# Knowledge Management (Km) In the Age of Cloud Computing (CC): Benefit and

Challenges

BY

Musa, Shittu (<u>shittukmusa21@yahoo.com</u>, smusa@abu.edu.ng) Faculty of Social Sciences Library, Ahmadu Bello University, Zaria

Musa, Aminu Umar (<u>aminumusaumar@gmail.com</u>, <u>aminumusa2k8@yahoo.com</u>) Kashim Ibrahim Library, Ahmadu Bello University, Zaria

Abdulkadir, Aliyu ( <u>abdulaliyu74@yahoo.com</u> , abdulkadiraliyu@abu.edu.ng ) Kashim Ibrahim Library, Ahmadu Bello University, Zaria

Being a paper presented at National Seminar/Workshop Organised by Nigerian Library

Association Abuja Chapter in Collaboration with University of Abuja, Theme; Clone

Librarianship in the 21<sup>st</sup> Century. Held on 1<sup>st</sup> – 5<sup>th</sup> September, 2015, At ICT- Laboratory,

University of Abuja Library, along Giri Airport Road, Abuja Nigeria

#### Abstract

The paper explores the concept of knowledge management, (KM), KM activities in an organization comprises of organizing, transferring, locating and ensuring the usage of information and expertise. Cloud computing (CC), being one of the technology in which data and services reside in massively scalable data centers in the cloud and can be accessed from a web browser has greatly impacted on the way knowledge is being managed. Two CC models: service model and deployment model were discussed. Characteristics of CC such as Self Healing, Multitenancy, linear scalability, and others were highlighted. Impact of CC on KM in libraries was also discussed. KM software such as Igloo software, SpringCM solution, Office 365 and SharePoint Online and others were explained. KM tools such as blog, wiki, discussion board, RSS feed and others have also been treated in the paper. Issues and challenges associated with KM using cc were also discussed. The paper therefore, concluded that the new trend, KM in CC has made Knowledge management easy to capture, store, disseminate and share knowledge in large organizations. Finally, organization needs to harness the benefits of cloud computing in knowledge management system.

# Key words: Knowledge Management (KM), Cloud Computing (CC), Utilization, Benefits and Challenges, Libraries.

#### Introduction

The globalization of world economy together with the advancement in Information and Communication Technology (ICTs), has brought about need for Knowledge management through cloud computing, whereby emphasis is being made in recent time across diverse disciplines including librarianship; scholars globally have shown rigor interest on the emerging field that has known to be one of the most lucrative means of managing most important assets of any organization. According to Uriarte (2008) there is no universally accepted definition of knowledge management. But there are numerous definitions proffered by experts. Put very simply, knowledge management is the conversion of tacit knowledge into explicit knowledge and sharing it within the organization. Putting it more technically and accurately, knowledge management is the process through which organizations generate value from their intellectual and knowledge based assets. Defined in this manner, it becomes apparent that knowledge management is concerned with the process of identifying, acquiring, distributing and maintaining knowledge that is essential to the organization. Soliman & Youssef (2003) reported that one of the most important elements in competitive advantage is information. Some information are critical enough for organizations to identify and manage them using various means and tools from both knowledge management (KM), information management (IM) and cloud computing (CC). Accordingly, Jain (2012) observed that the roles of academic librarians have changed radically at both library practitioners and library school educators' levels. They are no more traditional information protectors and managers. New trends such as cloud computing, open access, knowledge management, digital scholarship, institutional repositories are all often owned by the libraries and the librarians. Following a study conducted in 2004 by White noted that resources, users and the practical knowledge of the organization, form a model for the librarian "know-how" that is found in the minds of library staff and is embedded in working practices and in their culture. In an organization KM duties comprises of organizing, transferring, locating and ensuring the usage of information and expertise within the organization. The enablers support for such a process is the culture of the organization, leadership perception, the technology used and measurement of achievement. Within such understanding management use the processing capabilities to take effective action to achieve the firms' goals (Oliver and Kandadi, 2006). White (2004) further drew attention to some risk (difficulty to capture and manage knowledge in large libraries, difficulty of integrating the knowledge management strategy in the existing strategy of the organization, staff fear of sharing their knowledge with colleagues) and benefit (knowledge of experienced personnel is maintained within the organization, a better understanding of user's requirements through evaluation of the services and improvements, an opportunity to see the specialists in library not only service-oriented, but also value-oriented) factors that must be considered before implementing knowledge management in a library.

