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Application of Cloud Computing Technology in Resource Sharing in Abubakar Tafawa-Balewa University, Bauchi

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Abstract

The study investigated the adoption of cloud computing technology for resource sharing among Faculty libraries and the main university library. Our research questions were raised, among which are: the existing computer network available in the main library and the rationales for the adoption of cloud computing to share library resources with the faculties. Qualitative research method was adopted; Focus group method, University Librarian and other librarians from the faculties were used as sample size of the study. Guided interview constituted the instrument for data collection, while descriptive method was used to analyze the data collected. The finding revealed that LAN, WAN, CAN, Internet and Network were the existing computer networks in the library; another finding of the study shows that library use cloud computing to provide library and information services to its students only within the main library building, and the library is distance to faculties in which students finds it difficult where access to information must not be location specific. The major implication faced by the adoption of cloud computing in terms of cost, staff and maintenance were: budgetary issues which lead to inadequate training of staff and recruiting the right staff to do the job among others. Based on the forgoing, the major way to overcome budgetary issues in the adoption of cloud computing is for university library to solicit for grants from financial institutions like banks, NGOs, and other foundations, more so, since cloud services are usage based or pay as you go pricing, university Library should adjust the usage and cost of its IT services in an efficient way. University library can experience cost reduction and flexibility of cost.

Keywords: *Cloud, Computing, Library Students and Staff*

Introduction

Cloud computing is a new technique of computing service offered over the internet, which has completely changed the way one can use the power of computers irrespective of geographic location. Cloud computing provides a shared pool of resources, including data storage space, networks, computer processing power, and specialized corporate and user applications. Cloud computing contains features of different technologies including utility computing, grid computing, unified computing, web 2.0, service-oriented architecture. Cloud computing has provided libraries

with great opportunities which enhance the management, access and dissemination of information resources to users, also stated that Cloud computing technologies enables library users to access and use library services from their homes and offices. This means that library users can read books, conduct research regardless of their location (Ogbu, 2015). Cloud computing is now being used by most organizations, its application includes, data backup in a case of disaster recovery, software development, and big data analytics. Cloud computing is now being adopted by various professions as well such as health where it is used to develop personalized treatments for patients also financial services companies are using the cloud to sway real-time fraud detection and prevention more so, Video game producers are not left out as they use the cloud to deliver online games to limitless players. The National Institute of Standards and Technology (NIST) has identified five essential characteristics of cloud computing: "on-demand service, broad network access, resource pooling, rapid elasticity, and measured services (Gambo,2017". Cloud services exhibit five essential characteristics that demonstrate their relation to, and differences from, traditional computing approaches: On-demand self-service: this those not require human interaction with a service provider, a customer can singly serve itself computing capabilities like server time and network storage as needed automatically. (Basaka& Babangida,2018, also affirmed that, in Broad network access, capabilities are made offered over the network and accessed via standard mechanisms that stimulate use by heterogeneous client platforms, thirdly Resource pooling is a situation where computing resources are pooled to serve multiple consumers with the aid of multitenant model, with diverse physical and virtual resources which are dynamically assigned to suit the demand of the consumer., fourthly in rapid elasticity, capabilities are unlimited on rapid elasticity, it can be provisioned rapidly and quickly and as well as automatically scale out and in and as well can be purchased in any quantity at any given time, lastly, on measured service, the provision of services is being monitored for the benefit of the user and consumers, it also automatically controls resource usage. It is against this background that this study seeks to investigate the way in which libraries can share resources for effective service delivery among faculty libraries and the main Library of the University.

Library as a growing organism that expands every time needs to service its teaming users effectively, the physical space and the increasing information resources has to shift focus to minimize its space and collection which can only be done through cloud computing between

Faculty Libraries and the main Library in the Institution for effective service delivery. However, recent study has shown inhibiting factors for the adoption of cloud computing that are hidden to many librarians. The literature review conducted shows that most of researches are centered on discussing the charges and benefits of utilizing cloud services in academic libraries and very few studies have examined cloud acceptance from users "perspective (Park & Ryoo, 2013). This therefore means that there is inadequate information regarding the factors affecting reception and utilization of cloud information services which should guide in decision making regarding the adoption process in institutions of higher education (Gambo, 2017). Scholars also hold the same view that even with the rapid rise in acceptance of cloud information systems, there are inadequate researches from the users" perspective. Scholars such as, (Alotaibi, 2014; Hashim & Hassan, 2015) argue that the biggest hindrances affecting cloud based system acceptance are related not to technology, but perception of users and the utilization of cloud computing technologies boosts the competitive advantage of an organization.

