advantages of cloud computing adoption. Yeboah-Boateng and Essandoh (2012) in their study of cloud computing usage among small and medium enterprises in developing economies found cost reduction on IT infrastructure and maintenance, improved communication, scalability, and business continuity as the main drivers of cloud adoption. Biddick (2008) remarked that the most likely applications to migrate to cloud computing are storage and business applications, while specialized information technology applications, such as security, management, or compliance, are far less likely to migrate to cloud computing.

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However, Greenberg (2008) observed that in spite of the advantages the individual, as well as organizations, derive from the movement toward transitioning computing and storage applications to cloud computing, there are some applications that organizations are choosing not to transit.

Cloud computing derived its name from the acronym CLOUD, which stands as C for “Computing resources”, L for “Location independent”, O for “Online accessibility”, U for “Utility for users” and D for “Demand by users” (Yuvaraj, 2013b). Computing has been in existence for a while now (Rajan & Shanmugapriya, 2012). According to Goldner (2010), the technology actually propelling cloud computing is the advent of internet, the increased reliability and reduced cost of internet, increased use of web-based applications, demand for applications access via multiple devices using multiple form factors. Cloud computing is “a style of computing in which massively scalable and elastic IT-enabled capabilities are delivered as a service to external customers using Internet technologies” (Petty & Forsling, 2009).

According to Ogunsola (2005), libraries in Nigeria tertiary institutions as the heart of the institution they serve, support research and learning, are there for not left out in harnessing the opportunities presented by cloud computing service trend, in view of this is evidence to show gradual computerization of Nigerian libraries in the universities through the commencement of digitization and establishment of library information network with connectivity through the university campus network to the Internet. IT News Africa, revealed the successful establishment of digital libraries in three (3) Nigerian Universities by Mobile Telephone Network (MTN) Nigeria. These Universities include the Ahmadu Bello University, Zaria, the University of Lagos, and the University of Nigeria, Nsukka.

Breeding (2015) and Goldner (2012) reported that libraries are beginning to adopt cloud computing services and technologies to meet the technological needs of their users thereby saving costs, ensuring flexibility, and enhanced data management. This is due to the benefits derivable from the adoption of cloud services. As Masillamani (2010) rightly noted, cloud computing promotes collaboration, and resource sharing among libraries, librarians, library users through its remote management capabilities.

There are a number of challenges that face the use of cloud computing services in libraries in developing nations. According to Ashima and Popli (2016), the cost implication for subscription cloud services and maintenance of access is a major challenge to libraries that are not financially buoyant, and this applies especially to libraries in developing countries like Nigeria where poor funding of libraries has become a perennial issue.

Also, the shortage of skilled manpower to manage and maintain the required ICT Infrastructure and erratic power supply as part of the challenges faced by Virtual Libraries implementation (Adesanya & Idogwu, 2013). These have made it practically difficult for Virtual Library in Nigerian Tertiary Institutions to be effectively maintained and its benefits fully harnessed. Coupled with the fact that virtual library is characterized by round the clock availability, these challenges posed a prohibitive cost to the libraries as against the limited available funds.

## *2.2 Cloud Computing Service Models*

According to Voorsluys, Broberg, and Buyya (2011) cloud computing providers offer their services

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according to three fundamental models: Infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS) where IaaS is the most basic and each higher model abstracts from the details of the lower models.

### *2.2.1 Infrastructure as a service (IaaS)*

In this most basic cloud service model, cloud providers offer computers, as physical or more often as virtual machines and other resources. The virtual machines are run as guests by a hypervisor, such as Xen or KVM. Management of pools of hypervisors by the cloud operational support system leads to the ability to scale to support a large number of virtual machines. Other resources in IaaS clouds include images in a virtual machine image library, raw (block) and file-based storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles (Amies et al., 2012).

### *2.2.2 Platform as a service (PaaS)*

In the PaaS model, cloud providers deliver a computing platform typically including operating system, programming language execution environment, database, and web server. Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers. With some PaaS offers, the underlying computer and storage resources scale automatically to match application demand such that cloud user does not have to allocate resources manually.