Over the decades we have witnessed how the Information and Communications Technology (ICT) has been evolving in terms of its infrastructure requirements and the provisioning of the services and their management aspects. In recent times, Cloud Computing technology has emerged as a promising ICT approach to improve the way people and businesses see ICT as a service (Rafiq, Bashar & Shaikh, 2014)

Cloud computing can transform the way systems are built and services delivered, providing libraries with an opportunity to extend their impacts (Matt. 2010) According to Ogbu and Lawal (2013) Cloud computing offers a new dimension in computing, it changes how we invent, develop, scale, update, maintain and pay for applications and the infrastructure on which they are run. In cloud computing, data and services reside in massively scalable data centers in the cloud and can be accessed from a web browser. Mohr (2012) stated that as technology

changes, however, the need for a clear and definitive knowledge management is increasing. The increase in adoption of mobile devices, cloud computing, and virtual workplace has makes knowledge management more important. Therefore, this study is aim to explore the various ways in which cloud computing can assist library and information professionals in Nigeria on Knowledge management practice.

# **Cloud Computing**

The dynamism in information and Communication Technology posed a lot of challenges to organization of all types across the globe. Even though, some organizations take advantage of such dynamism to create some solution to the existing problems such as cloud computing in library service. Kaplan (2010) stated that one of the most lamenting challenges facing organizations across the globe for years has been knowledge management. In the past, the task of capturing, organizing and disseminating valuable information so it could be properly utilized by end-users and business executives was an herculean effort that produced limited results. Today's cloud computing movement offers exciting opportunities to remedy those age-old challenges.

Kaushik & Kumar (2013) reported that the concept of cloud computing was emerged as far back as 1960s, when John McCarthy opined that computation may someday be organized as a public utility. Chellappa gave the first academic definition of the term Cloud Computing in 1997 and later on, in the year 2007 the term cloud computing came into popularity and firstly was used in this context when Kevin Kelly opined that eventually we will have the inter-cloud, the cloud of clouds. The emergence of Cloud computing in 2007 has attracted a great deal of attention from many quarters (e.g., authors, consultants, technology analysts, companies). The more interest it attracted the more attempts were made to define it (Sultan, 2013).

According to a study conducted by McKinsey (the global management consulting firm) found that there were 22 possible separate definitions of cloud computing. In fact, no common standard or definition for cloud computing seems to exist (Grossman, 2009; Voas & Zhang, 2009). The word "Cloud" According to Kaushik & Kumar (2013) connotes the combination of servers, networks, connection, applications and resources. Cloud computing can be defined as a kind of computing technology which facilitates in sharing the resources and services over the internet rather than having these services and resources on local servers/ nodes or personal devices. Cloud computing is acting as a resources pooling technology for accessing infinite computing services and resources as per demand of users and can be compare with models of

pay as you use or utility model same as used for mobile services usages and electricity consumption (Kaushik & Kumar, 2013) According Sultan and Sultan (2012) cloud computing is a modality, that uses advances in ICTs such as virtualization and grid computing for delivering a range of ICT services through software, and virtual hardware (as opposed to physical) provisioned (by data centers owned and operated by cloud providers and/or end users) according to user demands and requirements and delivered remotely through public (e.g., Internet), private networks or a mix (i.e., hybrid) of the two delivery modes.