The specific objectives of the work are to:

i. To assess the impact of cloud computing information services in service delivery between main library and the Faculty libraries in ATBU

ii. examine the application of cloud computing technologies in Resource Sharing in service delivery between main library and the Faculty libraries in ATBU

iii. find out the factors influencing optimal use of cloud computing in information services delivery between main library and the Faculty libraries in ATBU and

iv. examine appropriate strategies to increase usage of cloud computing and resource sharing among main library and the Faculty libraries in ATBU

Literature review

Cloud computing is now being used by most organizations, its application includes, data backup in a case of disaster recovery, software development, and big data analytics. Cloud computing is now being adopted by various professions as well such as health where it is used to develop personalized treatments for patients also financial services companies are using the cloud to sway

real-time fraud detection and prevention more so, Video game producers are not left out as they use the cloud to deliver online games to limitless players. The National Institute of Standards and Technology (NIST) has identified five essential characteristics of cloud computing: “on-demand service, broad network access, resource pooling, rapid elasticity, and measured service”. Cloud services exhibit five essential characteristics that demonstrate their relation to, and differences from, traditional computing approaches: On-demand self-service: this those not require human interaction with a service provider, a customer can singly serve itself computing capabilities like server time and network storage as needed automatically. Secondly, in Broad network access, capabilities are made offered over the network and accessed via standard mechanisms that stimulate use by heterogeneous client platforms, thirdly Resource pooling is a situation where computing resources are pooled to serve multiple consumers with the aid of multitenant model, with diverse physical and virtual resources which are dynamically assigned to suit the demand of the consumer. fourthly in rapid elasticity, capabilities are unlimited on rapid elasticity, it can be provisioned rapidly and quickly and as well as automatically scale out and in and as well can be purchased in any quantity at any given time, lastly, on measured service, the provision of services is being monitored for the benefit of the user and consumers, it also automatically controls resource usage by leveraging a metering capability (Hassan,2015). Cloud computing service models Choosing a cloud service provider gives users more or less control over their cloud depending on the type. However, when choosing a provider, it is very essential to compare the intent of use. The need will vary depending on what one needs it for, either in libraries, for business, for health services, or personnel benefits as all these needs and purposes require different cloud types and services. Cloud service models are in three categories that one can subscribe to Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). It has been detailed by several scholars as they pointed out its usefulness. Such as (Mell & Gance 2011, Swapna & Biradar, 2017, Dhaka 2017, Neethus & Vanaja 2017, (Makori 2016; Ireno, Tijani & Bakare 2018; Chudasman, Bhatt, & Trivedi ,2019). These three types differ in the level of control that one has over its contents, and the specific functions deliver by the service providers. Software as a Service (SaaS): services are delivered to users from any online devices. Installing, upgrading and maintenance are the sole responsibilities of the service provider two packages are made available free and also subscribers benefit from low costs. The free one’s web 2.0 applications,

