

Librarianship in Africa

JOURNAL OF LIBRARY AND INFORMATION SCIENCE



VOL. 10 (1&2)

ISSN 1933 - 8308

DEC, 2018

PUBLISHED IN NIGERIA

INFLUENCE OF CLOUD COMPUTING IN KNOWLEDGE MANAGEMENT AMONG UNIVERSITIES LIBRARIES IN AKWA IBOM STATE, NIGERIA

BY

BASSEY, MARY MFON (CLN), PhD
Collection Development Section
Library Department,
University of Uyo, Akwa Ibom State
E-mail princemji@yahoo.com



Abstract

The study investigated the influence of cloud computing in knowledge management among universities libraries in Akwa Ibom State. One research question was raised and one hypothesis was formulated to guide the study. The population of the study comprised 2200 university librarians in Akwa Ibom State and a sample size of 120 librarians (60 males and 60 females) were selected for the study through purposive random sampling technique. The questionnaire titled "cloud computing in knowledge management questionnaire (CCKMQ)" were used for data collection. The instrument was validated by the experts and the reliability of the instrument was calculated using Cronbach reliability statistics. The data obtained using the instrument was analyzed using mean standard deviation and independent t-test statistics and the result shows that cloud computing play a significant role in knowledge management among universities wishes to recommend that more researchers on the influence of cloud computing in knowledge management among universities library should be carry out.

Keyword: *Cloud computing, knowledge management, Information and Communication Technology (ICT).*

INTRODUCTION

The emergence of technology has change the landscape of library and information science from traditional method to just-in-time access. This current development has gone a long way to confirm the saying that the only thing that is constant under the sun is change. It is in the spirit of this change that many new technologies have been introduced in

the field of information science, ranging from personal computer storage space to the internet speed, software, hardware and now cloud computing. According to Marshal (2016) an authority in cloud computing while speaking in a conference organized to elaborate on why libraries should keep up with the development of new technology (cloud computing) for the benefit of all

the users, pointed out among others that the new trend in technological innovation will enable libraries to experience a big relieve in the reduction of the cost and stress of the maintenance of hardware and software. Cloud computing is a technological advancement that focuses on the way in which we design computing systems, develop applications, and leverage existing services for building software. It is based on the concept of dynamic provisioning, which is applied not only to services, but also to computer capability, storage, networking, and Information Technology (IT) infrastructure in general.

Resources are made available through the Internet and offered on a pay-per-use basis from Cloud computing vendors. Today, anyone with a Masters/credit card can subscribe to Cloud services, and deploy and configure servers for an application in hours, growing and shrinking the infrastructure serving its application according to the demand, and paying only for the time these resources have been used. The storage capacity of cloud is unlimited and the services offered are sophisticated. Cloud computing is one of the ICT initiatives within the education sector, which is being implemented to reduce internal data centre utilized for research and development initiatives. As much as ICT is highly developing, then the need for high cloud information security is inevitable. The purpose of this chapter is to provide a conceptual framework of cloud computing, advantages and disadvantages, deployment models,

categories of cloud services, and its application to library services (Klazar, 2016).

What is Cloud Computing

The word cloud computing is a concept that has variously been defined by different scholars, depending on the framework of their perception as well as what they make of it. It is not a new technology which enables organization, individual, government parastatals and institutions such as libraries to share resources and services or personal devices. Thus the combining of servers, networks connection application and resources is known as cloud. Cloud computing is a subscription-based service where an individual can obtain networked storage space and computer resources. For instance, if you open an email with Yahoo, Gmail, or msn mail, the email client/platform will take care of the hardware and the software to support your personal email account and system. Any time you want to access the mail, you will open the web browser, go to the email client and log in with internet access. This can be done anywhere, anytime and on any devices that is connected to the internet. Since your email is not house by your physical computer, you can access it even if you are on a trip or at work. Unlike MS Word software that is installed on PC, for example, when a document is created with word processing software, the document stays on the device that was used creating it, unless the PC is moved physically or the file is transferred by the use of memory stick (Khan *et al.*

2011).

The most widely acceptable definition of Cloud computing is the one by the National Institute of Science and Technology NIST (2011). that sees, cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources which includes networks, servers, storage, applications, and services, that can be rapidly provisioned and released with minimal management effort or service provider interaction. This implies that cloud computing is acting as resource pooling technology for the assessment of infinite services and resources on demand of users which can be compared with models of pay as you use or utility model same as used in electricity consumption or mobile services.