#### **Models of Cloud Computing**

#### Service Model

Cloud computing models are numerous offering variety of service that originated on the web but three service models widely used for delivering the different cloud based services (Rafiq, Bashar & Shaikh, 2014). These models are:

1- Infrastructure as a Service (IaaS): This service model comprises a wide range of features,

Services and resources which support to build an virtual infrastructure for computing. Organizations can be developed entire infrastructure on demand e.g. Amazon Web Services, Rackspace, Savvis, HP, IBM, Sun and Google Base.

**2- Platform as a Service (PaaS):** Platform as a Service model helps in generating the computing platforms to run the software and other tools over the internet without managing the software and hardware at the end of user side. Amazon Elastic Cloud, EMC Atmos, Aptana and GoGrid are the examples of PaaS model which providing platforms to users in maintaining and supporting their IT infrastructure without spending huge amount for buying hardware, software and related technology.

**3-** Software as a Service (SaaS): In this model, users can avail the facilities to access and use any software available with cloud vendors. However, it is not necessary for the users to buy the software, install and run, maintenance the applications on their own servers. The cloud users need not to manage the cloud infrastructure and platform on which the application is running. This service model provides online email applications, free services, limitless storage, and remote access from any computer or device with an Internet connection (Kaushik & Kumar, 2013)

#### **Deployment Model**

Deployment models deal with the manner in which the infrastructure of Cloud Computing system is deployed, owned and managed by the service providers & consumers. This leads to the concept of Private, Public, Community and Hybrid cloud architectures (Zhang et al. 2010). Currently, four types of cloud deployment models have been defined in the cloud community: These models are:

- 1- Private Cloud: This type of deployment model mainly developed and managed by a single organization or a third party irrespective of whether it is located in premise or off premise. There are various reasons responsible for the development of private cloud for an organization some key reasons include optimize utilization of existing in-house resources, security concerns including data privacy and trust also make private cloud an option for many firms, data transfer cost from local IT infrastructure to a Public Cloud is still rather considerable, organizations always require full control over mission critical activities that reside behind their firewalls and for research and teaching purposes (Kaushik & Kumar, 2013)
- 2- Community Cloud: community clouds are often regarded as type of cloud that can be provided by one organization and consumed by groups of organizations in businesses or professions similar to that of the providing organization. However, there are little examples to demonstrate the viability of this approach (Sultan& Sultan, 2012).
- **3- Public Cloud:** This method of deployment mainly makes cloud infrastructure available to the public on a commercial basis by a cloud service provider. This allows a consumer to develop and deploy a service in the cloud with very little financial implication compared to the capital expenditure requirements normally associated with other deployment options such as private (Ogbu and Lawal, 2013)
- 4- Hybrid Cloud: This type of cloud made from more than one cloud deployment models that may be public, private, community and other models also, bound together with by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds). The Hybrid cloud model is widely used by institutions and organizations because this model provides more facilities and flexibilities in making optimum use of their resources and accomplishing the tasks (Kaushik & Kumar,

2013) the above discussed models of Cloud Computing system are summarized in Fig. 1. Below:



Figure 1: Models of cloud computing

### **Characteristics of Cloud Computing:**

Cloud computing being one of the modern technology uses in storing and sharing mass scalable of data across the globe poses the following characteristics as reported by Gosavi, Shinde, and Dhakulkar, (2012)

### 1. Self Healing:

Any application or any service running in a cloud computing environment has the property of self healing. In case of failure of the application, there is always a hot backup of the application ready to take over without disruption. There are multiple copies of the same application - each copy updating itself regularly so that at times of failure there is at least one copy of the application which can take over without even the slightest change in its running state.

### 2. Multi-tenancy:

With cloud computing, any application supports multi-tenancy - that is multiple tenants at the same instant of time. The system allows several customers to share the infrastructure allotted to them without any of them being aware of the sharing. This is done by virtualizing the servers on the available machine pool and then allotting the servers to multiple users. This is done in such a way that the privacy of the users or the security of their data is not compromised.

