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Security Concerns on the Application of Cloud Computing in Federal University Libraries in Nigeria

Okwoli Mercy Enefu (CLN)
National Open University of Nigeria
Special Study Centre for the Air Force, Kaduna, Kaduna State.
08033173383
Okwoli.mercy@yahoo.com/mokwoli@noun.edu.ng

Prof. Philip U. Akor (CLN)
Federal University of Technology
Department of Library and Information Technology. Minna, Niger State
08036880881
puakor@gmail.com /akorusman@futminna.edu.ng

Prof. Juliana Udensi (CLN)
Federal University of Technology
Department of Library and Information Technology. Minna, Niger State
08035860072
julieudensi@yahoo.com

Abstract
The study sets to investigate the security concerns on application of cloud computing in federal university libraries in Nigeria. Issues related to major security concerns in the application of cloud computing in federal university libraries in Nigeria such as: security of data, confidentiality of data and privacy of data were investigated. Descriptive research method was adopted. The researcher used cluster sampling technique to select 340 out of the 2900 target population of university librarians, ICT heads and librarians in charge of the administration of cloud computing application in these various libraries from the six (6) geo political zones. The sample size selected for the study was obtained using Raosoft online sample calculator at 95% confidence level with 5% confidence interval. The findings revealed that the major security concerns on the application of cloud computing in Federal University Libraries include: insecurity of data, confidentiality of data and privacy of data among others. It was concluded, that the federal University libraries should incorporate hybrid cloud deployment models to its libraries in order to benefit from all the services it offers and also to minimize the fear usually associated with confidentiality, privacy, data loss and data theft or interruption of data in the cloud. It is recommended that federal university libraries in Nigeria should make adequate use of Ning, Survey Monkey, Wufoo, Stumbleupon and My goya application in the cloud for effective and efficient library services.

Keywords: Cloud computing, Information Technology, Library Services, Information Resources.

Introduction

Cloud Computing is a web-based technology, which is a new form of computing, it is a service provided on the internet or network. Cloud computing is completely new information technology and it is known as the third revolution after Personal Computer (PC) and Internet in information technology (Matt, 2010). It is a server-based service, which is very helpful in modern times. Cloud computing requires remote server as well as internet to maintain and

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organise data and applications. In cloud computing so many computers are connected with a server, the applications are installed in a remote server and all the computers connected to that server location can use all these applications. Goldner (2010) see cloud computing as a computing paradigm involving data and/or computation outsourcing, with infinite and elastic resource scalability, on demand "just-in-time" provisioning, no upfront cost and pay-as-you-go. It means that library use cloud computing as much or as less as they need, use it only when they want, and pay only what they used. Cloud computing though still an evolving paradigm, its definitions, use cases, underlying technologies, issues, risks, and benefits are refined in a spirited debate by the public and private sectors.

According to National Institute of Standards and Technology (NIST) (2018), cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources such as networks, servers, storage, applications, and services that can be rapidly provisioned and released with minimal management effort or service provider interaction. To be more specific, cloud computing is the improvement of distributed computing, parallel computing, and grid computing and distributed databases. In other words, by collecting large quantities of information and resources stored in personal computers, mobile phones and other equipment, cloud computing is capable of integrating and putting them on the public cloud for serving users Lai, 2017).

Dastagiri & Kumar (2017) defined cloud computing as the computing software and services that can be accessed via the Internet rather than residing on a desktop or internal server. Cloud computing is acting as a resource pooling technology for accessing infinite computing services and resources as per demand of users and can be compared with models of pay as you use or utility model same as used for mobile services usage and electricity consumption. The researcher see cloud computing as a kind of computing which is highly scalable and use virtualized resources that can be shared by the users. Users do not need any background knowledge of the services before using it. Moreover, a user on the internet can communicate with many servers at the same time and these servers exchange information with one another