Characteristics of cloud computing in knowledge management

The characteristics of Cloud Computing is derived from the National Institute of Science and Technology (NIST) draft definition of cloud computing as it recorded five vital qualities of cloud computer and goes on to demonstrate what they are in specialized terms. They are;

- i) On demand service
- ii) Broad network access
- iii) Resource Pooling
- iv) Rapid elasticity
- v) Measured service

I. On-Demand service: This can also be seen as Self administered service. It implies that one can easily request a service over the internet

when needed without physically interacting with each service provider. Buyers can log onto a site or use web services to have extra computing resources on interest at whatever point they need them, without conversing with a deals delegate or spcialized backing staff. For example; if you want to buy goods, you simply log on to a site like Jumia.org, and place order for whatever you want to buy and do at anytime, at will.

ii. Broad network access or Ubiquitous network access:

Access to cloud computing has no limit; it is so expansive and large to accommodate so many clients simultaneously. Services are available and can be accessed through a range of devices (Phones, tablets PC,) on the grounds that they are electronic, you can access it from anywhere in the world, from any internet associated mechanism. With a web program on a PC (or even a flimsy customer computer terminal) you can do anything, however there is additionally, as a rule, express underpin for prevalent hand held apparatuses, for example Blackberries and iPhone.

iii. Resource pooling: Resources are pooled in order to cater to multiple customers using a multi-tenant model with different physical and virtual resources dynamically allocated and reallocated in respect to customer requirement. The customer generally has no control or knowledge of the precise location of the resource been provided except when specified at a higher level of abstraction (Mell & Grance, 2011). In order words the

system allows several customers to share the infrastructure allotted to them without any of them being aware of the sharing. This done by virtualizing the servers on the available machine pool and then allotting the servers to multiple users

iv. Rapid flexibility: Resources can easily be increased or decreased to cater to customer's demand. To a customer the capability appears to be unlimited and can be appropriated in any quantity at any given time and place. Cloud computing can also be empowered computing resources or client records to be quickly and flexibly provisioned or discharged with the intention that clients can scale their frameworks (and costs) all over at whatever time consistent with their evolving prerequisites.

v. Measured administration: The service been used is measured, resource usage can be controlled, monitored and reported providing transparency for both the service-provider and customer e utilized service. A customer is charged for what he uses (Mell & Grance, 2011). Cloud computing suppliers immediately screen and record the resources utilized by clients or as of now allocated to clients, which makes conceivable the pay-for e- utilization charging model that is central to the cloud computing ideal model.

Deployment Models

The followings are the deployment models in Cloud computing:

- i) Private Cloud
- ii) Public Cloud

- iii) Community Cloud
- iv) Hybrid Cloud

Private cloud: This is a model where the cloud infrastructure is owned by a single organization, managed and operated by the organization or a third party and it ca I either on or off premises. Example is individual business.

Public cloud: As the name implies, it is the opposite of private cloud. This is where the cloud infrastructure is open to the public, and is been used by individual organizations and government. It is owned, managed and operated by the ser- provider and it is located on the premises of the provider

Community cloud: The cloud infrastructure is provisioned for a group organizations that have similar/shared concern (e.g., mission, policy, compliance considerations and security requirements). It may be owned, managed and opera: by one or more of the organizations or a third party and it may exist on or off premises.

Hybrid cloud: The cloud infrastructure is a combination of two or more distinct c infrastructures (private, public or community) that remain separate entities but bound together by standardized or proprietary technology that enables data and application portability.

Categories of cloud services or types of cloud computing:

The following are types of service model or cloud computing model

Software as a Service (SaaS) - This is a service that gives subscribers access to b resources and applications. It makes it unnecessary for the

subscriber to have physical copy of software to install on his / her devices SaaS also makes it easier subscribers to have the same software on all of their devices at once by accessing the cloud SaaS may be available on rental basis or on per use basis Example CISCO, storage service, social software, web-based application, (facebook, twitter, you tube, gmail) File creation, document sharing, dropbox, google docs, google drive, bloggers etc. In a SaaS agreement, you have the least control over the cloud, Platform as a Service (PaaS) - A PaaS system goes a level above the Software as a Service setup. A PaaS provider gives subscribers access to the components that they require to develop and operate applications over the internet. Here an operating system is providing to a customer or end user on a monthly rental basis. Example of the major cloud computing vendor is Amazon, Microsoft, and Google etc. Infrastructure as a Service (IaaS) - This model deals primarily with computational infrastructure. In an IaaS agreement, the subscriber completely outsources the storage and resources, such as hardware and software that they need. Hardware services such as processor, memory and network, Web-services, Google computer engines

