

Running Head: CLOUD COMPUTING IN EDUCATION

How Cloud computing could be implemented in DAIS(Dhirubhai Ambani International School)  
in comparison with standard business process in business

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## CHAPTER 1: INTRODUCTION

### **Introduction**

Information technology (IT) has considerably enhanced and improved the learning and teaching mechanism. Now, the traditional classroom methods of teaching are slowly becoming obsolete and are being replaced by e-learning or learning through the internet. In this system, the teachers and students interact using internet, for instance, in online lectures. Similarly, students are required to write and submit their assignment on online portals. In this context, this study aims to examine the relatively new technology of cloud computing within the Dhirubhai Ambani International School (DAIS).

### **Contextual Background**

Rouse (2016) defined cloud computing that it deals with provision of hosted services through the internet, which allow companies to use computer resources in the form of utilities, like electricity. This technology does not require building and maintaining in-house infrastructures for computing. On the other hand, Vaquero, Rodero-Merino and Caceres (2008, p.52) proposed their own definition in which they considered clouds as distinct pool of resources that are virtualized, usable and accessible. In this regard, these clouds involve hardware, software, development services and platforms.

Safonov (2016, p.295) revealed that nearly 35% of world organizations do not possess strong security procedures and policies. Only 17% of firms possess highly regulated, managed, audited, and reviewed programs of security. In this context, cloud computing offers a strict control on systems where only a number of trusted employees can access the servers. In order to curtail cyber-attacks, this technology is characterized with antivirus software, patch

management, network segmentation, and firewalls. Furthermore, to provide maximum security, this technology asks its user to constantly update their system on a regular basis so all malware can be removed by servers themselves. This process is carried out through automated scanning systems and tools for any kind of susceptibility. Similarly, the system is kept updated by the input of software vendors and security experts.

Rouse (2016) further explained that there are three key benefits associated with the cloud technology. First of all, it is based on the provisioning of self-service, in which users may outsource the computing services if there is a high workload on a given server. Second, companies are able to increase or decrease their needs of computing services with respect to the demand. Finally, the payment criterion is granular in nature in which costs incur according to the workload and used resources.

In recent years, the significance of cloud computing has considerably evolved in the education sector. In this regard, Ishaq and Brohi (2015, p.9) explained that cloud computing is an innovation within the traditional sector of e-learning. It strengthens the framework of e-learning, in which users may access the education related data from any internet device by maintaining records on central servers. With regards to benefits of clouding computing for teachers and students, it has been highlighted that students can take e-courses, attempt online exams, get direct feedback from their instructors, and send their assignments and projects to them. Similarly, teachers can also develop online tests, handouts, give homework, and may give their feedback to students through e-discussion.

### **Research Problem**

Matthew (2012, p.475) explained the problems associated with implementation of cloud computing in education sector and universities that it might not be able to run all study-

related applications. It can also risk the security and data protection, and issues of intellectual property may also erupt. Similarly, the absence of internet and low speed also negatively influence the working paradigm of this technology. This point is also highlighted by Anand and Kamyani (2015, p.152), noticing that this technology faces real problems of inter-operate ability, security, and reliability within the education sector and universities.

Yadav (2014, p.3112) highlighted the issues associated with the use of cloud computing that it saves crucial and significant data in a single place due to which there are high chances of hacking. Data protection is another key security issue in this technology. In this regard, the educational institutions are often hesitant in implementing the technology because they believe their data remains secure in in-house hosting of institution. The transfer of data to a third party resource beyond the control of educational institution is normally perceived as highly threatening and risky. In this regard, it has been argued that educational institutions should keep contact with multiple providers, instead of relying on one. It will help them to maintain and secure data at multiple places and lowers the risks of hacking.

Ishaq and Brohi (2015, p.891) explain that overall the system of e-learning cannot be entirely trusted. Although, in cloud computing users may acquire and access the data from any place and at any period in time, nevertheless the security stakes are high. In this regard, the example of Knowledge ville University has been given that in 2002 it came across an assault in which the main server of e-learning had been shut down during the middle of the semester. Consequently, all the academic tasks of teachers and students suddenly came to a halt and obstructed the learning process. Hence, considering these problems of security and data access, this study seeks to address the issues in implementing cloud computing in the Dhirubhai

Ambani International School. This study further highlights that in case of implementation, what type of issues might erupt and how can they be tackled by the institution.

### **Research Aim & Objectives**

The research aim of this study is to examine why DAIS may or may not want to implement cloud computing and how it could be implemented in comparison with the standard implementation process in business firms. With respect to this aim, the following research objectives were formulated:

- To analyse how cloud computing could be implemented in the DAIS.
- To assess ways in which the implementation of cloud computing could affect the DAIS.
- To compare the potential implementation of cloud computing in the DAIS to the business firms.

### **Research Questions**

Based on the research objectives, the following questions are formulated:

- How Cloud Computing could be implemented in the Dhirubhai Ambani International School Education system.
- How Cloud Computing can be compared with the standard implementation process in businesses?

### **Rationale of the Study**

Jaeger, Lin and Grimes (2008, p.274) revealed that generally the implementation of cloud computing is not without concerns and questions. In this regard, it has been identified that the system poses questions of security, reliability, anonymity, and privacy expectations. Similarly,

these expectations also vary with respect to corporate sector, academic sector, government sector and individual users. Similarly, the element of security, privacy, reliability and anonymity also seem to influence the decision making abilities of users with respect to the selection of cloud providers. In a similar manner, this technology also raises concerns for intellectual property details of every user.

Yavuraj (2015) further conducted his study to explore the factors and features of favourable environment to implement cloud computing in the library system of Bararas Hindu University. In this regard, a questionnaire is developed that investigated the response of library professionals of the university to adopt cloud computing. It has been found that though the library staff was willing to acquire the system and ready to deal with its challenges, nevertheless the benefits offered by this system were unable to persuade the university to remove their traditional setup and integrate cloud computing in its place. It has been found that the technological advancement was not perceived by the university to completely remove their previous system, rather it may adopt it as an innovative additional factor for the university's growth and development.

Thus, it has been identified that in spite of several benefits associated with cloud computing, users possess several apprehensions about its long term benefits and security aspects. It is a huge problem for the technology to get implemented in the education sector. Due to these reasons, most of the universities prefer not to choose cloud computing within their e-learning environment and continue to choose their old setup. However, to some extent they consider cloud computing to introduce innovation in their existing system. Hence, this study has been developed to examine these concerns within the context of DAIS in which researcher has tried to examine the benefits and issues of implementing this technology in the selected university.

### ■ *Significance of the Study*

Ishaq and Brohi (2015, p.898) illustrated that in the last few decades, there is an increased use of e-learning and cloud computing in educational setups. Cloud computing has been designed to acquire certain goals as one of its core determinants, including a higher standard of education, make high business placement for institutes, improve security paradigm and acquire genuine cloud processes with respect to educational settings. It has been identified that general e-learning setup and cloud computing possess certain similarities with each other, therefore by incorporating both frameworks simultaneously, the security paradigm can be enhanced and higher business productivity can be generated. It will also minimize the high infrastructural investments of technologies to maintain privacy and security of education based IT management.

Abbasi and Janjua (2010, p.21) has conducted their study to investigate the significance of cloud computing in universities across Pakistan. It has been found that there is a wrong perception that IT management and its infrastructure strongly needed high investments in the form of software, hardware and a large workforce. Due to this notion, most of the universities lack basic IT facilities and are unable to compete with international standards with respect to activities of learning management and knowledge management. Whereas, cloud computing is considerably efficient in performance of all education related tasks and normally requires minimum investments as per se.