Skype, Hotmail, and Google Apps, while most business-oriented SaaS, such as SalesForce, are leased on a subscription basis. On the subscription, level access is available 24/7. Platform as a Service (PaaS): These services provide computing platforms with supplies tools to enable companies to build, test, and deploy Web-based applications. Infrastructure as a Service (IaaS)/ or Hardware as a Service. Amazon's Web Services is one of the leads in this area it involves 4 both storage services and computing power. Amazon's Web Services offers two main products including the Elastic Compute Cloud (EC2), that offers computing resources, and the Simple Storage Service (S3) for data storage. Cloud Computing Deployment Models National Institute of Standard Technology (NIST) explained to cloud deployment models as follows: Private cloud: the private cloud infrastructure is usually operated for a specific organization; the infrastructure may exist on-premise or off-premise. The organization can choose to manage it by itself or by a third party. Although on-premise infrastructure is usually expensive but secured (Balan, Gupta, Kanal, Singh, & Bhanumurthy, 2014). Community cloud: community infrastructure is shared between organizations, that have similar interests, shared concerns in mission, security requirements, and policy. It may be managed by the organizations or a third party and may exist on-premise or off-premise. (Dillon, Wu, & Chang, 2010). Public cloud: This is a type of infrastructure in which the computing infrastructure is run, and situated within the sites of the host company's data centers and not in the customers' premises. That is, it is an off-premise arrangement from which services are provided. The physical infrastructure is not being controlled by the subscriber. The cloud infrastructure is made available to the general public or a large industry group and is owned by the service provider. This type of cloud uses a shared infrastructure pool from which many companies and institutions that need their services share the same infrastructure to run their services. The access is without any geographical location just with internet connectivity. Hybrid cloud: Hybrid cloud is a combination of private, community, or public. The cloud infrastructure of the private, community and public are unique entities but bound together by standardized technology that enables data and application portability for transitive information exchange. They use standard methodologies regardless of ownership or location. In establishing the relevance of cloud computing in academic libraries, studies such as Adegbiler, Iwari and Hamzat (2017) reviewed the prospect of cloud computing technology in Nigerian academic libraries. They proposed the Library Service Platform (LSP) as the most important gateway for implementing this technology in

Nigeria. The study recommended that for successful adoption of LSP in academic libraries in Nigeria, library authority must form the research team for LSP, assess the library workflow, review the current process and apply innovation and technology in library operations and explore open sources tools for maximum utilization of this technology for the betterment of academic libraries. Similarly, Arpaci (2017), studied the antecedents and consequences of adopting cloud computing education to achieve knowledge management using the technology acceptance model (TAM). His study was carried out on undergraduate students in a Turkish university. Cloud computing adoption can be promoted if educational institutions can be increasing the awareness of knowledge management. On the contrary, Raed, Fash, and Chang (2015). Study on the migration of cloud services and deliveries to higher education revealed that the major challenges affecting the adoption of cloud in these universities under study include data security, lock-in, privacy issues, regulatory compliance, data insecurity, Pillai and Seena (2018) surveyed the application and awareness of cloud computing technology at Kerala University. Their findings revealed that 42.16% of library staff have less idea about cloud technology, this is to say the majority of them are not aware of cloud service modules although the majority of these professionals used Google applications in their daily tasks. Therefore, the study recommends an urgent need for the library staff understudy to be trained and informed about cloud computing technology Enefu, Gbaje, and Aduku (2015) investigated the basis for the implementation of cloud computing for the faculty library services. Their findings revealed the library provides services using various networks. Although they used cloud computing in providing services which do not have a wide coverage as some student left out. they recommended their library need to provide services through Wide Area Network (WAN) that can provide wide coverage to the student also they suggested a hybrid cloud deployment model Similarly, Wada (2018) carried out a study on "cloud computing implementations in libraries " he stated that implementing cloud computing in libraries will significantly reduce the cost of maintaining systems, save energy and expose library to multi-variant information resources and as well for better optimization of library services, he furthered that digital resources, internet service, thin-client architecture, wireless access point and digital librarian are the major prerequisites for cloud computing deployment. A study by Yuvaraj, (2015). "On implementing and sustaining cloud technology at Banaras Hindu University Library (BHUL)". revealed that the library is providing valued-added cloud-based library services to its