### 3. Linearly Scalable:

Cloud computing services are linearly scalable. The system is able to break down the workloads into pieces and service it across the infrastructure. An exact idea of linear scalability can be

obtained from the fact that if one server is able to process say 1000 transactions per second, then two servers can process 2000 transactions per second.

# 4. Service-oriented:

Cloud computing systems are all service oriented - i.e. the systems are such that they are created out of other discrete services. Many such discrete services which are independent of each other are combined together to form this service. This allows re-use of the different services that are available and that are being created. Using the services that were just created, other such services can be created.

# 5. SLA Driven:

Usually businesses have agreements on the amount of services. Scalability and availability issues cause clients to break these agreements. But cloud computing services are SLA driven such that when the system experiences peaks of load, it will automatically adjust itself so as to comply with the service-level agreements. The services will create additional instances of the applications on more servers so that the load can be easily managed.

# 6. Virtualized:

The applications in cloud computing are fully decoupled from the underlying hardware. The cloud computing environment is a fully virtualized environment.

# 7. Flexible:

Another feature of the cloud computing services is that they are flexible. They can be used to serve a large variety of workload types - varying from small loads of a small consumer application to very heavy loads of a commercial application

### **Features of Cloud Computing**

Cloud computing being an emerging computer paradigm where data and services reside in massively scalable data centers in the cloud and can be accessed from any connected devices over the internet. Therefore, it poses the following features:

- 1- Convenient & Ubiquitous: available through standard Internet enabled devices.
- 2- On-demand self service: customers can adjust their services without needing anyone's help. Best of breed self-service provides users the ability to upload, build, deploy, schedule, manage, and report on their business on demand.

- **3-** Location independent resource pooling: processing and storage demands are balanced across a common infrastructure with no particular resource assigned to any individual user.
- 4- Rapid elasticity consumers can increase or decrease capacity.
- **5- Pay per use:** Consumers pay for only what resources they use and therefore are charged or billed (Mehmet and Serhat, n.d)

# **Features of Cloud Computing**



Fig. 2 Features of Cloud Computing

### The Impact of Cloud Computing on Knowledge Management in Libraries

Many literatures revealed that there is concrete relationship between innovation such as cloud computing and knowledge management. This strong relationship between CC and KM. can play a significant role for the survival of any organization for its competitive advantage without which the organizational goals cannot be achieved easily. Leal-Rodríguez *et al* (2013) inferred that there is a strong knowledge-innovation link in organizations that have low barriers to knowledge creativity, sharing and knowledge transfer and those that promote open cultures. Cloud services are increasingly being used for the purpose of knowledge management because of the following reasons:

- 1. Technological advancement related to ubiquitous high-speed internet connectivity
- 2. Shrinking cost of data-storage,
- 3. 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 demonstrates the potential of cloud computing to empower the users with sophisticated and high powered yet uncomplicated and easy-to-use

computer applications and information, which was otherwise not so easy to access (Dave1, Dave, Shishodia, 2013). Disseminating knowledge through manual means is not effective which in most cases is slow and often does not meet the needs of the user population. It is important for corporations to develop a knowledge management strategy that responds to user needs in a timely and efficient manner that takes information and data real time and provides information and data in the right context from a trusted source – the corporation (Mohr, 2012).