Yadav (2014, p.3110) highlighted the significance of cloud computing in university education system that it help users access and control data through the internet. With respect to the education sector, the main users include teachers, students, administrative staff, faculty members, admission branch, and examination branch. All of these users remain connected with cloud with respect to their work login detail. It helps teachers to post class assignments, tutorials,

and tests on the server, which can be accessed by students through the internet by using different devices 24/7. This system also enables teachers to keep an eye on students' study records and identify their problems where they make most of their mistakes. Through this manner, both teachers and students may enhance their teaching and learning skills.

By keeping these details in consideration, this study investigates the scope of cloud computing in the case study of DAIS. This study has helped to physically witness the advantages and disadvantages associated with cloud computing technology and its implementation in an educational setup.

### **Defining Key Terms**

E-learning: Horton (2011, p.1) defined e-learning that it entails utilization of network technologies and computers for the purpose of education. It can also be defined as the use of computer and information technology devices to create and expand one's learning experiences.

Cloud computing: Schubert and Jeffery (2012, p.19) presented the definition of cloud computing, which has been given by National Institute of Standards and Technology (NIST), that it is a model which allow convenient and ubiquitous networks to access a shared source of computing resources. These resources include storage, application, services and networks, which help in rapid access to data and require minimum management for the interaction of service provision.

### **Structure of the Study**

This study is divided into five chapters which highlight numerous aspects of the research.

Chapter one presents a background of the study, research problem, aim and objectives, and the rationale and significance of the study.

Chapter two presents a literature review in which the concept of cloud computing in education is explored in detail to develop an understanding of the topic.

Chapter three highlights the methods of data collection and data analysis in this study along with presenting the research approach, design, paradigm, limitations and ethical considerations.

Chapter four presents the analysis and findings based on the data collected from the respondents. This data is discussed against the literature to evaluate the findings and reach proper conclusions.

Finally, chapter six concludes by presenting summarized findings along with providing recommendations to key stakeholders and highlighting future implications of this study.

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## CHAPTER 2: LITERATURE REVIEW

### **Introduction**

Cloud computing refers to the network of remotely operating servers which are hosted by users in order to manage, store and process data. Cloud computing is an innovative technology which is different from the local server in a way that it hosts services over the internet and not on personal computers. Cloud computing provide organizations such computing operations and resources that does not need installation of any tangible computing infrastructure. Cloud computing involves running and processing of data and applications on the basis of pay-for-use over the internet (IBM, 2016).

With the advent of this technology, cloud computing is rapidly gaining popularity in a number of industries because of its effectiveness in various functions of business. These industries include banking sector, government offices, insurance groups, retail industry and media (Palian, 2016). In addition, cloud computing is increasingly being implemented in the educational sector with the aim of delivering higher quality of education services to the students. This is carried out by providing them latest hardware and software in terms of infrastructure. Furthermore, there is still a high potential for cloud computing to be implemented into the educational setup given its novelty in the sector. This study aims to analyse how cloud computing could be implemented into the education sector. Furthermore, it also aims to address what strategies could be formulated in order to implement cloud computing in the educational system of the DAIS.

The technological needs of a firm, whether big or small, exist in a state of flux. It adapts and changes based on the requirements and demands of the business and also on the industrial advancements. All businesses and companies rely on technology for their day to day operations.

Technological advancements can decrease the time required to complete a task, and in some cases even completely eliminate the need for a job function or process. The need for increase in productivity fuels upgrades to technology within a company and this can significantly affect a company's operations. Improvements in computers and technology enhance business efficiency. Organizational structure adopts and responds to these changes by reorganizing departments and adding or removing jobs. Web-based companies may add new jobs or departments in order to acquire specialty and expertise in new and emerging areas of technology. Employees benefit from these requirements in the form of fewer hours of tedious and repetitive office work and improvements in efficiency. Owners of the business use comprehensive software in order to streamline operations. As an example CRM systems provide a computing system which is cloud based for management of projects, assignment of tasks and maintenance of accurate log of client communication.

### **Impact of Technology on Organizational Change**

Chen, et al., (2010, p.1) explained that organizational change is a process, which entails by firms to improve their performance with the purpose of reaching their ideal state. It is usually an outcome of environmental changes, certain crisis situation, or intentionally instigated by leaders themselves. The long term and growth oriented change is not applied to fix certain temporary problems. Rather, it is aimed to inclined the organizational structure and performance with firm's vision and mission more accurately.

Voiculet, et. al, (2010, p.5) illustrated that organizations are open systems therefore, they are considerably affected by the factors of external environment. In this regard, technological development is one of the significant element of this environment that influence the firm's structure together with its products and services.

With respect to business and management, Kumar (n.d., p.3) explained that they face considerably dynamic and complex environment. Technology has influenced every industry and it is a huge source of introducing change management in businesses. For example, media companies are heavily relying on technology with respect to telecommunication, broadcasting, data processing, and publishing etc. Similarly, supermarket chains are concerned with online services and airlines are not only concerned with the provision of transport services but to luxurize the consumer experience with the help of online hotel booking and car hiring etc.

Harrington (2014, p.7) also enunciated that the existing business environment is highly characterized with technology and it is so significantly integrated that most of the project teams are asked to demonstrate their project and performance through technology. However, this technology is constantly evolving and it is necessary for firms to continuously update their technological structure and performance with respect to it.

Evangelista and Vezzani (2011) asserted that the technological innovation within organization often leads to make an indirect positive impact on firm's performance and growth. It has been explained that these indirect impacts demonstrate themselves variably with respect to type of innovation introduced by executives or management. Similarly, Burnes (2004, p.448) explained that some organizations device change management in their structure through the implementation of technology, which eventually helps in development of new working environment or to establish new norms for firms.

### ■ *Cloud Computing*

Cloud computing, as referred in several studies, is the technological innovation which enables storing the data and accessing the programs, applications and documents over the internet. This is an innovation in the information technology sector which drives the users away

from the traditional data processing based on mechanisms like hard drives of computers. In addition, cloud computing deviates from traditional data operating and storing mechanism in a way that it does not include Network Attached Storage (NAS) server to store data. Moreover, cloud computing involves computing and accessing the data or processing the program over the internet or to any extent involves the synchronization of data over the internet (PC, 2015). The National Institute of Standards and Technology (NIST) in the US explain cloud computing as a model that enables on-demand and convenient access of network and forms a shared pool consisting of configurable computing resources (Chandra and Malaya, 2012).

### *2.3.1. How Cloud Computing Works*

Cloud computing is also considered by several studies as the extension of distributed computing which denotes the processing and functioning of many programs at a time which virtually connects many computers and by a common network. The internet serves to be assisting the whole process and makes it achievable to all the users of the network. Cloud computing works on subscription-based services which provides the user computing resources and network storage. The network storage provides space for the clients to keep their files and store data over the network of cloud and which is supplemented with the availability of internet. In case of the mailing accounts, studies suggest that the web servers or clients work in a way that they provide accessibility of data to the end user from any part of the world regardless of the need of physical computers. In this way, cloud computing carries the data in a virtual setup which enables the user to access the data and other files from any part of the world, providing the internet connection (Zhang, Cheng and Boutaba, 2010).