Library resources in the era of cloud computing, has being around since the invention of Internet, it has becomes wide spread because of remote storage and access technologies. Cloud applications have assumed an important role since their implementations to the extent that scholarly journals and the software that provides access to these contents are more frequently cloud-based. Whenever information resources are stored away from the physical Information Technology tools and accessed remotely over Internet, it is believed that cloud computing has taken place. Missions of library are now been fulfilled and manifested by the presence of cloud-based solutions due to its support and facilitation of online electronic resources and services provision (Nagalakshmi, 2013; Madhusudhan, 2013). Ultimately, cloud computing in libraries is demonstrated by the Online Computer Library Center WorldCat, which has been around for generations (Mcmanus, 2016), where it is indicated that cloud computing is already playing a very large role for research libraries. Surprisingly, people hardly notice that cloud computing is part of their activities until they are engaged in and committed to carrying out their transactions in the cloud, such as emailing and accessing resources on Internet. The benefits of cloud computing for libraries services provision is increasingly attracting attention of library professionals and librarians. For the effective and efficient application of cloud computing in libraries, there is a need for adequate and accurate security of library resources in the cloud.

According to Parker & Castleman, (2019), the security of library resources is of utmost importance to the librarian and information specialist for the purpose of reducing or avoiding unauthorised access to information bearing resources available in the library. To avoid

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unauthorised access to library resources, Buckland (2017) states that librarians and information professionals must devise strategies which will enable them to provide adequate security that can protect information resources available in the library. Library resources such as electronic journals, electronic books are the information bearing materials which enable library to fulfill its goal of meeting the information needs of its users. As cloud computing is achieving increased popularity, concerns are being voiced out about the security issues as introduced through application of this new model. The effectiveness and efficiency of cloud computing are being reconsidered as the characteristics of innovative deployment model that can differ widely from those of traditional architectures. A key point to remember is that, at the most basic level, the library data resides on someone else's server(s). This means that the data is controlled by someone somewhere and it all boils down to trust and control issues.

Despite the good benefits of cloud computing in libraries, certain issues such as data privacy, confidentiality, and accessibility of data, data theft or interruption of data are some security concerns in the application of cloud computing in libraries. In line with this, Lie (2017) observed that security is an evolving concept whose requirements keep shifting as old vulnerabilities are addressed. Cloud security being one component of security is in a constant state of evolution due to an ever changing Internet environment, hence there is a need for a continuous awareness in order to mitigate new threats as they emerge and how they affect cloud usage.

In order to address the above concerns, the study intends to find out security aspect of confidentiality and privacy among other issues which the researcher believe will reduce the concerns most libraries have about cloud computing because these observations have not been studied empirically. It is against this backdrop that the researcher has deemed it fit to investigate the security concerns on the application of cloud computing in federal university libraries in Nigeria.

Statement of the Research Problem

The emergence of information technology like cloud computing led some university libraries into moving their information resources and services online for anytime and anywhere access on real time basis. However, the information technology, of which cloud computing is a part, is very complex, especially in area of data and information security. Furht and Escalante (2017) reported that moving information resources and services to the cloud connote exposing library resources to the global world which is both advantageous and worrisome. Nevertheless, lots of libraries are reluctant to expose their information resources and services due to fear of data lost, database hacking, denial of library services, exorbitant charges and services disruptions.

Unfortunately, there are dearth literatures discussing the complexities and open system architecture of cloud computing, which are concerned with insecurity of data, confidentiality of data and privacy of data. Extending from these cloud related challenge is legal issues encompassing what, how, why and when information resources should be accessed and how library services should be provided. All these challenges are confronting librarians and stakeholders in library and information services management.

In order to address these concerns, this study identified the security concerns on the application of cloud computing to library services, in terms of confidentiality, privacy and data theft or interruption of data in the cloud.

Aim and Objectives of the Study

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The main aim of this study is to investigate the security concerns on the application of cloud computing in federal university libraries in Nigeria**.** Specifically, the study is designed to:

1. identify the extent on the application of cloud computing in Federal University Libraries in Nigeria.
2. determine the major security concerns in the application of cloud computing in Federal University Libraries in Nigeria.