Today, the continuously falling costs of computing, data transmission and storage are constantly broadening the opportunity for cloud services to transform businesses and business models (Davel, Dave, Shishodia, 2013). Linnake (2008) noted that organization needs Social Media to support, manage and strengthen collaboration in the organization. Staff needs more information about existing knowledge in the organization and about competences their coworkers have. Therefore libraries as repositories of knowledge are not exclusive as they also need to support, manage and strengthen collaboration among their staff and users alike. It is important to note that the entire social networking phenomenon is enabled by cloud computing. It is believed that the eventual impact of social networking on businesses and the related improvement in productivity will be profound (Dave1, Dave, Shishodia, 2013). There exist many Social Media Applications - like Face book, LinkedIn or MySpace - that offer possibilities to interactive communication, effective document sharing, employee competences and best practices. Besides existing Social Media tools, organizations can also acquire tools that can be use for knowledge management in the organization. Also networks between different people could be made visible to other employees with the help of this kind of Social Media utilization. Social Media also enables more effective sharing of knowledge in an organization. Wiki, blog or online forums can be used to improve the personnel's possibilities to correct, update or add instructions, documents or other materials to a company's Intranet (Säntti, 2008) Tapscott and Williams (2008) cited an example at Xerox a wiki is used, for example, collaboratively to define the company's technology strategy. The personalization of virtual workplaces or intranet view is also feasible with the help of Social Media. The reason behind knowledge management is to ensure and facilitate creation, storage and dissemination of knowledge. In the 21<sup>st</sup> century the benefit of knowledge management could be easily harness through cloud computing using varying software as flat form which enables the tool to be effectively utilized. Some of software together with the various tools was discuss under the following:

#### **Knowledge management software**

#### 1- Office 365 and SharePoint Online

Office 365 (Microsoft's new productivity suite) This cloud-based software, renamed Share- Point Online, allows users to create and publish websites without any programming involved, just by selecting or modifying components such as themes, templates, Web parts (widgets), and data structure elements available within this platform. With little effort and technology expertise, site administrators can create sophisticated structures such as blogs, wikis, newsfeeds, discussion boards, surveys, and email distribution lists that are commonly found in the best Web-based communities and portal (Sultan, 2013)

#### 2- BMC Knowledge Management

BMC provides a powerful knowledge content search engine that not only helps service desk analysts find solutions to incidents, but also provides users with access to resources for resolving their own issues. BMC Knowledge Management as a Service is part of the BMC Remedy IT Service Management Suite. This offering delivers cloud-enabled service desk, selfservice, inventory, and basic knowledge management capabilities hosted on the Cloud Platform (Knowledge Management Solutions, 2013)

#### 3- Salesforce Knowledge Management

Service Cloud is Salesforce.com's enterprise KMS. The new release of this platform (Service Cloud 3) was unveiled in March 2011. It is designed to enable companies to monitor blogs, forums and online social networks and capture conversations about their brands through Radian6 technologies. Radian6 is a company, bought by Salesforce.com in 2011, that uses tools for social media listening, tracking and monitoring. It was bought by Salesforce.com in 2011. While the previous version allowed users to answer questions on a company's Facebook page, Service Cloud 3 provides a deeper integration with the online social network by enabling users to convert Facebook wall posts and comments into cases within the platform and have someone respond to them. That way, you can service those customers with the same processes that you would use for more traditional channels. Salesforce.com has also added the same functionality for Twitter and allows users to create cases and share knowledge from Tweets and conversations.

#### 4- Igloo Software

Igloo is a web-based platform for collaborating at work. It's a digital workplace that enables to share files, find answers, solve problems, locate information and expertise and tap into the collective knowledge of customers, partners and peers, virtually anywhere.

- 1. Build rich user profiles to locate expertise & knowledge
- 2. Collaborate through blogs, forums, wikis, polls and events
- 3. Find what you need faster through activity streams & search
- 4. Share, organize & manage documents & multimedia
- 5. Communicate with integrated messaging, presence & status (Igloo Software, 2013)

The Igloo platform combines document management and collaboration tools with social software capabilities to help build and support communities both inside and outside an organization (Ashenden, 2009). In March 2009, Igloo launched a BlackBerry Client application. The app allows community members to access and contribute content to their online communities via a BlackBerry Smartphone. In April 2010, Igloo unveiled the industry's first Social Media Playbook. The Playbook provides free access to a number of resources for building online communities from the ground up

#### 5- SpringCM Solutions

SpringCM offers powerful content cloud services platform available for businesses today. The service provided makes it easy to share documents, collaborate around content, streamline business processes, and deliver better business outcomes. A broad range of information - from content management, document and file sharing to collaboration, automated workflows, and cloud technology - in a wide range of formats are provided (Springcm Resources, 2013)