### 2.3.2. *Cloud Computing Services*

The core services of cloud computing include Software as a Service (SaaS), IaaS (Infrastructure as a Service) and PaaS (Platform as a Service) (Armbrust, Fox, Griffith, Joseph, Katz, Konwinski, Lee, Patterson, Rabkin, Stoica and Zaharia, 2010, p.50)

- Software as a Service (SaaS) is the application provided to the customer with a purpose to use the applications which run on cloud infrastructure. With a thin client interface, the applications are easily accessible such as web-based email or a program interface. The management and control of the underlying cloud infrastructure are managed by the provider by giving bounded configuration settings which are user specific.
- Platform as a Service (PaaS) is the application designed using programming languages, services, and libraries created or acquired by the customers by deploying it on the cloud infrastructure. The management and control of the underlying infrastructure inclusive of servers, networks, operating systems and storage is to be done by the provider.
- Infrastructure as a Service (IaaS) is the application developed for provision processing, storage, networks, and other fundamental computing resources, here the customer can control and run arbitrary software (Melland Grance, 2011, p.2).

### 2.3.3. *Uses of Cloud Computing in different Domains*

#### 2.3.3.1. *Overseeing and reporting in business and educational sector*

Movement and flow of information is critical to the organization in the useful areas. Therefore, it is very useful for the business entities and educational institutes to adopt and implement cloud computing in their operations to run them smoothly (Ishaq and Brohi, 2015, p.890).

### 2.3.3.2. Agriculture sector and cloud computing

According to Hori, Kawashima and Yamazaki (2010, p.448), the four main functions of cloud computing in the field of agriculture are: production planning/sales planning, operational planning/results management, patrolling support and cultivated land data management.

### 2.3.3.3. Cloud computing and healthcare

In the healthcare industry, the collection of data from the patients, analysis of gathered information and data storage had been manual yet problematic. Now, real-time data collection, reduction of manual work and facility in deployment processes are the key advantages of using cloud computing in healthcare industry (Rolim, Koch, Westphall, Werner, Fracalossi and Salvador, 2010, p.97).

### 2.3.4. *Business Applications of Cloud Computing*

Several reports suggest that organizations are increasingly dependent upon the cloud computing technology for conducting their day-to-day business operations. Furthermore, it is also provided by several studies that companies that hold 25,000 employees use approximately more than 500 cloud services and applications. In addition, the use of e-mailing accounts like Gmail and Yahoo mail also involve cloud computing in the daily business activities by a large number of users (Huth and Cebula, 2011).

The architecture for cloud computing is considered to be user friendly and simple in spite of the sophisticated and technical processes going behind the curtains (Aljabre, 2012). The availability of applications on a cloud server maximizes the computing power of businesses,

which in turn significantly reduces the cost of information technology, especially for the small-medium enterprises (SMEs) (Renda, 2012).

### *2.3.5. Factors affecting the Implementation of Cloud Computing in Business*

In the world of IT, cloud computing has become a viral buzz. Cloud computing has spread out from the main areas of information systems. It is an application service like web-based e-mail, office software, and enterprise resource planning (ERP). According to the researches contributing in this field, numerous factors affect the implementation of cloud computing in businesses. Some of these are discussed ahead.

#### *2.3.5.1.Environment*

Among the primary research findings, the factors affecting can be classified in three contexts, such as technological, organizational, or environmental. Specifically, the environmental context is defined as firm's competitors and government policy or intention (Low, Chen and Wu, 2011, p.1010).

#### *2.3.5.2.Unauthorized access to management interface*

One major factor that is becoming a hurdle in the implementation of cloud computing in the educational sector is the service providers' unauthorized access to management interface. The on-demand self-service requires management interface which can also be accessed by the service users. Therefore, the probability is higher that unauthorized access might take place compared to the conventional systems where the access is restricted to the administration (Grobauer, Siemens, Walloschek and Stocker, 2010, p.53).

### 2.3.5.3. Security and privacy concerns

One study reported that 75% of the participants resist implementing cloud computing technology because of the privacy and security concerns. Organizations are likely to implement it using a careful analytical approach, such as waiting until the announcement of government regulation addressing security issues (Sultan, 2010, p.114).

### 2.3.6. *Cloud Computing and implementation Strategy*

The implementation of cloud computing is largely dependent upon some organizational strategies, including the diversity of business, willingness and role of managers in its implementation, culture of the organization where cloud computing is to be implemented as well as the planning of a development framework and resource allocation for several processes of the organization. All of these strategies thus contribute towards the implementation of cloud computing in an organizational setup and determining its successful implementation (Calheiros, 2011).

Therefore, based on the above strategies, it can be established that in order to successfully implement the cloud computing technology, organizational strategies should be well aligned with the process of implementation. In addition, it is also argued that the successful implementation of cloud computing through organizational strategies also depends upon the transparent approach throughout the organization, involving the top management and other employees. This in response enables smooth decision making in the organizational setup and thus successful implementation of cloud computing is ensured (Garrison, Kim, and Wakefield, 2012).

### **Uses of Cloud Computing in the Educational Sector**

Information technology has an important role to play in the education sector as almost all educational institutes heavily utilize the internet facility to accommodate the needs of their students. The services provided to the students are usually in terms of internet facility which helps them to conduct research based studies for their academic assignments as well as their personal grooming. In the above provided scenario, cloud computing is nicely utilized by the academic sector enabling the students and teachers to access and control data via internet (Ishaq, and Brohi, 2015). In addition, cloud computing is highly being utilized in higher education in a way that it involves students, faculty members, examination board, administrative staff and admission board to be connected to the cloud, thus making the institutional activities to be more integrated.

Apart from that, students and teachers are connected through cloud servers in a way that the class assignments and tutorials are uploaded on the internet through cloud computing. Several admission tests are also conducted using cloud servers which are accessible by students and checked by teachers without any geographical bindings. Furthermore, it helps in maintaining the study records of students which are analysed by the teachers thus providing them a tract of the progress of students. This in response thus helps the teachers as well to improve their teaching styles while evaluating and analysing the track record of both the teacher and students' performance, ultimately leading to identification of problem in the entire educational setup of the institute (Aramri and Qureshi, 2015). Using cloud computing is also significant in a way that it reduces the time and cost efforts of students as well as the teachers. Due to the fact that the learning material is shared through the server with other colleagues as well, it reduces the cost of operation and also expands the coverage of that material to several students at a time.

### 2.4.1. *Cloud computing and E-Learning*

#### 2.4.1.1. From traditional e-learning to cloud education

With the advance in technology, all the traditional methods are being replaced by business entities to sustain and adapt to the new ones. Same goes for the conventional e-learning methods. Hence, the benefits sought from e-learning like flexibility, measurement and so on cannot be neglected. In the traditional modes of e-learning, the physical existence, management and control are located internally within a particular entity which requires huge investments in installations. In contrast, using cloud based e-learning model brings together the efficiency scale mechanism, more comprehensive features and improved performance (Laisheng and Zhengxi, 2011, p.716). In the conventional e-learning model, the management and control belongs to individuals within that institution, but in cloud computing, the service provider is in charge for maintenance and control however the user can focus merely on application usability and performance.

#### 2.4.1.2. Benefits of cloud based e-learning

According to Ishaq and Brohi (2015, p.10), several key benefits result when the cloud computing technology is implemented with e-learning. Some of them are:

- Cost: In order to run the applications, users of e-learning do not require high end configured computers. The application can be run easily through their smart devices with an internet connection.
- Improved performance: While working, most of the applications are processed in cloud; therefore, customer's machines cannot create problems in performing actions.