Research Questions

The following research questions were formulated in pursuance of the study:

1. What are the extent of the application of cloud computing in Federal University Libraries in Nigeria?
2. What are the major security concerns in the application of cloud computing in Federal University Libraries in Nigeria?

Research Design

The study employed descriptive survey design. This type of research design is suitable for this study, because it describes the security concerns on the application of cloud computing in federal university libraries in Nigeria. Descriptive research design according to Abdulrahman (2018) refers to the collection of relevant data for the purpose of describing and interpreting existing relationship, attitudes, practices, processes, conditions and trends. Equally, descriptive survey was used to collect data from the study population and describing it in a systematic manner. Descriptive survey is a kind of study, which aimed at collecting data and describing it in a systematic manner, the characteristics features or facts about a given population.

According to Punch (2005) descriptive survey design often involves summarizing specific factual information into empirical generalization. Sulaiman (2007) also expressed this much, when he said that the aim of descriptive survey research is to obtain information from sample of respondents that relate to the problem being investigated. The use of descriptive survey research method is suitable for this work because the study is aimed at describing the security concerns of the application of cloud computing in federal university libraries in Nigeria. Since this study is a fact finding research about the security concerns of the application of cloud computing in federal university libraries in Nigeria, describing research method/design is found to be most appropriate for use.

Population of the Study

The population of this study is made up of 2,900 Librarians from the NUC approved 43 federal universities in Nigeria, the University Librarians and Head of ICT units in the Libraries in charge of the administration of cloud computing in the libraries.

Sample and Sampling Technique

The sampling size for this study is 340. The sample size selected for the study was obtained using Raosoft online sample calculator at 95% confidence level with 5% confidence interval (2016). Raosoft calculator was found suitable due to its reliability in determining required minimum sample to be studied for effective representation of the population. Therefore, for a

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population size of 2,900 a sample size of 340 is adequate. This shows that a sample size of 340 was obtained from 2,900 at a level of confidence of 95% and at margin error of 0.05.

In selecting the 6 universities that will represent the 6 geo-political zones, stratified sampling technique was adopted and finally simple ballot system of random selection was used to select one federal university from each zone. The following university libraries have been randomly selected to represent the entire six geo-political zones: National Open University of Nigeria, Abuja (north-central), Ramat Library Maiduguri (north-east), John Harris Library, Benin, (south-south), Kenneth Dikke Library, Ibadan (south-west), Nnamdi Azikiwe Library, Nsukka (south-east), and Kashim Ibrahim Library, Zaria, Kaduna, (north-west geo-political zone) respectively.

Table 1 below shows the sample size for the study.

Table 1: Sampling Size of Respondents that are in charge of the administration of cloud computing in the six (6) selected federal university libraries in Nigeria

S/No	Name of Library/ Institution	University Librarians	Heads of ICT Librarians	Librarians
1	National Open University of Nigeria, Abuja	1	1	26
2	Kenneth Dikke Library, Ibadan	1	1	40
3	Ramat Library, Maiduguri	1	1	43
4	John Harris Library, Benin, Edo State	1	1	35
5	Nnamdi Azikiwe Library, Nsukka	1	1	46
6	Kashim Ibrahim Library, Zaria	1	1	150
	Total	**6**	**6**	**340**

Source: Through Visitation and Phone calls (November, 2019)

Instruments for Data Collection

The research instruments used for collecting data for the study were the questionnaire and interview guide. The purpose of using questionnaire was to enable the respondents express their opinions for the study and it is the most appropriate instrument that is used for the study because it is easy to administer and data can be collected within a very short timeframe and the interview guide was also used in order to elicit information on the security concerns on the application of cloud computing in federal university libraries in Nigeria. The interview guide was used for the university librarians and the heads of ICTs librarians in order to build on data collected from questionnaire by verifying and elaborating on information supplied by the informants individually.