#### **Knowledge management Tools**

Knowledge Management tools can be categorized into four groups according to their functionalities (Jashapara 2004) these groups are also in line with Social Media tools. The four categories of Knowledge Management tools can be divided into knowledge capturing tools, knowledge evaluating tools, knowledge sharing tools and tools that can be used to store and present knowledge. Organization needs tools from all these four groups to be able to manage knowledge effectively (Jashapara 2004). These tools include:

#### **1- Blogs**

A blog is a Website that is usually maintained by one person or in some case by a group of people. A blog contains normally descriptions about happenings, ideas or events in a chronological order. A key feature of a blog is that people can comment on it easily and that the texts in the blog stay as they were put to the blog. In many organizations blogs are used to present managers ideas to the employees. This is done for example at TietoEnator. Because of the chronological order of blog content, however, the finding of information can be complicated. (Otala 2008; Tapscott and Williams 2008)

### 2- Wikis

A wiki is a Web page that can be viewed and modified by anybody with a Web browser and access to the Internet. This implies that any visitor to the wiki can change its content if they desire. Wikis permit asynchronous communication and group collaboration across the Internet. Variously described as a composition system, a discussion medium, a repository, a mail system, and a tool for collaboration, wikis provide users with both author and editor privileges; the overall organization of contributions can be edited as well as the content itself. Despite the vulnerability of the page for mischief, wikis have some potential of being robust, open-ended, collaborative group sites. Wikis are able to incorporate sounds, movies, and pictures; they may prove to be a simple tool to create multimedia presentations and simple digital stories. The first wikis appeared in the mid-1990s. Scientists and engineers used them to create dynamic knowledge bases. Wiki content—contributed "on the fly" by subject-matter specialists— could be immediately (and widely) viewed and commented on (Educause Learning Initiative, 2005)

### 3- Newsfeeds

RSS-feeds (Really Simple Syndication) are Web feed formats that are used to publish frequently updating material in XML form. A feed can be ordered from many Web pages and it is sent to the subscriber when the content of the Web page changes. RSS can be used to compensate emails, for example. (Hintikka 2007)

# 4- Discussion boards

A discussion board (known also by various other names such as *discussion group*, *discussion forum*, *message board*, and *online forum*) is a general term for any online "bulletin board" where you can leave and expect to see responses to messages you have left. Or you can just read the board. The first discussion boards were available on bulletin board systems.

13

On the Internet, Usenet provides thousands of discussion boards; these can now sometimes be viewed from a Web browser. Many websites offer discussion boards so that users can share and discuss information and opinions. Special software is available that provides discussion board capability for a website (WhatIS.com, 2011)

# 5- Corporate portal

A corporate portal is a framework of integrating information and people in organizations. These portals are used to centralize content contribution to employees through a secure user interface. Shared information can be personalized by employee's interests. An example of a corporate portal is Microsoft's SharePoint server.

#### Issues and Challenges in the Utilization of Cloud Computing Software and Tools

The deployment of Extending SharePoint with Content-Centric Applications need a lot of investment in IT infrastructure, by virtue of Extending SharePoint Applications which constitute a lot of functionalities that requires third party product before it can effectively operate. For example such as scanning, OCR, business process management (BPM), Fax, ERP integration, e-signature and records management all these cannot be successfully operate without total automation of the entire departmental processes. This is in line with research report of Forrester on collaboration, only 49% of small and medium businesses (SMBs) and 50% of enterprises report satisfaction with SharePoint and Lotus Notes (Sultan, 2013).

Even though cloud computing tools offer a lot of opportunities in organizations yet, there a lot of challenges when using social media in working activities. According to Gartner's research (Linnake 2008), companies face five main challenges when starting to utilize Social Media in the activities of the company. These challenges are

(1) Choosing the right operational models to find Social Media tools that are relevant for the organisation's operational plans and needs.