- Instant software updates: The applications runs and processes over the cloud, therefore the software updates are instant automatic and manual updates are not required (Miller, 2009, p.1).
- Benefits for students: The main benefits for students are that through cloud power, they can take courses, attend exams, send projects and obtain result feedback online (Behrend, Wiebe, London and Johnson, 2011, p.232).
- Benefits for teachers: For facilitators, the major benefits are that they can conduct online tests, make better content, test evaluation and provide necessary recommendations via online discussions (Blue and Tirota, 2011, p.31)

#### 2.4.2. *Potential uses of Cloud Computing in the Educational Sector*

Educational institutes always seek necessary changes. Therefore, in order to increase the learning of students, cloud computing provides enormous choices to the students. Students are given a detailed exposure of the software tools and wide variety of resources through the provision of flexible and enriched environment. With the model obtained from Ishaq and Brohi (2015, p.896), following are the potential benefits that can be extracted in various activities through cloud computing in the educational sector:

##### 2.4.2.1 Business continuity

Conducting business over the internet has become a common trend nowadays. Additionally, as the technology is revolutionized, every single institution is constraint to adapt to it. With respect to cloud computing's potential usage; business continuity is the first and foremost aspect to put light on. For the institutions to continue their businesses in the long-term,

the usage of cloud computing is becoming more and more essential (Hudic, Islam, Kieseberg, Rennert and Weippl,2013, p.38).

#### 2.4.2.2.Communication management

As per the reviewed articles, the customer is not bound to take control and manage the cloud server, therefore the ultimate in charge is the service provider himself. As a result, the communication and co-ordination becomes easier for both the educational sector and the provider.

#### 2.4.2.3.Access control

Usually, the service providers store the data on multiple servers operated virtually by fragmenting it in order to prevent unauthorized access. The cloud computing applications have limited the customer's access to the applications and are supported by the provider at the back end. It is essential that the customer trust the cloud service providers to keep the data confidential and respect the privacy of their customer's information. (Hudic et al., 2013, p.38)

#### 2.4.2.4.Security policies and programs

Cloud computing has come up with such information security programs, removing all the concerns of confidentiality, information availability, cloud security, application security, e-investigating and proactive monitoring that allows educational institutes to adopt cloud computing technology and implement it without any security concerns (Yadav, 2014, p.3112).

### 2.4.3. *Cloud Computing Benefits for Students*

The use of cloud computing offers a number of benefits to students as well, apart from the institutions. These benefits as discussed by several studies and they include:

- **Personalized learning:** with the advent of cloud computing and with the implementation of this technology in educational sector, it has increased the chances of students' self-grooming and personal development. Students get more opportunity to learn using internet connections. The world of internet provides them access to a wide range of software tools and other academic resources which in turn help strengthen their skills and abilities.
- **Cost reduction:** cloud based technology helps the educational institutes to reduce their investment and costs on infrastructure for storing the bulk of data. In addition, students need not purchase several software applications because they are made available on the university portal.
- **User friendly:** one of the main achievement of cloud computing is that this technology is user friendly and provides an easy access to its users. Therefore, it is easily adoptable by the users from all the sections of life, including the students and academic professionals (Sultan, 2010).

#### ■ ***Implementation of Cloud Computing in DAIS***

It is suggested that cloud computing is a great technological advancement not only for the business sector, but also for the education sector with all its benefits. A number of universities around the world are increasingly implementing the cloud computing technology with different strategies and outcomes (Calheiros, 2011). Therefore, it is suggested that the DAIS should also implement cloud computing while formulating a framework or strategy for their university which would be based on the diversity of university's functions, willingness of the administration of the

university and also the resource allocation of university for acquiring new technologies. In addition, the framework should also include transparency in acquiring and implementing cloud computing technology so that all members of the university are involved in the implementation process to make it successful.

In addition, cloud computing is the next natural step in the evolution of on-demand information technology services and products. To a large extent, cloud computing will be based on virtualized resources (Vouk, 2008, p.235). Cloud computing is a new trend in distributed computing where people can develop SOA (service oriented architecture) based service on the internet network. The process of cloud computing includes the fundamental concepts of information technology, such as data storing, managing and retrieving of data in order to transmit information throughout the given spectra efficiently. There are numerous companies that calculate and evaluate the advantages of cloud service implementation. Cost effectiveness is the main thing that is calculated in order to implement cloud computing. Moreover, it helps in preventing time wastage on traditional methods of handling data of the company and providing customers the esteem benefits to their IT scope.

In DAIS, cloud computing could help increase the effectiveness and efficiency of teaching and research activities through various user friendly cloud services and e-learning solutions. The process could involve five stages. First, there needs to be a knowledge base about cloud computing, by understanding the initial benefits of the installation of cloud services. Secondly, the current IT situation should be evaluated in terms of IT gaps and requirements. Then, the cloud solution can be tested on trial and error basis. Further, a workable solution should be selected and optimized. Finally, the cloud solution should be implemented, monitored and managed (Mircea and Andreescu, 2011).

In order to use cloud computing services in DAIS, SaaS and IaaS are proposed to be implemented. Both of them are very useful for students, researchers, and administration staff as both software provides the services of working online in terms of handling data. It allows consumers to function all the front end assignments having no regard to what so ever to the back of the software. Cloud hybrid is the service model that can be recommended because of its flexibility and blended characteristic between public cloud and private cloud. Public cloud is managed by cloud provider with limited access as a subscriber, meanwhile private cloud means the service is owned by the higher education with access limited only for students, researchers, administration staff, and IT staff (developers) (Asniar and Budiawan, 2016, p.3). Both of the cloud services provides convenience to the customers in terms of handling the data and its security that any company wants over the precious information, therefore private cloud and public cloud are considered as the efficient products for cloud computing.

The solution implementation may be done in iterative phases, through a continuous transition of the data, services and processes towards cloud, with the eventual return from cloud to operations internally hosted. It is performed based on some continuous evaluations of the cloud technology benefits upon the university. At the same time, implementation supposes establishing a flexible program of risk management (for treating the informational risks in continuous growth) (ISACA, 2009), testing the solution performance and implementation management (Mircea and Andreescu, 2011, p.14).

### ■ *Conceptual Framework*

The significance of implementation of cloud computing in the educational sector is evident from several researches indicating that cloud for education is an efficient system in the

educational setup. It can be established by a number of services attached to the educational sector which are directly incorporated into the institutional activities and processes.

- The administration departments of educational institutes are now largely depending on these cloud servers to manage and run the administrative function and files of the institute.
- Same goes for the examination branch which regulates the examination results of students and manages the results on the cloud while collecting results from various departments.
- The admission section also needs integrated network which includes all the information of students that is shared by other departments of the university as well.
- The class lectures are also uploaded on the cloud server which is accessible to the designated students of the institute (Yadav, 2014).

All of these services thus contribute towards making a cloud of education that is useful for not only students, but also for the teachers and other administrative offices of the institute.

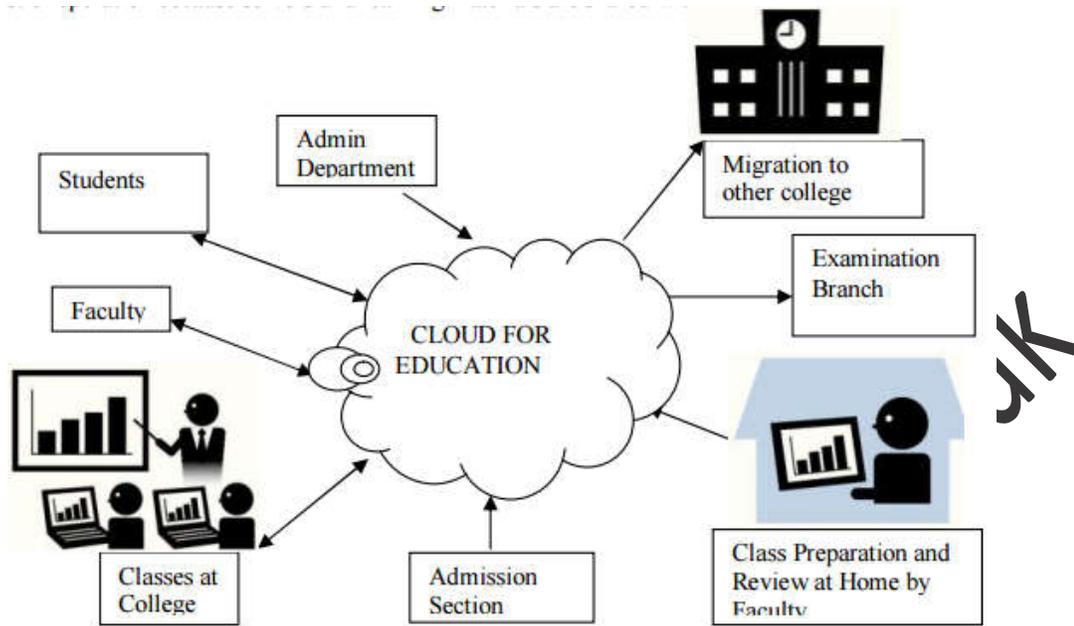


Fig 1: Services attached to Education Cloud

Source: (Yadav, 2014)