### *2.2.3 Software as a service (SaaS)*

In this model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. The cloud users do not manage the cloud infrastructure and platform on which the application is running. This eliminates the need to install and run the application on the cloud user's own computers simplifying maintenance and support. What makes a cloud application different from other applications is its elasticity. This can be achieved by cloning tasks onto multiple virtual machines at run-time to meet the changing work demand. These services are used in integrated library management and retrieval system for cloud computing. The open-source software and open standards are also used for Internet-based services towards the next automated library system. The most important cloud computing-based services are provided for accessing journals, e-books in library OPAC, as well as librarian interface and these, can be achieved in a different way such as information mashup, import bibliographic and authority data, reference management and web 2.0 by using twelve checklists. These important services are described in the following way (Hamdaqa, 2012). The most common cloud computing service providers to libraries are Worldcat, Summon (Exlibris), Google Docs, Discovery service, Polaris Library System, OSS labs, Scribd, and OCLC.

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### 3. Methodology

The study adopted a descriptive survey design. The population of the study comprises of 132 professional and para-professional librarians of the three selected university libraries in Edo State. That is the University of Benin, Ambrose Alli University, and Benson Idahosa University. The study adopted a total enumeration sampling technique, to study all professional and para-professional librarians of the selected academic libraries because the population was deemed manageable. The study used questionnaires as an instrument for gathering data, and the data gathered was analyzed with descriptive statistical tools. Specifically, percentages, frequency count and mean statistics were used.

### 4. Results

Table 1 shows the mean rating on the extent to which librarians are aware of cloud computing services in the library. The table reveals that the librarians are aware of Google docs ( $x=3.23$ ) OCLC ( $x=3.16$ ), and world cat ( $x=3.12$ ) to a high extent while the majority are not aware of OSS Labs rate ( $x=2.38$ ). The grand mean of  $X=2.83$  indicates that overall, the librarians' extent of awareness of cloud computing is high.

**Research Question 1:** What is the extent of awareness of cloud computing services by the librarians?

**Table 1.** Extent of awareness of cloud computing service by Librarians

| S/N        | Cloud computing services | Very High Extent | High Extent   | Low Extent    | Very low extent | Mean | Standard deviation | Decision |
|------------|--------------------------|------------------|---------------|---------------|-----------------|------|--------------------|----------|
| 1          | OCLC                     | 53<br>(42.4%)    | 48<br>(38.4%) | 15<br>(12%)   | 9<br>(7.2%)     | 3.16 | 0.26               | HE       |
| 2          | World cat                | 51<br>(40.8%)    | 46<br>(36.8%) | 21<br>(16.8%) | 7<br>(5.6%)     | 3.12 | 0.25               | HE       |
| 3          | Google docs              | 59<br>(47.2%)    | 44<br>(35.2%) | 14<br>(11.2%) | 8<br>(6.4%)     | 3.23 | 0.24               | HE       |
| 4          | Discovery service        | 34<br>(27.2%)    | 51<br>(40.8%) | 26<br>(20.8%) | 14<br>(11.2%)   | 2.84 | 0.32               | HE       |
| 5          | Polaris library system   | 32<br>(25.6%)    | 49<br>(39.2%) | 26<br>(20.8%) | 18<br>(14.4%)   | 2.76 | 0.36               | HE       |
| 6          | OSS Labs                 | 18<br>(14.4%)    | 38<br>(30.4%) | 42<br>(33.6%) | 27<br>(21.6%)   | 2.38 | 0.40               | LE       |
| 7          | Scribe                   | 22<br>(17.6%)    | 40<br>(32%)   | 42<br>(33.6%) | 21<br>(16.8%)   | 2.50 | 0.37               | HE       |
| 8          | Encore                   | 24<br>(19.2%)    | 47<br>(37.6%) | 36<br>(28.8%) | 18<br>(14.4%)   | 2.62 | 0.35               | HE       |
| 9          | Exlibris                 | 36<br>(28.8%)    | 48<br>(38.4%) | 24<br>(19.2%) | 17<br>(13.6%)   | 2.82 | 0.35               | HE       |
| Grand mean |                          |                  |               |               |                 | 2.83 |                    |          |

Table 2 shows the type of cloud computing service used by librarians in the three selected university libraries. The table revealed that 99 (79.2%) respondents use OCLC, 88 (70.4%) respondents use world cat, while 108 (86.4%) respondents use Google docs. It was also discovered that 80 (64%) respondents use discovery service, 61 (48.8%) respondents use the Polaris library system, while both OSS Labs and Scribd are used by 46 (36.8%). Furthermore, findings revealed that 51 (40.8%) use Encore and 59 (47.2%) use Exlibris. Therefore, it can be concluded that the type of cloud computing services used by the majority of the respondents is OCLC, World cat, Discovery service, Google docs, and Polaris library system.