Advantages of cloud computing

Cloud computing offers numerous advantages both to end users and the entire libraries in all sizes. The enormous benefit is that you no more have to support the infrastructure or have knowledge necessary to develop and maintain the

infrastructure. These advantages are in the area of;

- Cost reduction
- Adjustable storage
- Convenience
- Accessibility
- Backup and recovery
- Scalability
- Resiliency and redundancy
- Quick deployment
- Software integration
- Availability anytime and anywhere
- Create and collaborate
- Flexibility and innovation

Disadvantages of cloud computing:

The challenges or disadvantages of Cloud computing is visible especially in the area of:

- Security
- Privacy
- Dependency
- Vendor lock-in
- Technical difficulties and Down Time
- Limited Control
- Increased vulnerability

Application of Cloud Computing to Library Services

Cloud computing is one of the most popular virtual technology for libraries to deliver the services in an effective and efficient manner. It contains features of different technologies including utility computing, grid computing, unified computing, and web 2.0 services oriented architecture among others. The services offered by cloud computing to libraries is in new format with the elasticity such as pay as you use model, access anywhere, any time and prompt connection of their service

to serve the user better. Libraries, nowadays use cloud computing technology to enhance their services by adding more values, attracting the users and cost effectiveness. Kaushik and Kumar (2013) expressed that the new concept of cloud and libraries has generated a new model called cloud libraries. Though the usage of cloud computing may vary with the libraries nature. Services and information needs but most common usage of cloud computing within libraries can be development of digital libraries, corporate cataloging, acquisition, storages and sharing the resources on virtual environment on the web. The need of 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, problems in library resources management, complex demand of users and attraction of users towards cutting edge technologies (Kaushik and Kumar, 2013).

The application of cloud computing in our library system will help to reduce the operation cost without being perturb about any capital cost. For instance Libraries that are not capable of purchasing all books because of limited budget can share resources using cloud computing. The combine efforts of the libraries in cloud computing will not only improve efficiency but also make the system more scalable, according to their requirement in other to save money. It will help in converting the principal investment on infrastructure into operation expenditure. (pay on pro-rata basis for services). The

Implementation of cloud computing model, installation of server is not required in the libraries and the services are provided on periodic subscription basis. Also maintenance of all hardware and software are taken care by the service provider, with this, libraries can save the human resources and thereby saving cost. With the application of Cloud computing, library and information centers can build up their own customized applications for library housekeeping activities and they can share these customized applications over the Internet as Web services for others to find and reuse. They can innovate collectively and increased visibility and accessibility of collections. (Ajay, Praveen & Rama, 2014) Among the numerous services provided by Cloud computing, software as a service (SaaS) and data storage seem to be the most useful in the library because it provides maintenance of software and hardware as well as data storage like memory, components, devices and media. For example Departments in the University that are connected to the library cloud can access all uploaded information about the library, without the library worrying about infrastructure and software. In a nutshell, with Cloud computing;

- 1) Libraries are able to save cost
- 2) Libraries are able to share resources easy
- 3) Libraries need not to invest much on hardware and software
- 4) Libraries are able to store and maintain same data thousand times
- 5) Networking between ~~different~~

libraries is possible

- 6) There is flexibility and innovation
- 7) Accessibility and visibility of library services anytime/anywhere

Knowledge management is the process of accurately transferring knowledge to the company of staff in a timely manner to assist the staff in taking proper action to improve the continuity organizational performance. According to Yong (2011) pointed out that knowledge from the perspective of knowledge management is a fluid mix that includes framed experience, values, contextualized information, organized and analyzed information that can be understood and can be supplied to solved problems and make decisions. Lee (2010) also pointed out that knowledge management refers to the organizational and technological infrastructure of knowledge of knowledge absorption, knowledge sharing and knowledge storage.

Abdullah (2011) carryout a study on the influence of cloud computing in knowledge management in libraries and found out that cloud computing in knowledge management enable users accessibility and visibility of library services anytime and anywhere. Abdullah (2011) further pointed out that cloud computing in knowledge management make accessed knowledge aids adequately in generation of new knowledge. In another study by Cruz et al (2011) provide a comprehensive survey of research in the area of cloud computing and knowledge management system

by searching three prominent research database, namely, ISI web of science, IEEE explore and EBSCO (mus Quarterly). They conclude that cloud computing when applied to knowledge management system can enable libraries save costs, adopt new practices explore and share new resources. This is because cloud computing relieves the library to invest heavily on information technology resources and simultaneously provide a platform to share and exchange information.

Impact of Cloud Computing on Knowledge Management

Cloud services are increasingly being used for the purpose of knowledge management because of the following reasons:

- i. Technological advancement related to ubiquitous high-speed internet connectivity.