### Chapter Summary

Cloud computing is one of the emerging technologies not only in the business sector, but it has significantly acquired due importance in the educational sector as well. The technology serves all the sectors of life in a number of ways, including cost and time effectiveness. In addition, it also helps the businesses in overseeing and managing the business activities. On the other hand, cloud computing serves as tool for educational institutions to empower the students and all the concerned authorities by enabling them to exploit the benefits of this technology. The technology serves the students to polish their learning experiences by providing them access to an enriching learning experience at affordable rates.

In addition, the study also shows that that due to several benefits of acquiring cloud computing in educational sector, the DAIS should also implement a strategic framework to implement this technology. The study also incorporates a conceptual framework which addresses

that cloud computing can be beneficial for the DAIS in a number of ways as it would serve the administration, examination and admission department of the university. Apart from that, cloud computing would be a great deal of benefit to the students of DAIS and would help them in fulfilling their educational needs.

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## CHAPTER 3: RESEARCH METHODOLOGY

### **Introduction**

Within any given research study the chapter detailing the research methodology is of critical importance as it highlights the process that a researcher utilized in order to generate and obtain the desired level of information. In addition, another aspect of the following research methodology chapter is to lay a foundation for the forthcoming chapter, titled as data analysis. With the intention to shed additional light on the relevant research methodology that was used within the respective research study, the research has made use of the following headings; Data Collection Plan, Research Design, Research Paradigm, Sample Size, Research Strategy and the sampling technique.

### **Research Paradigm**

However, due to the use of qualitative research design within the following dissertation, the researcher has utilized the interpretivist theoretical paradigm. According to Merriam (2012) the interpretivist research paradigm assimilates reality as an infinite and subjective entity, one that is susceptible to change, depending upon the understanding and comprehension skills of the observers. Furthermore, Maxwell (2012, p.32) postulated that the use of the interpretivist research paradigm allows a researcher to gather in-depth, analytical information, information that can be used to add new theoretical domains within the topic of the research study. Hence, in order to attain sufficient subjective information, the researcher for the following research study used the interpretivist theoretical paradigm through the entire dissertation.

### **Research Approach**

Similar to the research paradigm, there are two basic types of research approaches, deductive and inductive, and each one of the approach has its own relevant application and usage (Matthews and Ross, 2014, p.84). Hence, in line with the requirements of the following research study along with the chosen research paradigm, the current study has incorporated the use inductive research approach. As documented by Goldkuhl (2012) one of the key benefits of using an inductive research approach is that it allows to the researcher to evaluate the growth and development that the chosen research topic has undergone. In addition, Flick (2015, p.67) predicated that the use of inductive research approach is more flexible in nature and allows the researcher to demonstrate a deep understanding of the research variables and the topic under study.

### **Research Design**

According to Denzin and Lincoln (2011) there are three types of different types of research designs that can be used within a research study; Qualitative, Quantitative Mixed Method Research Design. Hence, based on the above mentioned assessment the researcher has utilized the qualitative research design which allowed the researcher to add new theoretical domain within the following research study. In addition, using the qualitative research design, the researcher was able to incorporate and interpret intangible characteristics pertaining to the implementation of cloud computing.

### **Research Strategy**

The purpose of incorporating the element of research strategy within the following chapter is to highlight how information has been obtained by the researcher. Moreover, As predicated by Bryman (2012) some of the key research strategies are action research, content

analysis, case studies and surveys. Since the key research objective was to compare the methodology used by DAIS IT team to standardize steps of implementing and transformation of Hosted Servers to Cloud Computing the researcher opted for the use of interviews as the research strategy.

One of the key benefits of using the interview research strategy pertains to the flexibility in choosing the sample size of the respondents. By using the interviews research strategy, the researcher can assign a convenient and sufficient sample size, which the researcher finds suitable (Yin, 2013, p.17). Furthermore, according to Saunders, Lewis and Thornhill (2012) the interview research strategy is time efficient and less costly in usage and ensures that the researcher can complete the research study within a given period.

#### **Data Collection Method**

Universally there are two types of data collection methods, primary and secondary and both the data collection method have contrasting and unique characteristics and attributes. In light with the requirements of the research study, the researcher inundated the use of the primary data collection method. Using such a data collection method, the researcher was able to add new academic and theoretical data to the already existing literature pertaining to concept and use of cloud computing. Furthermore, since the following study was utilizing the inductive research approach, using the primary data collection would be more feasible and allowed the researcher to add incremental value to the notions of validity and reliability within the research study.

#### **Sampling Method**

According to Saunders, Lewis and Thornhill (2012) there are two types of sampling methods, probability sampling and non-probability sampling. The current research has

implemented the non-probability sampling method and within which the researcher selected the survey respondents through the use of the convenience sampling technique based on availability of the respondents.

### ■ *Sample Size*

As mentioned in the statement above the following research study has implemented the convenience sampling technique in order to reduce time and be cost effective. Therefore, with respect to the following study, the sample was  $n=15$ , where all the respondents were part of Dhirubhai Ambani international School(DAIS) Institute's IT staff and belonged to the university's IT department, together with staff, student, program director. 7 interviews were conducted from IT team whereas 8 interviews were staff, student, and program director of Dhirubhai Ambani international School. IT managers was named as Group A and staff, student, program director were named as group B of the research.

### ■ *Research Instrument*

Since the researcher for the following study opted for the use of survey research strategy, the researcher utilized interviews as the ideal source in terms of the research instrument. The researcher formulated 8 key interview questions for group A and 6 questions for Group B and were open ended in nature thereby allowing the respondents to answer questions as they see fit, without any limitations. According to Myers, Well and Lorch (2010, p.127) interviews are considered as efficient data collection instruments since they can provide a researcher with in-depth results and insight regarding the personal opinions of the respondents. Furthermore, from a technical aspect, interview questions can be easily interpreted and the interviewee is on hand to

explain the questions to the respondents and clear any ambiguities thus providing for more precise and effective answers and results (Maxwell, 2012, p.32).

### ■ *Data Analysis Plan*

Since the following research study has utilized the qualitative research design and the primary data collection method of interview survey, therefore, the researcher utilized the thematic data analysis plan to interpret and comprehend the collected information. Using the thematic analysis is a potent tool where the researcher categorizes common objectives into different but recurring themes. This makes interpreting and understanding the information a more systematic task ensuring high effectiveness of the data collection and analysis method.

### ■ *Ethical Considerations*

Throughout the following research study the researcher has maintained all the required ethical considerations and has abided by all the ethical code of conduct. Since the primary research study involves the use of interview questionnaire, the researcher has taken special care to ensure that no personal or private information of the respondents is either misplaced or treated in any derogatory or casual behaviour. In addition, all the secondary information incorporated within the following research study is necessarily and accurately cited with no form of plagiarism insubated in the research study.