users and as well fully prepared to clamps any challenges that may surface towards cloud computing in the university library. This optimistic attitude was confirmed in a study by According to Kaushik and Kumar (2015), the idea of cloud computing is based on a very fundamental principle of reusability of IT capabilities. Cloud computing broaden horizons across organizational boundaries compared to automatic, grid, utility, and distributed computing. However, some country's economic situation is obstacles inhibiting libraries and information center adoption to clouds, according to Makori (2016), library and information centers in Kenya faced abundant operation needs due to staff economic situations. he also recommended that cloud computing is progressively thrust as the best means to handle and support the delivery of services in the library and information centers. According to Nag and Nikam (2016), Libraries are now loaded with various expenses. On the other hand, with cloud computing, there is little or nothing to finance. "Pay-as-you-go" & "Subscription" methods are two modes of payment in cloud computing. With it, there is no gainsaying that cloud computing will solve storage issues for libraries. In the same vein, Sahu (2015) reiterates that cloud computing has the tendencies of transforming the way services are delivered given libraries a better prospect to extend their impact. Thus, with cloud computing, the cost of computation, hosting, storage, and delivery of services is meaningfully less. An earlier study by Abdulsalam and Fatima,(2011) explored the applications of cloud computing in higher education in Nigeria, Their study affirmed that cloud computing has great potentials in improving the ICT applications and infrastructure at higher levels of education in higher institutions in Nigeria, although Their study identified some cogent factors that have militated a successful implementation of cloud computing in Nigeria's higher institutions such factors include unsteady power supply, cost of ownership, lack of access, etc. however for a better transition, they opined such institution keep in contact with reliable organizations such as National Institute of Standards and Technology(NIST) to ensure the suave transition. 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 6 providing library services. The study further revealed that the deep interest to use this technology in library services and operations as

they believed that by applying cloud technology it will reduce the overall cost of library and easy collaboration. A study by Udanor, Obilo, and Aneka (2018), on implementing cloud computing storage in Nigeria tertiary institutions, was able to develop a model of a stable cloud infrastructure that enables researchers to collaborate and share data among the academia. The design and implementation are based on the Synnefo cloud. Similarly, Yuvaraj (2013) explored the application and usage of cloud technology at libraries of a total of 29 central universities in India. The survey tool designed and collected data from a total of 407 library users from all the universities. Findings revealed that 32.4 percent of library professionals have core computer literacy in terms of professional certification in computer science in addition to a professional degree in library science. Almost 87 percent of the library personnel shows a willingness to provide library services through the cloud. Library professionals indicated the willingness to use layers of cloud computing mainly free software, platform, and infrastructure as cloud services in the central university. Data security and protection of personal data are the major concerns expressed by the library professionals. Oyeleye, Fagbola and, Daramola, (2014) on the "impact and challenges of the adoption of cloud computing in public universities in the South-west, Nigeria". Their results revealed that adopting cloud computing has a key influence on cost-effectiveness, enhanced availability, reduced investment in physical assets, reduced IT complexities, and ultimately increased operability. This was affirmed also by Yuvaraj, and Mayank, (2013), that 91% of the organizations in the US and Europe agree that the reduction of cost is a major reason for them to migrate to a cloud environment. From the user's point of view, a study by Ashtari and Eydgahi, (2017) examined the influence of users' perceptions toward the cloud computing technologies was investigated The researchers focused on the associations between variables identified in the literature that were considered to be influencing the perception of students in the university in Southeast Michigan. These variables include users' perceptions of the usefulness and effectiveness of cloud computing applications, perceived ease of use, Internet self-efficacy, computer anxiety, computer self-efficacy. They carried out an online survey among 40 undergraduate students at Michigan University and used the Technology Acceptance Model (TAM) to analyze the adoption of cloud computing by students. According to Gisolfi, (2015), with the presence of smart technologies and other innovative IT gadgets, today's library patrons are techno-savvy and most prefer to interact via email, instant messaging services, streaming news, and media outlets. Hence,

libraries must acknowledge technology trends and re-invent their services to provide efficient services, so as not to be bypassed by users that perceive their services to be slow, unappealing, and irrelevant inactive library service delivery. There is a need for libraries to be proactive by re-strategize and restructure their mode of service delivery to satisfy their clientele (McCallum, 2015). Therefore, embracing new technology trends like cloud computing that can improve service delivery to her clientele is the only way for libraries and information centers survival Although, the migration to the cloud-based library may not take place out rightly, however it is inevitable to look at various opportunities that cloud base services can offer that will necessitate its adoption by library and information centers. As specified by Neethu and Vanaja (2017) are Cost Efficiency, Scalability, Lower investment, Support included, Greater security and accessibility, Portability, Adjustable storage, Cloud OPAC, Unlimited Storage, Backup and Recovery, Essay Access to Information. More so it is user-centric, interoperability, representation, connect and 7 convert, and create and collaborate, Easy on installation and maintenance, highly automated, Better mobility (24x7) service, and Shared resources.