- ii. Shrimming cost of data-storage.

- iii. The propagation of smart mobile devices at electric speed around the world, these factors have helped in fulfilling the pre-requisite of simple, cost-effective and flexible information. The use of smart phones and tablets demonstrate the potential of cloud computing to empower the users with sophisticated and high-powered yet uncomplicated and easy to use computer applications and information while which was otherwise not so easy to access.

- iv. Maintaining freedom of information and with the aid of cloud

computing knowledge can be converted into an asset which acts as a stimulant for innovation and research (Mohr, 2012)

Statement of Problem

Major problems or challenges plaguing cloud computing in knowledge management among universities libraries in Nigeria with particular reference to Akwa Ibom State is visible especially in the area of security, privacy, dependency, vendor lock-in, technical difficulties and downtime limited control and increase vulnerability. It has also been observed that insufficient in service delivery, out-right theft, waste of organizational resources, favouritism, nepotism, poor finding and resistance to change especially when such changes might expose corruption loopholes and the dissimulation of cooperate knowledge is show and other does not meet the needs of the users population. The problems as enumerated may also stem from old leadership styles or standard practices which seem to thwart the efficiency of universities libraries, and a few researchers have tried to solved the problem which still persists such studies include those of Fahad (2014), Gasari, Seetal and Bhagyashrel (2012) which identified the following innovations in management behaviours: expert consultation, knowledge sharing, transformational management and utilization of information and communication technologies (ICT). Therefore this study seek to investigate the influence of cloud computing in knowledge management among universities libraries in Akwa

Ibom State of Nigeria.

Research Question: What is the influence of cloud computing in knowledge management among Universities libraries in Akwa Ibom State?

Research Hypothesis: There is no significant influence of cloud computing in knowledge management and University libraries in Akwa Ibom State.

Research Method

The descriptive survey research design was used for the study. The population of the study comprised of all 2200 Universities librarian in Akwa Ibom State. A sample size of 120 librarians (60 males and 60 females) was selected for the study from the target population through purposive random sampling technique. The instrument used for the study was cloud computing in Knowledge Management Questionnaire (CCKMQ) and was validated by the experts. The instrument was structure to conform to four point rating scale. The questionnaire, the instrument contains two sections: Section A was on demographic data of the respondents section B was designed to collect information that represent items under the dependent variable. The reliability of the instrument was calculated using Cronbach reliability statistics and the reliability coefficient of 0.85 was obtained which was deemed adequate for the study. The instrument was administered to the subject in their respective institutions with the help of two research assistance. The retrieved copies of the

questionnaire was collected and analyzed using mean and standard deviation in answering the research questions while independent t-test statistics was used to test the null hypothesis all at 118 degrees of freedom and 0.05 significant levels.

Results

Research Question 1

What is the influence of cloud computing in knowledge management among universities libraries in Akwa Ibom State?

Table 1: Mean and standard deviation of the influence of cloud in knowledge management among universities library in Akwa Ibom State.

Gender	N	Mean	SD
Male	60	68.80	8.66
Female	60	67.45	11.46

N = 120

From table 1 above, the result indicate the mean scores of 68.80 and 67.45 for the responses of male and female libraries on cloud computing in knowledge management among universities libraries in Akwa Ibom State. The result shows that cloud computing in knowledge management exert high positive

influence among universities libraries. It was also revealed that there was no significant difference in the mean score of both genders.

Research Hypothesis 1: There is no significant influence of cloud computing in knowledge management among universities libraries in Akwa Ibom State?

Table 2: Independent t-test analysis of the influence of cloud computing in knowledge management among universities libraries in Akwa Ibom State.

Gender	N	Mean	SD	t-value	t-crit	df
Male	60	68.80	8.66	6.87	1.96	118
Female	60	67.45	9.46			

N = 120

Table 2 shows that the calculated t-value of 6.87 is greater than the critical value of 1.96 at 118 degrees of freedom and 0.05 alpha level. Hence the null hypothesis which stated that there is no significant influence of cloud computing in knowledge management among universities library in Akwa Ibom State is reflected while the alternate hypothesis is retained. This implies

that cloud computing play a significant role in knowledge management among universities library.

Discussion of Findings

The study examines the influence of cloud computing in knowledge management among universities libraries in Akwa Ibom State. The result presented in Table 1 shows that there was no significant

difference in the mean scores of male and female librarians on cloud computing in knowledge management. Also from Table 1, the mean score of male librarian was 68.80 while the mean score of female librarian was 67.45 with the standard deviation of 8.66 and 9.46 respectively. This result shows that cloud computing in knowledge management has a high positive influence on universities libraries.