### ■ *Research Limitations*

All research studies are marred by certain limitations which, at some point, restrict or hinder the prognosis or development of the following research study. Therefore, the limitations of the following research studies are as follows:



## CHAPTER 4: RESULTS AND DISCUSSION

### Introduction

This chapter presents the results of primary research conducted in this study. As explained, earlier the primary research was based on interviews with IT manager and other staff in DAIS. The researcher prepared transcripts of conversations during the interviews and then applied Thematic Analysis on the transcripts to derive meaningful results for this study. For the sake of ease for readers, the chapter has been classified into various headings in accordance with the research question and objectives. The chapter also presents a detailed discussion that compares the results of this study with the secondary research presented in chapter 2 as well as other secondary resources available.

### Results

#### 4.2.1. Implementation of Cloud Technologies in DAIS

One of the main purposes of interview questions was to understand how universities, or in this case DAIS, implement cloud computing in their operations. The majority of the IT managers opined that there are several factors that affect the feasibility of implementing cloud computing technology in university and many of them are specific to each university. However, there are some general or common factors (Calheiros, 2011). One of the participants opined that *“cloud technology has a potential to play a significant role in improving the education system, particularly in higher education, where it can provide advanced tools to users, including students, to share data for teaching purposes and enhancing privacy and security.”*

University management must carefully examine existing IT infrastructure and identify the gaps and opportunities for improvement in the existing system. Then the management must

explore how and what benefits do cloud technology offer to improve the university operations. Another participant opined that *“rushing towards glamorous cloud technology is not the most prudent choice. First, the university must identify needs as well as cost and benefit analysis of implementing cloud technology.”* This statement implies that university management should use a business approach and perspective about decision towards cloud computing. It is important to ensure that implementation of cloud technology will improve efficiency (Mircea and Andreescu, 2011).

Another participant argued that developing and maintaining the existing IT infrastructure was not an easy task and she believes that investment made in existing IT systems has not yielded maximum benefits (Kaur, 2015). She also suggested that university management has beared in mind that cloud computing does improve efficiency, however, the critical aspect is the timing. In other words, whether is it really worth it right now?

Another important factor for universities to consider while implementing cloud technology is the unique needs and requirements of educational institutions. One of the managers opined that using cloud implies that data and applications of the university will be residing in a real physical server in a data centre somewhere and most probably in more than one server. Universities must know where the data and applications are stored in order to prevent conflicts with cross-border regulatory requirements (Arpaci, Kilicer and Bardakci, 2015). The participant stated, *“you do not want the heads of a research department to wake up on a normal day and find out that while using cloud services to store and secure research material; he/she accidentally data export law. This might lead to halt of funding or even worse criminal charges.”* Thus location of the server in which university data and application are being stored must be considered by the university.

Due to unknown location of storage, there are also some other issues related to security of IT environment. One of the participants opined that two most significant aspects of IT environment security are control and transparency. Transparency implies that who, when, and where the data is being accessed. Control refers to ensuring that unauthorised personnel cannot access. When using cloud technology, universities ability and power to control and transparency are substantially compromised (Rindos, Vouk and Jararweh, 2014). This is because university as a customer may have absolutely no idea as to where the data has been stored and who, when, and where has access to it. In his words, *“universities need to consider whether they can afford to compromise these protection issues in order to gain the benefits of cloud technology.”*

#### 4.2.2. Benefits of Cloud Technologies for DAIS

The study also inquired about the potential benefits of cloud technology to DAIS and these benefits affect its operations. The majority of the participants opined that the most significant benefit of implementing cloud technology to DAIS is accessibility and flexibility to information and academic material (Huth and Cebula, 2011). One of the participants opined stated, *“you know how the cost of text-books has been rising! Text books required at university-level are pretty expensive. The rise in the cost of textbooks is higher than any other in education, which include tuition.”* With cloud available to, students expensive books can be made available, particularly to students belonging to low-income group population. It can be used to minimise disadvantage some students face as compared to their affluent counterparts (Aljabre, 2012).

Another participant highlighted that teachers, professors, and researchers need servers to store research material and the cloud technology offers virtual servers. These virtual servers can be hired for hourly basis and can be opened and shut at convenience. Researchers can use such

options to secure their research material as well as share with fellow researchers. This implies that students have access to latest and most recent research material for their studies. In addition, they can prevent waiting for expensive hardware, which may not be available readily to universities, especially after the budget cuts in recent past (Renda, 2012).

One of the participants pointed out that students also face a huge cost of using various softwares in their academic career. For example, in order to purchase a single Microsoft Office student license, student needs to USD 140. In contrast, students may opt for a cloud-based subscription for only USD 10 per month and 5 computers and 5 mobile devices can be used on this subscription. They may also use Google Docs (absolutely free). The cloud technology offers SaaS applications which can be used by students to minimise their software subscription costs. For example, a cloud-based learning management system such as ProProfs' Training Maker is available for only USD 60 per month with unlimited number of users.

One of the interesting positive outcomes of using cloud technologies is that DAIS can cater the needs of more diverse student groups. For example, for adult students who left high school incomplete, there were limited options to complete education before education went online. Now with the introduction of cloud technologies, educational institutes such as DAIS can offer customise courses and degree to adult students as it removes all types of time and geographical constraints.

#### 4.2.3. *Barriers to implementation of Cloud Technology*

One of the barriers identified by the participants in the implementation of cloud technologies in DAIS is abandonment of the existing IT infrastructure with all the expensive equipment and devices in place. The significant sunk cost that DAIS has already incurred in

developing and maintaining existing infrastructure and set of software is an important issue. In accordance with economic point of views as well as from business point of view, there is a need to evaluate whether the existing infrastructure has outrun its life or whether it has significant useful life ahead (Vouk, 2008). One of the participants stated, *“since considerable funds have been spent on existing IT system and that users are well aware of its use (i.e. do not need training) DAIS need to use it until it achieves desirable economic payback as was planned earlier. This refers to as sunken costs conundrum.”*

This implies that there is a situation among decision makers in the DAIS. This can be considered as a hurdle to implementation of cloud technologies as the capital expenditure or investment made in existing system has not fulfilled its economic purpose yet. Therefore, this may not be the adequate time to abandon existing system and invest in new cloud technologies. Another participant highlighted that there is reluctance towards implementation of cloud technologies due to certain degree of uncertainty and doubt in the minds of various stakeholders. The participant stated, *“whenever a change is proposed, particularly implementation of a radical and disruptive technology in an organisation, people show doubts and uncertainty regarding the potential benefits for them as well as organisation.”*

This study compares this statement with the Fear, Uncertainty and Doubt (FUD) strategy in the business world by whereby legacy vendors attempt to cast doubts regarding stability and security of the disruptive technology which in this case is cloud technologies. In case of DAIS, the university relies on vendors heavily on vendors. It is highly likely that these vendors may try to manipulate the truth about cloud technology and its implementation in DAIS for their own interests (Mircea and Andreescu, 2011). For this purpose, they may use limitations and critiques on cloud technologies.

## **Discussion**

In this section, this study discusses the results and findings of the primary research within the context of research aims and objectives as well as presents a discussion of implementation of cloud technologies within general literature.

This first objective of this study was to analyse how cloud computing could be implemented in the DAIS. The primary research reveals a number of factors that must be considered by the university management in developing a strategy as how cloud technologies can be implemented. The section 4.2.1 of this chapter shows that important factors to be considered are cost-benefit analysis, security issues, and legal and regulatory compliance. University management must carefully examine existing IT infrastructure and identify the gaps and opportunities for improvement in existing system. Then the management must explore how and what benefits do cloud technology offers to improve university operations. The cost benefit analysis is another important factor. The interviews reveal that university management should use a business approach and perspective about decision towards cloud computing. It is important to ensure that implementation of cloud technology will improve efficiency.