Methodology

Descriptive survey design was adopted for this study. Fifty three library staff from six Faculties constitutes the respondent for the study. These respondents were randomly selected from the six faculties in, ATBU, Bauchi.

Questionnaire was used as instrument for data collection. Google forms was employed to create the items of the questionnaire which was administered on the respondents via online professional associations. The data collected was analyzed using descriptive statistics such as frequency counts and percentages were used with the aid of Software Package for Service Solution (SPSS).

Results and Discussions Table 1.

S/NO	**Name of Faculties**	**No of users**	**percentage**
1	Faculty of Agriculture	05	15.05
2	Faculty of Engineering and Engineering Technology	08	20.9
3	Faculty of Environmental Technology	08	13.00
4	Faculty of Management science Technology	08	15.05
5	Faculty of Science	12	22.3
6	Faculty of Technology Education	12	13.7
	Total	53	100

Source: **University Bulletins**

The Faculties under survey and the Demographics Information of the respondents are Frequency count and Percentage (%)

Sections in the library	**Frequency**	**Percentage**
Circulation	21	(39.6)
Cataloguing	13	(24.5)
Reference	4	(7.5)
Acquisition	3	(5.7)
E-Library	12	(22.6)
Total	53	100
Educational qualifications		
PhD	4	(7.5)
MLS/MIRM	22	(41.5)
BLS	24	(45.3)
HND	3	(5.7)
Total	**53**	**100**
Gender		
Male	22	(41.5)
Female	31	(58.5)
Total	53	100
Working experience		
1-5	22	(41.5)
6-10	25	(47.2)
8 11 years and above	6	(11.3)
Total	53	100.0

The analysis as shown in Table 1 above revealed that large number of the respondents from the four universities under survey were Female (58.5%). While (41.5%) of the respondent were Male. With (45.3%) of whom are degree holders

Table 2: Awareness of Cloud Computing S/N Awareness of Cloud Computing Yes No Is a type of computing that relies on shared computing resources , and provide unlimited storage capabilities 49(92.5) 4(7.5) From the analysis,

Table 2 shown that 49 (92.5%) respondents of library personnel from the different faculties under survey were aware of the concept of Cloud Computing. While only 4(7.5 %) were not aware. Therefore, this implies that the majority of library personnel are aware of this concept and are not lagging.

Table 3: Purpose of Using Cloud-based Services

S/N	**Purpose**	**A A Score%/**	**AD Score%/**
For Personal Purpose			
1	I use it to Store files online	49(92.5)	4(7.5)
2	I use it to store Collaborative writing output	38(71.7)	46.2
3	I use it to store my personal photos and videos	95(179.3)	11(20.7)
4	I use it to store both received and sent mail	49(92.7)	4(7.5)
For professional Purpose			
5	I assist users in information resources provision/ federated search	36(67.9)	17(32.1)
6	I use it to store the output of my professional collaborative research with put	40(75.4)	13(24.6)
7	I use it for file sharing services to users	43(81.1)	10(18.9)

8 I use it to store created Document/ office software 32(60.4) 13(24.5)

9 I assist library users in information retrieval 40(75.5) 13(58.5)

10 I assist in Providing document delivery services to users 36(67.9) 17(32)

11 I use it to create, upload and save newsletters, new arrivals and forthcoming events for user community 39(73.6) 14(26.4)

12 I use it for users records maintenance/ storage/creating alerts to users based on SDI 48(90.6) 5(9.4)

13 I use it for File synchronization services 36(67.3) 17(32)

From the analysis, Table 3 depicted the responds rate on the purpose of using cloud-based services, given that it can be used for professional and personal purposes. Under the personal purpose of using cloud-based services, it indicates that the majority of the respondent 95(179.3) are using cloud services to Store Personal photos and Videos.