(2) Overcoming cultural barriers arisen from the attitude and behavioral changes needed to get all employees taking part to the Social Media tool use posed a great challenge to many organizations.

(3) Issue relating to privacy is another bedeviling challenge face by most organization. For example, separating information that are meant to be private and those that are meant for the public consumptions always use to be difficult to maintain.

14

(4) Behavior of the tool users. Behavior of the tool users should also be observed. According to Fiilin (2007) the possibility to publish information on an organization's Intranet without a name or behind a pseudonym might dilute the quality of the Intranet content. He discusses that IBM has also noticed that problem, and for this reason the policy is such that the conversations in the Intranet must be done using the employee's own name. Fiilin (2007) tells that IBM has been satisfied with this way of communicating with the person's real name added to the conversations.

#### Conclusion

Cloud computing has begin to transform the way systems are built and services delivered, providing libraries with an opportunity to extend their impacts. The new trend has made Knowledge management easier to capture, store, disseminate and share knowledge in large organizations. This is more realizable due to fulfilling the pre-requisite of simple, cost-effective and flexible information sharing that are attributed to cloud computing. Cloud providers must ensure that the information security systems they provide are responsive to customer requirements and the data, both primary and secondary, must be preserved as authentic and reliable. Finally, organization needs to harness the benefits of cloud computing in knowledge management this will go a long way in reducing the difficulties face in the traditional knowledge management system.

# References

- Ashenden, A. (2009). "On the Radar: IGLOO Software". Available at: https://en.wikipedia .org/wiki/IGLOO\_Software [Accessed on 24 April 2014]
- Dave1, M. Dave, M. and Shishodia, Y. S. (2013) Cloud Computing and Knowledge Management as a Service: A Collaborative Approach to Harness and Manage the Plethora of Knowledge BIJIT - BVICAM's International Journal of Information Technology Vol. 5 No. 2 P.619-622
- Educause Learning Initiative (2005) 7 things you should know about... Wikis Available at: https://net.educause.edu/ir/library/pdf/ELI7004.pdf [ Accessed on 26<sup>th</sup> August, 2015]
- Mehmet, F. E. & Serhat, B. K. "Cloud Computing for Distributed University Campus: A prototype suggestion," presented at The International Conference on The Future of Education Yildiz Technical University, Turkey
- Soliman, F. & Youssef, M. (2003) the role of critical information in enterprise knowledge management.  $r \circ [. * \circ - * \land *, pp. * \cdot \cdot *), \forall (\cdot \cdot * Industrial Management & Data Systems Approaches * \circ$
- Fiilin, P. (2007) Verkon käyttäjä: Näin panostat yhteisöön. Available at www.fakta.fi
- Gosavi, N., Shinde, S. S. and Dhakulkar, B. A. (2012) Use of Cloud Computing in Library and Information Science Field *international journal of digital library services Vol. 2 Issue 3* .pg
- Grossman, R. (2009). The case for cloud computing. IT Professional, 11(2), 23–27.
- Hintikka, K. (2007) Web 2.0 johdatus internetin uusiin liiketoimintamahdollisuuksiin. TIEKE tietoyhteiskunnan kehittämiskeskus RY: n julkaisusarja Available at: http://www.bmc. com/products/offering/Knowledge- Management.html [Accesses on 7<sup>th</sup> April, 2015]
- Igloo Software: The new digital workplace, Available at: http://www.getapp.com/igloo-software -application [Accesses on 13<sup>th</sup> April, 2015]
- Jain, P. (2012). An Empirical Study of Knowledge Management in University Libraries in SADC Countries, New Research on Knowledge Management Applications and Lesson Learned,
- Jashapara, A. (2004). Knowledge Management: An integrated approach. Pearson Education, UK.
- Kaplan, J. M. (2010). The Cloud's Answer to the Knowledge Management Challenge Available at: http://www.ecommercetimes.com/story/70363.html [Accessed on 19th August, 2015]