Another important factor identified in this study is related to security of data and software of the university using cloud technologies because of unknown storage location. Since clients do not know the location and the number of servers holding their data and software, therefore it is likely that transparency and control may be compromised, legal and regulatory compliance related to data and information storage may also be violated due unknown location of server(s).

The second objective of this study was to assess ways in which the implementation of cloud computing could affect the DAIS. The primary research (see section 4.2.2.) reveals that there are positive impacts of implementation of cloud technologies for DAIS. The most

commonly cited benefit among participants was benefits to the accessibility and flexibility to information and academic material. The research revealed that cloud available to students expensive books can be made available, particularly to students belonging to low-income group population. It can be used to minimise disadvantage some students face as compared to their affluent counterparts. Furthermore, DAIS can minimise the cost of operations particularly in terms of expenses regarding IT. For instance, researchers can use cloud technologies to store, secure, and share their research material more efficiently as compared to existing technologies. Cloud technologies also allow students to minimise their cost related to software subscriptions. The cloud technologies enable students to share expensive software and academic books with fellow students. The same sharing can be achieved with geographically far researchers and students. Finally the primary research confirms that DAIS can cater the needs of more diverse students using cloud technologies by developing and offering customise courses.

Finally, the last objective of this study was to compare the potential implementation of cloud computing in the DAIS to the business firms. This was achieved by identifying the barriers of implementation of cloud technologies in DAIS. The primary research revealed various barriers. This section discusses these barriers with barriers in business organisations in order to compare the implementation of Cloud technologies in DAIS to implementation of cloud technologies in business organisations.

Firstly, the primary research (see section 4.2.3.) revealed that one of the barriers in implementing Cloud technologies in DAIS is the sunken cost conundrum. There has been considerable investment made in the existing IT system such as equipment and networking servers. This can be considered as a hurdle to implementation of cloud technologies as the capital expenditure or investment made in existing system has not fulfilled its economic purpose yet.

Therefore this may not be the adequate time to abandon existing system and invest in new cloud technologies. This barrier is common with a business organisation. Businesses are also very conscious about getting the most of their investment and therefore this is a common issue in implementing cloud technologies in both DAIS and business organisation.

Another barrier identified was the FUD strategy. The vendors of existing IT system may attempt to use FUD strategy to safeguard their business interest and highlight the challenges and limitations of cloud technologies. This is also a common issue with business organisations. The cost benefit analysis identified earlier is also common issue in the implementation of a disruptive technology both in business and education organisations.

### ■ *Chapter Summary*

Overall, this chapter shows that the primary research of this study shows that there are several factors that must be considered by university management while implementing cloud technologies. These factors affect the operations of the company and, if ignored or mismanaged, may lead to undesirable adverse outcomes on the operations. The major factors identified in the primary research were feasibility of cloud technologies for DAIS, cost-benefit analysis, location of the server in which data and software of the university would be stored by the cloud vendor, compliance to legal and regulatory requirements, and finally to ensure that specific and unique needs of DAIS as an educational institute are met by adopting cloud technologies so that the operational effectiveness and efficiency of DAIS can be improved. This chapter also shows that primary research confirms that there are several benefits of implementing cloud technologies for DAIS. These benefits include improvement in accessibility and flexibility to information and academic material. Furthermore, cost efficiency for students belonging to low-income groups is another benefit. DAIS can also use cloud technologies to address more diverse range of students

by developing customise courses and eliminating time and geographical constraints. Finally, the chapter shows that there are several barriers to implementing cloud technologies faced by DAIS. These barrier include sunken cost conundrum (i.e. whether existing IT system has provided all economic benefits or not), FUD strategies adopted by vendors, among others. These are common issues with business organisations. Overall the primary research was highly compatible with secondary research and shows that there is high level of consistency in the results of secondary and primary research.

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## CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

### Conclusion

Over the past few years, the business domain has evolved significantly, one which has been predominantly impacted by the resurgence and development of globalization. According to Safonov (2016, p.295) the concept of globalization has increased the competition level amongst market participants and therefore promulgated firms to adopt new and innovative strategies, in the haste to attain market dominance and a larger chunk of the intended target audience.

Therefore, within the following research study, the researcher has evaluated the concept of cloud computing and its relevant implication and implementation with respect to the education sector and the Dhirubhai Ambani International School. Furthermore, another key assessment that has been addressed within the domain of the following research study is the comparison between the implementation of cloud computing process in the education industry and the implementation of cloud computing in the business industry. As indicated by Rouse (2016) the paradigm of cloud computing articulates the use of internet services to access a hub or source of information.

Furthermore, according to Ishaq and Brohi (2015, p.9) cloud computing is the process that deals with provision of hosted services through the internet, which allow companies to use computer resources in the form of utilities, like electricity. This technology does not require building and maintaining in-house infrastructures for computing.

Since the inception of cloud computing, the following paradigm has benefitted businesses significantly and has allowed them to reduce their cost of operation and enhanced the effectiveness of their logistical functions (Matthew, 2012, p.475). However, through the secondary analysis carried out within the literature review, it was observed that the process of cloud computing is now being implemented within the education industry and sector as well. As

inferred by Kamyani (2015, p.152) both students and teachers have benefited from the use of cloud computing as it has reduce the burden upon them to either submit or collect assignments physically. In addition, cloud computing servers has also allowed teachers to place daily lectures and tutorials online enabling a larger number of the students to revisit the course module and daily lecture, for their own convenience (Yadav, 2014). In addition, Jaeger, Lin and Grimes (2008, p.274) further elaborated that information technology is now continuously playing a more prominent and comprehensive role in the education sector as almost all of the teaching and learning institutions heavily utilize the internet facility to accommodate the needs of their students. Moreover, the services provided to the students are usually in terms of internet facility which helps them to conduct research based studies for their academic assignments as well as their personal grooming (Yavuraj, 2015).

Yet, the implementation process of cloud computing is relatively different in the business sector as compared to the education sector. According to Abbasi and Janjua (2010, p.21) the process and application of cloud computing in the business domain is more extensive and complicated and usually involves more than one host servers. In comparison however, Schubert and Jeffery (2012, p.19) contemplated that most of the educational institutes do not require more than one cloud computing server, as their field of operations is limited towards the facilitating the educational faculty and the respective student body. However, contradicting the above mentioned analysis, Palian (2016) deliberated educational institutes like universities and colleges are now expanding their operational horizon and incubating an incremental number of students and staff members. Therefore, in order to facilitate the growing volume of academic staff members and students, colleges and universities are now reverting to the utilization of more than

a host server, an implementation process that is reflective towards the use of cloud computing in the business domain.

Similar analytical assessment and comprehension was derived through the primary data that was collected through the IT and other staff members currently employed at the Dhirubhai Ambani International School. Within the research study, one of the first research objective was to analyse how cloud computing could be implemented in the DAIS (Dhirubhai Ambani International School). As per the results provided by the respondents it was observed that the implementation of cloud computing at DAIS is dependent upon the technological infrastructure of the following school. The IT staff members were of the opinion that Dhirubhai Ambani International School is well equipped in terms of its technological infrastructure and can sustain the incorporation of cloud computing in their regular management operations. However, one area of concern that was raised by the respondents pertaining to implementation of cloud computing in Dhirubhai Ambani International School was regarding availability of trained employees and IT staff members who could implement and carryout the process of cloud computing.