Method of Data Analysis

To enable the researcher analyse the data adequately, descriptive and inferential statistical tools was used for the analysis. Frequency distribution, mean and percentages were used for descriptive analysis, while Pearson product moment correlation (PPMC) descriptive statistical tool was used to test the hypotheses. Whereas, the data collected from the interview guide was first organised for analysis using tape recorder and then transcribed into different types, depending on the source. The data was then tabulated and discussed descriptively using Content Analysis.

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Data Presentation and Analysis and Interpretations

This section analyses and discusses the data collected for the purpose of answering the first and second research questions raised in the study. Frequencies, percentages and charts were used to compute and present the results.

Response Rate

Out of the respondents, questionnaires were administered to 328 respondents while 12 were interviewed bring the total of all the respondents to 340. Please, note that out of 328 respondents 6 copies were invalidated and therefore, were never considered for analysis. Only 322 copies (92.4%) of the questionnaires were retrieved, duly completed and found usable for this study. This high response rate is attributed to be the fact that the respondents were duly followed up and given up to eight weeks within which to complete and return them.

Objective 1: Extent on the application of cloud computing in Federal University Libraries in Nigeria.

In order to identify the extent on the application of cloud computing in federal university libraries in Nigeria studied, lists of possible stages were highlighted to the respondents to tick the information related to their libraries. The opinion of respondents on extent of the application of cloud computing in Federal University Libraries in Nigeria was sought to establish extent of the application of cloud computing in Federal University Libraries in Nigeria. The respondents were requested to indicate the extent of the application of cloud computing in their libraries and their response were summarized in Table 2 below.

Table 2: Identifying the Extent on the Application of cloud services by the library

SN	Item	VLE =1	LE =2	GE=3	VGE=4	N	FX	Mean	SD	Remarks
		Freq (%)	Freq (%)	Freq (%)	Freq (%)					
1	Discussion Stage	82 (25.4)	154(47.7)	77 (23.8)	10 (3.1)	322	661	2.05	0.78	Low extent
2	Trial stage	110 (34.1)	183(56.7)	23 (6.9)	8 (2.3)	322	619	1.77	0.67	Low extent
3	Implementation Stage	94(29.2)	163 (50.5)	31(9.5)	35 (10.8)	322	577	2.02	0.91	Low extent
4	Currently in use	8 (2.3)	13 (3.8)	118 (36.4)	185 (57.4)	322	287	3.49	0.68	Great extent
5	Advanced usage	76 (23.6)	118 (36.4)	97 (30)	126 (10)	322	883	2.26	0.93	Low extent
6	Web-mail services	10 (2.8)	5 (1.5)	172 (53.3)	137 (42.3)	322	1080	3.35	0.66	Great extent
7	Store personal photos	19 (5.6)	20 (6.2)	210 (65.1)	75(23.1)	322	989	3.06	0.72	Great extent
8	On Line Application	20 (6.2)	8 (2.3)	209 (64.9)	86 (26.7)	322	1007	3.12	0.72	Great extent
9	Store personal video	48 (14.9)	10(3.1)	194 (60)	72 (22.1)	322	938	2.89	0.92	Great extent
10	Pay to store computer file online	53 (16.4)	11 (3.3)	190 (58.7)	70 (21.5)	322	925	2.85	0.94	Great extent
11	Back-up hard drive to an online site	47 (14.4)	13 (3.8)	211 (65.4)	53 (16.4)	322	918	2.84	0.87	Great extent

Source: Fieldwork, 2019; Item with weighted mean value < 2.5 signifies Low extend