**Research Question 2:** What are the types of cloud computing services used in the libraries?

**Table 2.** Types of CCS used by librarians (Edo State university)

| S/N | Types of CCS used by librarians | Yes (%)     | No (%)     |
|-----|---------------------------------|-------------|------------|
| 1   | OCLC                            | 99 (79.2%)  | 26 (20.8%) |
| 2   | World cat                       | 88 (70.4%)  | 37 (29.6%) |
| 3   | Google docs                     | 108 (86.4%) | 17 (13.6%) |
| 4   | Discovery service               | 80 (64%)    | 45 (36%)   |
| 5   | Polaris library system          | 61 (48.8%)  | 64 (51.2%) |
| 6   | OSS Labs                        | 46 (36.8%)  | 79 (63.2%) |
| 7   | Scribd                          | 46 (36.8%)  | 79 (63.2%) |
| 8   | Encore                          | 51 (40.8%)  | 74 (59.2%) |
| 9   | Exlibris                        | 59 (47.2%)  | 66 (52.8%) |

The table reveals that CCS is majorly used for sharing information ( $x=3.48$ ) and cataloging ( $x=3.42$ ) which are the highest mean ratings. This is followed by the use of CCS to store files online ( $x=3.38$ ), used in providing information to be universally accessible ( $x=3.37$ ), used for collection development functions, administrative functions, bibliographic checking, and compilation rate the same ( $x=3.29$ ), the mean rating indicates that most respondents use CCS for report management decision ( $x=3.30$ ), also for digital preservation of information resource ( $x=3.12$ ), for collaborative writing. In fact, from the table, the respondents agreed to the use of cloud services for the items identified. From data on Table 3, it can be concluded that the majority of librarians in universities in Edo State use CCS for all the purposes listed in the table.

**Research question 3:** What is the purpose of the use of cloud computing service by librarians in universities in Edo State?

**Table 3.** Purpose of use of cloud computing services

| S/N        | Purpose of use of cloud computing services  | Strongly agree (%) | Agree (%)  | Disagree (%) | Strongly disagree (%) | Mean | Standard deviation | Decision |
|------------|---|--------------------|------------|--------------|-----------------------|------|--------------------|----------|
| 1          | I use cloud computing service(CCS) for Collection development function                | 59 (47.2%)         | 46 (36.8%) | 17 (13.6%)   | 3 (2.4%)              | 3.29 | 0.19               | Accepted |
| 2          | I use CCS for cataloguing   | 69 (55.2)          | 40 (32%)   | 15 (12%)     | 1 (0.8%)              | 3.42 | 0.16               | Accepted |
| 3          | I use CCS in providing information, to be universally accessible                      | 66 (52.8%)         | 42 (33.6%) | 14 (11.2%)   | 3 (2.4%)              | 3.37 | 0.18               | Accepted |
| 4          | I use CCS for bibliographic checking and bibliographic compilation                    | 55 (44%)           | 53 (42.4%) | 15 (12%)     | 2 (1.6%)              | 3.29 | 0.16               | Accepted |
| 5          | I use CCS for statistic taking  | 36 (28.8%)         | 55 (44%)   | 27 (21.6%)   | 7 (5.6%)              | 2.96 | 0.25               | Accepted |
| 6          | I use CCS for lending of E-Books  | 42 (33.6%)         | 48 (38.4%) | 27 (21.6%)   | 8 (6.4%)              | 2.99 | 0.27               | Accepted |
| 7          | I use CCS for digital preservation of information resource                            | 55 (43.2%)         | 44 (36%)   | 13 (10.4%)   | 13 (10.4%)            | 3.12 | 0.30               | Accepted |
| 8          | I use CCS for article delivery service to patrons                                     | 48 (38.4%)         | 49 (39.2%) | 20 (16%)     | 8 (6.4%)              | 3.10 | 0.26               | Accepted |
| 9          | I use CCS for marketing and for current awareness service                             | 49 (39.2%)         | 47 (37.6%) | 21 (16.8%)   | 8 (6.4%)              | 3.10 | 0.26               | Accepted |
| 10         | I use CCS for conducting information literacy program, orientation video presentation | 41 (32.8%)         | 46 (36.8%) | 31 (24.8%)   | 7 (5.6%)              | 2.97 | 0.26               | Accepted |
| 11         | I use CCS for collaborative writing   | 46 (36.8%)         | 50 (40%)   | 24 (19.2%)   | 5 (4%)                | 3.10 | 0.23               | Accepted |
| 12         | I use CCS to store files online   | 64 (54.4%)         | 41 (32.8%) | 11 (8.8%)    | 5 (4%)                | 3.38 | 0.19               | Accepted |
| 13         | I use CCS for Administrative functions  | 63 (50.4%)         | 40 (32%)   | 17 (13.6%)   | 5 (4%)                | 3.29 | 0.22               | Accepted |
| 14         | I use CCS for report for management decisions   | 65 (52%)           | 34 (27.2%) | 22 (17.6%)   | 4 (3.2%)              | 3.30 | 0.23               | Accepted |
| 15         | I use CCS for sharing information   | 71 (56.8%)         | 44 (35.2%) | 9 (7.2%)     | 1 (0.8%)              | 3.48 | 0.13               | Accepted |
| Grand mean |   |                    |            |              |                       | 3.21 |                    |          |