From the result presented in Table 2, it was found that the calculated value of 6.84 was greater the critical value of 1.96 which leads to the rejection of the null hypothesis which stated that there is no significant influence of cloud computing in knowledge management among universities libraries in Akwa Ibom State. This finding is in line with the earlier findings of Cruz et al (2011) who found out that cloud computing when applied to knowledge management system can enable libraries to save costs, adapt new practices explore and share new resources.

According to Ajay, Praveem and Pama (2014) cloud computing in knowledge management allow networking between different libraries possible, enable library to share resources easily and also help to store and maintain some data thousand times.

Conclusion

In this research, cloud computing in knowledge management were discussed and a comprehensive discussion of the cloud computing and its benefits for knowledge

management. Discussion was also made on the challenges in knowledge management implementation in cloud computing and trend in knowledge management using cloud computing. It shows how the transformation of the current knowledge management system to the cloud environment has resulted in various benefits, namely, cost savings, accessibility, software integration, adjustable storage, create and collaborate among others. The adoption of cloud computing through knowledge management will enable libraries to gain velocity with respect to information and to cater according to the continuously changing requirements of the library. It will not only empower the libraries but also the key participants. Cloud providers must ensure that the information security system they provide are responsive to the users' requirements and the data both primary and secondary must be preserved as authentic and reliable. Expansion and up graduation is imperative for cloud computing because if such an improvement is done in procedures or techniques or policies even for one user then it is going to be advantageous for others as well.

Recommendation

The researcher recommends that more research should be carryout on the influence of cloud computing in knowledge management among universities library to ensure security and privacy.

REFERENCES

Adullah, R, Eri, Z. D, and Talib, A. M

- (2011). *A model of knowledge management System for facilitating knowledge as a service (KAAS) in cloud computing environment international conference of research and innovation in information system (ICRIIS)*, 1-4.
- Ajay, R., Praween, K., Rama, S., (2014). *Application of cloud computing in Library information service sector. IGI Global. DOI: 10.4018/978-1-4666-4631-5.ch005.retrieved 1st November, 2016.*
- Craz, M. F, Correia, A. M. R. and Neves, F. T. (2011). Supporting knowledge management System through cloud computing: A scoping review, 6th librarian conference On information systems and technologies (CISTI), 1-6.
- Fahad, G. A. (2014). Computer Network Management. Unpublished Thesis Project. Personal blog
- Gartner.com. 2009. *Gartner Highlights Five Attributes of Cloud Computing.* (online) Available at: <http://www.gartner.com/newsroom/id/1035012> Accessed November 6, 2016).
- Gens, F. (2013) IDC Exchange Blog Archive Defining “Cloud Services” and “Cloud Computing”. (online) Available at: <http://blogs.idc.com/ie/?p=190> (Accessed on: 10th November, 2016).
- Gosari, N. Seetal, S. S. & Bhagyashrel, D. (2012). Use of Cloud computing in Library and Information Sceince field. *International Journal of Digital Library services*, 2(3), 51-60.
- Kaushik, A. & Kumar, A. (2013). Application of cloud computing in libraries. *International Journal of Information Dissimilation and Technology*, 3(4), 270-273.
- Khan, S., Khan, S., & Galibeen, S. (2011). Cloud computing an emerging technology: Changing ways of libraries collaboration. *Journal of Library and Information Science*, 1(2), 151-159.
- Klazar, E. (2016). Cloud services and storage. Carnegie CPD notes. University of Pretoria, South Africa.
- Leegy J. (2000). A case study on the effects of teaching innovation on learning effectives. Using a moderator of integrating information technology into teaching. *The journal of Human Resource and Adult Learning* 7(1): 58-69.
- Marsal, B. (2016). Carnegie CPD programme Clickup, 2016.

- Mell, P. and Grance, T. 2011. *The NIST Definition of Cloud Computing*. (e-book) pp. 2-3. <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.Pdf> (Accessed: 1 Sep 2013).
- Mohr, J. L. (2012). Knowledge management as a strategy: Driving a competitive edge through knowledge mind the IT cap. Available online at <http://www.servicemanagementfusion.com/conference.org.pdf>.
- Staten, M. (2009). Cloud Computing: An Overview. A summary of important cloud-computing issues distilled from Association of Computing Machinery (ACM) CTO Roundtables. Retrieved 5 / 0 9 / 2 0 1 2 from <http://queue.acm.org/detail.cfm?id=1554608>.
- Yong, B (2011) Cloud Technology and Zen merit times. As Edition (April 10, 2011).