VLE=Very Low Extent; LE=Low Extent; GE=Great Extent; VGE= Very Great Extent

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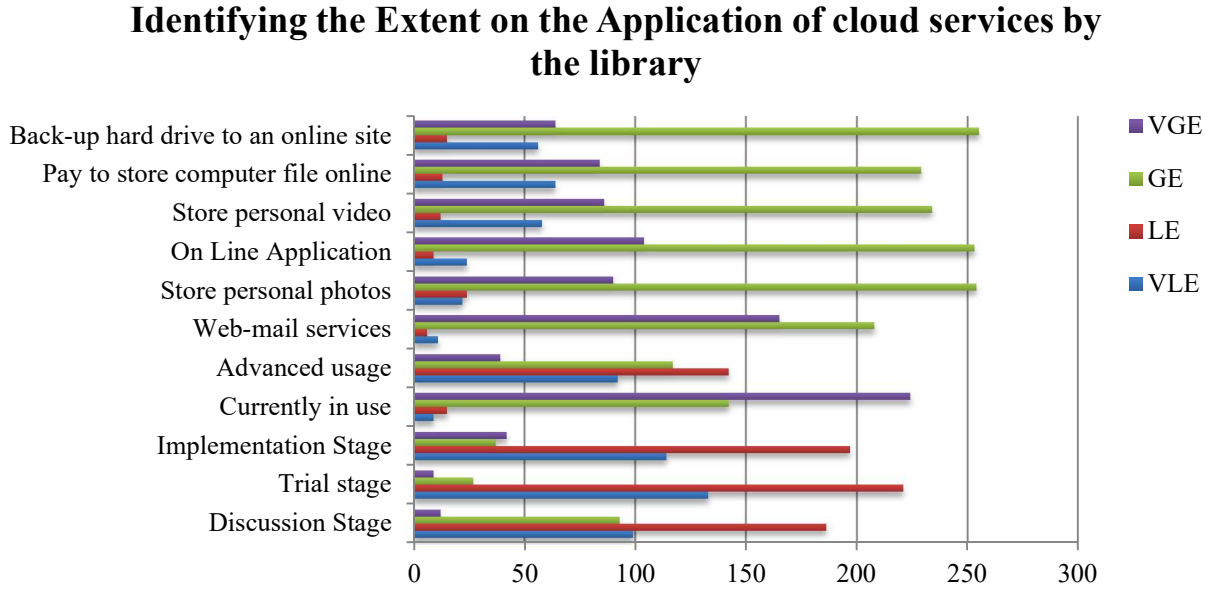

Tables 2 above present the descriptive statistics for identifying the extent on the application of cloud services by the library. These responses ranged from M = 2.05 ("Discussion state") to M = 3.35 ("Web-mail services"). The result shows that out of the eleven items listed for respondents to identify the extent on the application of cloud computing by the library, seven items have high mean scores above 2.50 bench mark. These items include: currently in use, web-mail services, store personal photos, on line application, store personal video, pay to store computer file online, back-up hard drive to an online site, thus it implies that these above aforementioned items were greatly applied in the application of cloud computing in Federal University Libraries in Nigeria.

On the other hand, four items produced low mean scores below the bench mark of 2.50 because they were not used in application of cloud computing by the libraries as expected. Consequently, those items were discussion stage, trial stage, implementation stage and advanced usage.

Objective 2: Major Security Concerns in the Application of Cloud Computing in Federal University Libraries in Nigeria

Table 2 below shows the responses of librarians and ICT librarians on the threats which are major concerns to the application of cloud computing in libraries.

Table 2: Threats which are major concerns to the application of cloud computing in your libraries