Source: Field Survey (2018)



The table reveals that the benefit of universally accessibility rate ( $x=3.64$ ) which rate the highest. This is followed by the benefit of cost savings( $x=3.53$ ), then time-saving( $x=3.47$ ). The table also indicates that effective and efficient in service delivery rate ( $x=3.44$ ) while limitless storage capacity rate ( $x=3.41$ ), and result to high users satisfaction rate ( $x=3.4$ ), efficient collaboration with other libraries shows ( $x=3.38$ ), while prevent repetition of routine rate ( $x=3.32$ ) and prevent loss of data reveals ( $x=3.30$ ). With a grand mean of 3.44, the results in Table 4 indicate that majority of respondents, believe that the use of cloud computing is highly beneficial to effective library service delivery.

**Research question 4:** What is the benefit of the use of cloud computing services by librarians in universities in Edo State?

**Table 4.** Benefit of use of cloud computing service(CCS)

| S/N        | Benefit of use of cloud computing service(CCS)           | Strongly agree (%) | Agree (%)  | Disagree (%) | Strongly Disagree (%) | Mean | Standard deviation | Decision |
|------------|--|--------------------|------------|--------------|-----------------------|------|--------------------|----------|
| 1          | It is universally accessible                             | 85 (68%)           | 35 (28%)   | 5 (4%)       | 0 (0%)                | 3.64 | 0.09               | Accepted |
| 2          | CCS is cost saving                                       | 76 (60.8%)         | 41 (32.8%) | 6 (4.8%)     | 2 (1.6%)              | 3.53 | 0.13               | Accepted |
| 3          | CCS is time saving                                       | 72 (57.6%)         | 43 (34.4%) | 7 (5.6%)     | 3 (2.4%)              | 3.47 | 0.15               | Accepted |
| 4          | Limitless storage capacity                               | 68 (54.4%)         | 48 (38.4%) | 11 (8.8%)    | 3 (2.4%)              | 3.41 | 0.16               | Accepted |
| 5          | It is effective and efficient in service delivery        | 66 (52.8%)         | 48 (38.4%) | 11 (8.8%)    | 0 (0%)                | 3.44 | 0.12               | Accepted |
| 6          | It enhances efficient collaboration with other libraries | 59 (47.2%)         | 54 (43.2%) | 12 (9.6%)    | 0 (0%)                | 3.38 | 0.13               | Accepted |
| 7          | It prevent lost of data                                  | 56 (44.8%)         | 54 (43.2%) | 12 (9.6%)    | 3 (2.4%)              | 3.30 | 0.17               | Accepted |
| 8          | CCS prevents repetition of routines                      | 57 (45.6%)         | 56 (44.8%) | 7 (5.6%)     | 5 (4%)                | 3.32 | 0.17               | Accepted |
| 9          | It results in high users satisfaction                    | 63 (50.4%)         | 52 (41.6%) | 7 (5.6%)     | 3 (2.4%)              | 3.4  | 0.15               | Accepted |
| Grand mean |  |                    |            |              |                       | 3.44 |                    |          |

The data on Table 5 shows that poor Internet connection rates ( $x=3.58$ ), unreliable power supply and poor funding of the library ( $x=3.51$ ) are the major challenges facing the use of cloud services and technologies. While the problem of data security ( $x=3.39$ ) and technical problems associated with the use of cloud computing services ( $x=3.38$ ) also challenges the use of cloud services and technologies by librarians in the selected universities.