However, few use it to store the output of their Collaborative writings, with responded to be 38(71.7) While for professional purposes, the maximum respondent rate indicated that they use it for users records maintenance/ storage and as well as creating alerts to users based on SDI with a responds are of 48(90.6) The least responds for professional use indicated that they use it to store, created Document/ office software , with a responded rate of 32(60.4).

Table 4: Cloud-Computing Library Services

S/N	Cloud Services	Used	Not used
E-mail services			
1	Gmail	45(84.9)	8(15.1)
2	Outlook	30(56.6)	23(43.4)
3	Yahoo	48(90.6)	5(9.4)
Social Networking			
4	Facebook	45(84.9)	8(15.1)

5 Whatsapp	47(88.7)	6(11.3)
6 Twitter	38(71.7)	15(28.3)
Video services		
7 Youtube	45(84.9)	8(15.1)
8 Vimeo	22(41.5)	31(58.5)
File storages & sharing		
9 Google drive	43(81.1)	10(18.9)
10 Drobox	23(43.4)	30(56.6)
11 SHAREit 24(45.3) 29(54.7) Information & data collection services		
12 Survey Monkey	44(83.0)	9(17.0)
13 Google forms	46(86.8)	7(13.2)
Event calendar		
14 Google calendar	16(30.2)	37(69.8)
15 Doodle	17(32.1)	36(67.9)
Online representation		
16 Slide share	40(75.5)	13(24.5)
17 Google doc	47(88.7)	6(11.3)
Online file editing services		
18 Picasa	16(30.2)	37(69.8)

The analysis as showed in

Table 4 above revealed that in cloud-based services, mailing services was highly used by the respondents with a response rate of (90.6 %) for yahoo. followed by Social Networking, Whatsapp was more used compare to Facebook and Twitter with a response rate of 10 (88.7%), equally in

online representations, Google Doc respond rate was (88.7%). in information and data collection services, Google forms respond rate was (86.85%), there were more utilized than survey monkey, while in video services, Youtube was more used than Vimeo with response rate was off (84.9%). Lastly, other services such as file storage and sharing, Event calendar, and online file editing services were also used by respondents though in file storage and sharing Google drive usage was more significant than others with (81.1%).

Table 5: Area of Adopting cloud computing services in the library

S/N	Areas of Adopting cloud services	**Yes%**	**No%**
1	Library portal for new arrivals, book request, queries, and feedback	31(58.5)	22(41.2)
2	Web OPAC, online renewals and reservations storage	40(75.5)	13(24.5)
3	Back up/ information resources storage	43(81.1)	10(18.9)
4	Storage of data and files in a public server	42(79.2)	11(20.8)
5	Library management software (LMS)	47(88.7)	6(11.3)
6	Data import and export	41(77.4)	12(22.6)
7	Resource Repository	41(77.4)	12(22.6)

The analysis as showed in Table 5 depicted areas in which cloud computing has not been adopted in the various faculty libraries under study. The maximum respondent rate indicates that “Library management software (LMS)” is the highest area where cloud computing has been adopted with the respondent rate of 47(88.7%) while the second majority area is Storage of data and files with the response rate of then 42(79.2). then “Back up/ storage of information resources” with a respondent rate of 43(81.1%). Then followed by “Data import and export” and equally “Resource Repository” with a response rate of 41(77.4%) respectively. Cataloguing and classification response rate is 40(75.5%) and the least response rate is Acquisition with 31(58.5 %) response rate.