		SD	D	A	SA					
	Items	**Freq (%)**	**Freq (%)**	**Freq (%)**	**Freq (%)**	**N**	**FX**	**Mean**	**SD**	**Remarks**
1	Cyber-attacks and hacking of sensitive information	15 (4.4)	0 (0)	116 (35.9)	193 (59.7)	322	1119	3.51	0.72	Agree
2	Illegal local network access from cloud services	8(2.3)	0 (0)	125 (38.7)	190 (59)	322	1151	3.54	0.62	Agree
3	Stolen information from cloud computing employees.	24 (7.4)	0 (0)	109 (33.8)	190 (58.7)	322	1143	3.44	0.83	Agree
4	Attacks from other customers	31 (9.5)	0 (0)	122 (37.7)	171 (52.8)	322	1078	3.34	0.89	Agree
5	Adherence and compliance of providers to security standard	18 (5.4)	0 (0)	158 (49)	167 (45.6)	322	1160	3.35	0.74	Agree
6	Data loss	15 (4.4)	0 (0)	159 (49.2)	150 (46.4)	322	492	3.38	0.71	Agree
7	Data Segregation from other customers	22 (6.7)	10 (3.1)	181 (56.2)	110 (34.1)	322	1025	3.18	0.78	Agree
8	Security culture among providers	8 (2.3)	10 (3.1)	125 (38.7)	180 (55.9)	322	1123	3.48	0.67	Agree
9	Evolving threats that may target clouds	21 (5.4)	0 (0)	232 (59.5)	137 (35.1)	322	865	3.24	0.71	Agree
10	Privacy concern	11 (3.3)	10 (3.1)	131 (40.5)	171 (53.1)	322	1108	3.43	0.71	Agree
11	Insider breaches	11 (3.3)	10 (3.1)	138 (42.6)	165(51)	322	1105	3.41	0.71	Agree
12	Malicious Code Injections	24 (7.2)	13 (3.8)	124 (38.5)	163 (50.5)	322	1074	3.32	0.85	Agree
13	Shared Technology Vulnerabilities	25 (7.7)	3 (0.8)	166 (51.5)	129 (40)	322	1193	3.24	0.81	Agree
14	Insecure Programming Interface	34 (10.5)	3 (0.8)	149 (46.2)	138 (42.6)	322	1041	3.21	0.90	Agree
15	Data loss/Leakage	32 (9.7)	6 (1.8)	167 (45.4)	137 (43.1)	322	1093	3.22	0.89	Agree

Source: Fieldwork, 2020

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Tables 2 present the descriptive statistics for the threats which are major concerns to the application of cloud computing in libraries. These responses ranged from M = 3.18 ("Data Segregation from other customers") to M = 3.54 ("Illegal local network access from cloud services"). The result shows that out of the fifteen items listed for respondents to determine the Threats which are major concerns to the application of cloud computing in libraries, all of the items have high mean scores above 2.50 bench marks. These items include: Cyber-attacks and hacking of sensitive information, illegal local network access from cloud services, stolen information from cloud computing employees, attacks from other customers, adherence and compliance of providers to security standard, data loss, data segregation from other customers, security culture among providers, evolving threats that may target clouds, privacy concern, insider breaches, malicious code injections, shared technology vulnerabilities, insecure programming interface, data loss/leakage.

These findings are in line with Ahmat (2015) that reported that cloud computing is clearly an advancement of other web services like web hosting and online storage and so it faces many of the same risks and from hackers and cyber thieves. Hackers who are able to break into a public or private cloud computing environment can steal sensitive information from many different users and either use or sell that information. Information such a credit card numbers, financial records, software and reports are obviously stored online by many users and are constantly at risk of being stolen. And also Romero (2016) stated that the issues of data security, internet bandwidth user privacy leaks, virtualization security are matter of concerns to cloud computing application in the libraries; as it may create doubt in the minds of professionals about data security as in the case of digital data there is still a huge fear of putting information in the hands of third parties; the libraries may lose ownership as the data is often stored in servers; and it is very difficult to migrate from cloud to cloud. Security of cloud computing services is a contentious issue that may be delaying its application.