**Research question 5:** What are the challenges facing use of cloud computing service by librarians in universities in Edo State?

**Table 5.** Challenges facing use of cloud computing service

| S/N        | Challenges facing use of cloud computing service              | Strongly agree (%) | Agree (%)  | Disagree (%) | Strongly Disagree (%) | Mean | Standard deviation | Decision |
|------------|---|--------------------|------------|--------------|-----------------------|------|--------------------|----------|
| 1          | Poor internet connections                                     | 82 (65.6%)         | 34 (27.2%) | 8 (6.4%)     | 1 (0.8%)              | 3.58 | 0.12               | Accepted |
| 2          | Unreliable power supply                                       | 80 (64%)           | 33 (2.4%)  | 8 (6.4%)     | 4 (3.2%)              | 3.51 | 0.16               | Accepted |
| 3          | Poor technical knowledge among librarians                     | 69 (55.2%)         | 39 (31.2%) | 11 (8.8%)    | 6 (4.8%)              | 3.37 | 0.12               | Accepted |
| 4          | Technical problems associated with the use of cloud computing | 66 (52.8%)         | 44 (35.2%) | 12 (9.6%)    | 3 (3.8%)              | 3.38 | 0.17               | Accepted |
| 5          | Poor funding of the library                                   | 78 (62.4%)         | 36 (28.8%) | 8 (6.4%)     | 3 (2.4%)              | 3.51 | 0.15               | Accepted |
| 6          | Problem of data security                                      | 60 (48%)           | 43 (34.4%) | 20 (16%)     | 2 (1.6%)              | 3.39 | 0.19               | Accepted |
| 7          | Problem of data privacy                                       | 61 (48.8%)         | 43 (34.4%) | 17 (13.6%)   | 4 (3.2%)              | 3.29 | 0.20               | Accepted |
| Grand mean |   |                    |            |              |                       | 3.43 |                    |          |

## 5. Discussion of the Findings

The findings revealed that the majority of the Librarians in the selected Universities in Edo State are aware of the types of cloud computing services used in the Library which are listed in Table 1 except OSS Labs which they are not aware of. This finding is in line with the findings of 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 findings also revealed that the majority of librarians use cloud computing services for library operations to a high extent. This finding is in line with Balasubramanian et al. (2014) that “librarians use cloud computing service for various functions such as Administrative functions like sending memos or circular within and outside the Library, monitors Librarians work time frame and services carried out on daily basis by every librarian” The finding also aligns with Hussaini et al. (2018) who found that librarians use cloud computing for Interlibrary Loan services.

The findings from this study further show the benefit of the use of cloud computing services by Librarians in the selected university libraries in Edo State. The respondents agreed that it is cost-saving, universally accessible, time-saving, has limitless storage capacity and enhances efficient collaboration with other libraries. This is in line with the findings of Ramani (2011) that cloud

computing save cost for the library by providing an economy. Also, Chahal et al. (2010) noted that cloud computing increases the optimal resource availability and utilization for libraries.

The findings equally showed that poor Internet connection, unreliable power supply, and poor funding of the library are some of the major challenges facing the use of cloud computing services by the librarians. This is in line with the findings of Ristenpart et al. (2009) that noted that slow Internet connection is a big challenge to the use of cloud computing services. Also, this finding aligns with Ashima and Popli (2016) who reported that cloud computing service needs a stable power supply in order to function well and be sustainable.

## 6. Conclusion

Awareness and use of cloud computing services in the library is a very vital and crucial thing that has to happen and changes every aspect of librarianship in the 21st century. It must be noted that cloud computing service is used to carry out library services that were previously done manually; this will aid easy access and retrieval. Therefore for effective use of cloud computing service in the library, the management should make provision for proper backup of data, constant power supply, constant Internet connection, adequate funding of the library, availability of technically skilled librarians, and increased awareness/sensitization.

## 7. Recommendations

Arising from the findings the following recommendations have been made:

- (a) Problems related to slow connectivity should be overcome by upgrading the bandwidth.
- (b) Effective and efficient power supply supplemented with standby generators should be provided to check the menace of frequent electricity power failure.
- (c) In the same vein, the government should address the problem of erratic power supply more seriously through research and development.
- (d) More generous financial support should be made available to provide the basic ICT infrastructural facilities.

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