- Kaushik, A. & Kumar, A. (2013). Application of cloud computing in libraries. *International Journal of Information Dissemination and Technology*, 3(4), 270-273.
- Knowledge Management Solutions: "Create and share IT know-how", Available online at: http://www.mobilewhack.com/igloo-releases-blackberry-application [Accessed on 24 March, 2014]
- Leal-Rodríguez, A., A. Leal-Millán, J.L. Roldán-Salgueiro, and Ortega- Gutiérrez, J. (2013). Knowledge Management and the Effectiveness of Innovation Outcomes: The Role of Cultural Barriers. *The Electronic Journal of Knowledge Management*, 11 (1), 62-71.Available at: www.ejkm.com [Accessed on August 10, 2014]
- Matt. G. (2010). Winds of change: Libraries and cloud computing, OCLC Online Computer Library Center. [Online], pp.5, Available: http://www.oclc.org/content/dam/oclc/events /2011/files/IFLA-windsof-change-paper.pdfmedia/HDIConf/2012/Files/White%20Papers /Julie\_Mohr\_KM\_Strategy.pdf [Accesses on 13<sup>th</sup> April, 2015]
- Mohr, J. L. (2012). "Knowledge Management as a Strategy: Driving a Competitive Edge through Knowledge", Mind the IT Gap, LLC, 2012. Available online at: http://www. servicemanagementfusion.com/conference/~/media/HDIConf/2012/Files/Whi te%20Papers/Julie\_Mo hr\_KM\_Strategy.pdf [Accesses on 13<sup>th</sup> April, 2015]
- Ogbu R. C. and Lawal A. (2013). Cloud Computing and Its Applications in –Library Services: Nigeria in Focus International Journal of Innovation, Management and Technology, Vol. 4, No. 5, 476-483
- Oliver, S., and Kandadi, R., (2006). How to Develop Knowledge Culture in Organization? A Multiple Case Study of Large Distributed Organizations, Journal of Knowledge Management, Vol. 10, No.4, pp. 6-24
- Otala, L. (2008) Osaamispääoman johtamisesta kilpailuetu. WSOY, Helsinki.
- Rafiq, M Bashar A. & Shaikh, A (2014). Innovative Trends in Knowledge Management: A Cloud Computing Perspective Proceedings of the First Middle East Conference on Global Business, Economics, Finance and Banking (ME14 DUBAI Conference) Dubai, 10-12 October 2014
- Säntti, P. (2008). Developing Corporate Knowledge Management through Social Media (Master's Thesis) Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Engineering. Helsinki University of Technology Faculty of Electronics, Communications and Automation

Springcm Resources, Available at: http://www.springcm.com/services

- Sultan, N. (2013). Knowledge management in the age of cloud computing and Web 2.0: Experiencing the power of disruptive innovations *International Journal of Information Management 33 (2013) 160–165 Retrieve from* www.elsevier.com/locate/ijinfomgt on [Accessed on 20/08/2015]
- Tapscott, D. and Williams, A. (2008). *Wikinomics How mass collaboration changes everything*. Atlantic Books, London.
- Uriarte, F. A. (2008). Introduction to Knowledge Management: A brief Introduction to the basic element of Knowledge Management for non-practitioners interested in understanding the subject: Jakarta. ASEAN Foundation pg. (13)
- Voas, J., & Zhang, J. (2009). Cloud computing: New wine or just a new bottle? *IT Professional*, 11(2), 15–17.
- WhatIS.com (2011). Discussion board (discussion group, message board, online forum) retrieved from http://whatis.techtarget.com/definition/discussion-board-discussion-group-message-board-online-forum [Accessed on 26 August, 2015]
- White, T. (2004). Knowledge Management in an Academic Library. In: World Library and Information Congress: 70th IFLA General Conference and Council. Buenos Aires, 2004. [CD-ROM]
- Zhang, Q., Cheng, L. & Boutaba, R. (2010). Cloud Computing: State-of-the-Art and Research Challenges, *Journal of Internet Services and Applications*, 1(1), 7-18.