Conclusion

This paper addressed security concerns in the application of cloud computing in federal university libraries in Nigeria. Despite the good benefits of cloud computing in libraries, certain issues such as data privacy, confidentiality, data ownership, and accessibility of data, data theft or interruption of data are some security concerns in the application of cloud computing in federal university libraries in Nigeria. The result of the findings revealed that the cloud service provided by federal university libraries in Nigeria include: PaaS, SaaS, IaaS, Cloud-based mailing services, Cloud-based forums, Cloud-based social networking, and Cloud-based information collection. The major security concerns in the application of cloud computing in Federal University Libraries in Nigeria, were insecurity, confidentiality, privacy, compliance of providers to security standard, data loss, and insecure programming interface and data loss/leakage.

Recommendations

1. Federal University libraries in Nigeria should make adequate use of cloud computing to great extent such as pay to store computer file online, Ning, Survey Monkey, Wufoo, Stumbleupon, My goya and Ms online to its information services as these will equally boost the library services delivery in federal university libraries in Nigeria.

2. Federal University Libraries of Nigeria should incorporate hybrid cloud deployment models to its libraries in order to benefit from all the services it offers and to eradicate the fear usually associated with confidentiality, privacy, data loss and data theft or interruption of data in their cloud.

References

Abdulrahman, D.A. (2018). *Research designs and its implications for data collections, analysis and interpretations*. In Oyetunde, T.O. (Ed.). *Issues in postgraduate studies*. Jos: University of Jos Press. Pp. 73-82.

Ahmat, K.A. (2015). *Emerging Cloud computing security Threat*: New York. University of New York. New York. Pp. 3-6.

Buckland, M. (2017). What is a document? *Journal of American Society for Information Science at 62. Journal of the American Society for Information Science 50*, no. 11(2017)

Dastagiri, D. and Kumar, P. S. (2017). Impact of Cloud Computing Applications in Academic Library and Services. *International Journal of Library and Information Studies*. Vol.7 (3). Pp. 25

Furht, A. and Escalante, I. (2017). Cloud Libraries: A novel application for Cloud computing. *International Journal of Cloud Computing& Services Science, 1(3), 79-83.*

Goldner, M (2010). *Winds of Change : Libraries and Cloud Computing* Matt Goldner Bibliothek Forschung Und Praxis 34(3):270. Crossref

Lai, P.C. (2017). Technology Adoption Models and Theories for the Novelty Technology. *JISTEM, Brazil* Vol. 14, No. 1, pp. 21-38. Retrieved on 512/5/2019 from www.jistem.fea.usp

Lei, Y. (2017). *Research on Information Security of Digital Library under the Cloud Computing Environment Library*, Atlantic Press. AJiangxi University of Science. Pp 96.

Madhusudhan, M. (2013). *A Comparative Study of Different Deployment Models in a Cloud*. Int. J. Adv. Res Comput. Sci. Softw. Eng. 3(5):991-996.

Malhotra, D.R, Jain, P. (2013). How to Choose an Economic Cloud Deployment Model. *Int. J. Computer. Trends Technol*. (IJCTT), 4(8):2607-2614.

Matt, G. (2010). *Winds of change: Libraries and cloud computing*. OCLC Online Computer Library Center. [Online]. P 5.

Mcmanus B (2016). *The Implications of Web 2.0 for Academic Libraries*. Electron. J. Acad. Special Librarianship. 3(3):1-10.

Nagalakshmi L.R. (2013). *Application of cloud computing at library and information centers*. RJSITM 2(5)43-46.

NIST Cloud Computing Program (2018). http//www.gov/itl/cloud computing (accessed 6/5/2019).

Parker, C. M., and Castleman, T. (2019). Small firm e-business adoption: A critical Analysis of Theory. *Journal of Enterprise Information Management*, 22 (1/2), 167-182.

Punch, K. F. (2005). *Introduction to Social Research Quantitative & Qualitative Approaches*. London: Sage, P35.

Romero, N. L. (2016). *Cloud computing" in library automation: benefits and drawbacks*. Bottom Line, 25(3), 110-114.

Sulaiman, S. N. (2007). *Fundamental of Research. Lagos: Sanbio Nes Publishers*: P.27-30.