Discussion of Findings

Based on the findings from the study, the results are discussed as follows: Findings to research question one awareness of cloud computing revealed that library personnel from the six faculty libraries understudy had a response rate of (92.5%), this indicates that large number of the respondents from these faculties under survey in ATBU, were aware with the concept Cloud Computing. This further implies that they are not lagging. This finding is in agreement with the study of Majhi, Meher, and Maharana (2015) who found out that 85.7% of library and information science professionals in 17 Indian university libraries were aware of cloud computing. On a contrary, a study by Pillai and Seena (2018) on the application and awareness of cloud computing technology at Kerala University revealed that 42.16% of library staff have less idea about cloud computing. The findings to the research question two revealed that large number of the respondent with respond rate (179.3%) were using cloud services to Store personnel photos and videos, this finding agrees with the study of Majhi, Meher, and Maharana (2015) whose study revealed that usage of cloud in library operations and services was not significant, a total of 75 % of the library 11 professionals used basic cloud services for personnel purposes. Also, Yuvaraj (2013) explored the application and usage of cloud technology at libraries of a total of 29 central universities in India, out of 407 library users only 87% percent personnel show willingness to provide library services through the cloud. The finding from the research question three revealed that the most cloud-based services is social networking with (88.7) respond rate and Online representations respectively (88.7). Based on the research question four, the maximum respondent rate indicates that “Library management software (LMS)” is the highest area where cloud computing has been adopted with the respondent rate of (88.7%). A study by Oyeleye, Fagbola and, Daramola, (2014) on the “impact and challenges of the adoption of cloud computing in public universities in the South-west, Nigeria”. Affirmed that adopting cloud computing has a key influence on cost-effectiveness. Similarly, Arpaci (2017), asserted that Cloud computing adoption can be promoted if educational institutions can increase the awareness of knowledge management. Conclusion The trends in information and communication technology (ICT) are unrelenting. Novel technological devices keep evolving with possibilities of offering innovative services. These technologies are playing a dynamic role in library services as well. The library has always been a point of contact for information therefore, Libraries a time faces many challenges that always result in the adoption

of new technologies. The adoption becomes necessary in other to ease processes involved in service delivery and ultimately to satisfy the needs of its users. It has become obvious that present library users are tech-no savvy therefore, have transformed their information seeking behaviour to a greater extent, which calls for new means of satisfying their queries.

However, it was shown from the study that large number of library personnel are aware of what cloud computing is but however uses it mostly for personal purposes. Furthermore, with the alternatives at the beck of patrons today there is no gainsaying that, dependence on libraries and information centers may shift. The only way to remain relevant is by creating awareness and adopting new technologies like cloud computing that has the potential in adding creativity and innovative service delivery to its users most especially distance from various faculties and the main Library, with the aid of this resource sharing to faculties and motivate students toward library use. Implications of the Findings There are several practical implications of this study for the library and information professions. Firstly, to create awareness, an adoption of cloud computing services, cloud computing service providers need to create room for sensitizing their users and also to teach them about the performance benefit of cloud services to library service delivery. By so doing, it will help the librarians to understand the relevance of this technological innovation to their daily routine. Secondly, the librarians will need to assess cloud computing technologies by considering the security challenges associated with it. Libraries have always faced storage issues due to the need to have a robust collection, However, the implication of adopting cloud-based library services by Libraries will thereby create a limitless storage capacity thus providing efficiency, increase reach, pave room for collaborative services reduce cost, improve workflow with faster access to services.

Therefore, Libraries need to consider reallocating resources from managing technology to developing added-value services that satisfy the demands of patrons. Furthermore, creating a centralized knowledge-based information pool is one of the perquisites to deliver efficient unified service delivery. Therefore, adopting cloud computing can help in achieving a general repository that can be accessed by all. From the foregoing, there is no gainsaying that the library needs to channel their energies and expertise into sourcing out creative ways of adopting new technologies and training their staff to familiarize themselves with it.

Recommendations

Based on the findings of this study, the following recommendations are therefore presented.

1. Libraries need to adopt cloud computing services to improve service delivery by encouraging library personnel to use it for professional use with or without visiting the main Library.

2. The university management needs to frequently organize training and retraining on the installation of different routers, switches, various communication media, these are good options, that can provide skills and knowledge on networking which are essential for managing cloud computing services.

3. Before the adoption of cloud computing technology, consideration should be given to privacy issues and all levels of security matters. This will give consumers the assurance that their resources are secured and save from intellectual property theft.

4. There is a need to curb all avoidable factors that could militate against cloud computing adoption such as Internet services and electricity should be resolved before engaging in cloud computing adoption in the libraries. Alternatively, the library can consider the use of a solar energy system and the use of an inverter to complement the electricity supply

5. Digital librarians need to extend their areas of researches to cloud computing that will enable them to participate and make some reasonable contributions to the development and utilization of cloud computing systems in libraries.

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