In addition, the other staff members who were also interviewed predicated that another limitation of implementing the process of cloud computing pertains to the issues of information security. As per the literature that was studied and in triangulation with the primary data analysis, all types of business entities, including educational facilities, face a common limitation of implementing cloud computing, security issues. When inquired from the respondents pertaining to the security issues of cloud computing implementation, the respondents were of the opinion that since sensitive information is being placed in one single server over the internet, the integrity of the information can be promised if the servers were hacked. In reflection with the

implementation of cloud computing in the business sector the risk of data theft is prominent in the education sector as well.

Therefore, based on the secondary literature review and the primary data collection analysis, the following research evaluated the implementation of cloud computing within an educational institute (DAIS) with respect to the implementation of cloud computing in the business sector. The research indicated that there are several barriers in implementing cloud technologies faced by DAIS. These barrier include sunken cost conundrum (i.e. whether existing IT system has provided all economic benefits or not), FUD strategies adopted by vendors, among others. Yet, irrespective of the following limitations associated with the use of cloud computing, the researcher has sufficiently provided data and evidence highlighting the fact that from a business management perspective the use of cloud computing can provide sufficient and positive results for Dhirubhai Ambani International School.

### **Recommendations**

With respect to the aims and objectives derived for following research study, the researcher was able to derive the certain specific and actionable recommendations, recommendations which would allow the IT management at Dhirubhai Ambani International School, who wish to incorporate the use of cloud computing within their operational domain, make a rationale decision in terms of the selection of an appropriate implementation strategy regarding cloud computing.

- One of the first research objectives of the following study was to highlight the implementation process of cloud computing within Dhirubhai Ambani International School. However, in order for the school to sufficiently benefit from the following

process of cloud computing is the employment of technical employees, employees who are aware of dynamics and specifications of cloud computing. Through the employment technical employees, Dhirubhai Ambani International School can reduce the risk associated with the unsuccessful implementation of cloud computing.

- In addition through the use of cloud computing, Dhirubhai Ambani International School can enable both, the students and the employees, to become more potent in terms of the work they perform. It would also reduce the amount of paperwork that teachers and students would normally have to deal with, thus ensuring maximum effectiveness of the educational objectives that the school has established for the betterment of the students.
- Another key aspect pertaining to the implementation of cloud computing within Dhirubhai Ambani International School is that of the technological infrastructure that the respective institute has. Since, cloud computing requires incremental use of electricity, internet and host servers, therefore, if the school lacks the designated technological infrastructure then it will be unable to truly benefit from the use of cloud computing.

### ■ *Future Implication*

Within any given research study, the aspect of future implication is critical, a part of the research study that lays framework and guidelines upon which future research studies could be carried out. Since the following study highlighted the implementation of cloud computing within the education industry, future research studies can be carried out based on the effectiveness of using cloud computing in the education sector. In addition, the sample size for the following research study was limited due to the chosen method of primary data collection; however, future researchers can utilize the quantitative data collection method, one which would allow the researchers to increase the sample size of respondents.

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### References

- Abbasi, E. & Janjua, N. (2010). Cloud Computing for Educational Institutions in Pakistan. *Journal of Independent Studies and Research – Computing*, 8(2), pp.18-23.
- Alamri, B.H. and Qureshi, M.R.J., (2015). Usability of Cloud Computing to Improve Higher Education.
- Aljabre, A., (2012). Cloud computing for increased business value. *International Journal of Business and Social Science*, 3(1).
- Anand, H. S. & Kamyani, (2015). Scope of Cloud Computing in Education Sector: A Review. *International Journal of Recent Research Aspects*, 2(2), pp.150-152.
- Armbrust, M., Fox, A., Griffith, R., Joseph, A.D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I. and Zaharia, M., (2010). A view of cloud computing. *Communications of the ACM*, 53(4), pp.50-58.
- Behrend, T.S., Wiebe, E.N., London, J.E. and Johnson, E.C., (2011). Cloud computing adoption and usage in community colleges. *Behaviour & Information Technology*, 30(2), pp.231-240.
- Blue, E. and Tirota, R. (2011). The benefits & drawbacks of integrating cloud computing and interactive whiteboards in teacher preparation. *Tech Trends*, 55(3), pp.31-39.
- Bryman, A. (2012). *Social Research Methods*. Oxford University Press; 4th edition
- Bryman, A., & Bell, E. (2015). *Business research methods*. Oxford University Press, USA.
- Buddharaksa, W., (2010). Positivism, Anti-Positivism and Neo-Gramscianism. *Ritsumeikan Center for Asia Pacific Studies*. The University of York, pp.1-7.

- Budiawan, R., (2016). Implementation of cloud computing in higher education. In *IOP Conference Series: Materials Science and Engineering* (Vol. 128, No. 1, p. 012022). IOP Publishing.
- Burnes, B., (2004). *Managing change: A strategic approach to organisational dynamics*. Pearson Education.
- Calheiros, R.N., Ranjan, R., Beloglazov, A., De Rose, C.A. and Buyya, R., (2011). CloudSim: a toolkit for modeling and simulation of cloud computing environments and evaluation of resource provisioning algorithms. *Software: Practice and Experience*, 41(1), pp.23-50.
- Chandra, D.G. and Malaya, D.B., (2012). March. Role of cloud computing in education. In *Computing, Electronics and Electrical Technologies (ICCEET), 2012 International Conference on* (pp. 832-836). IEEE.
- Chen, J.M., Suen, M.W., Lin, M.J. and Shieh, F.A., (2010). Organizational Change and Development. *Organization Science*, 12, pp.1-13.
- Collins, H., (2010). *Creative Research: The Theory and Practice of Research for the Creative Industries*. Ava Publishing.
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*.
- Denzin, N. K., & Lincoln, Y. S., (2011). *The Sage Handbook of Qualitative Research*. Sage Publication.
- Evangelista, R. and Vezzani, A., (2012). The impact of technological and organizational innovations on employment in European firms. *Industrial and Corporate Change*, 21(4), pp.871-899.

- Flick, U. (2015). *Introducing research methodology: A beginner's guide to doing a research project*. Sage.
- Garrison, G., Kim, S. and Wakefield, R.L., (2012). Success factors for deploying cloud computing. *Communications of the ACM*, 55(9), pp.62-68.
- Goldkuhl, G., (2012). Pragmatism Vs. Interpretivism in Qualitative Information Systems Research. *Linköping University*
- Grobauer, B., Walloschek, T. and Stöcker, E., (2011). Understanding cloud computing vulnerabilities. *Security & privacy, IEEE*, 9(2), pp.50-57.
- Harwell, M. R. (2011). Research Design in Qualitative/Quantitative/Mixed methods. *The Sage handbook for research in education. 2nd ed. Los Angeles, CA: Sage*, 147.
- Herrington, H. J., (2014). *Organizational Capacity for Change: Increasing Change Capacity and Avoiding Change Overlead*. Newtown Square: Project Management Institute.
- Hori, M., Kawashima, E. and Yamazaki, T., (2010). Application of cloud computing to agriculture and prospects in other fields. *Fujitsu Sci. Tech. J*, 46(4), pp.446-454.
- Horton, W. (2011). *E-Learning by Design*. John Wiley & Sons.
- Hudic, A., Islam, S., Kiesberg, P., Rennert, S. and Weippl, E.R., (2013). Data confidentiality using fragmentation in cloud computing. *International Journal of Pervasive Computing and Communications*, 9(1), pp.37-51.
- Huth, A. and Cebula, J., (2011). The basics of cloud computing. US-CERT. accessed from: <https://www.us-cert.gov/sites/default/files/publications/CloudComputingHuthCebula.pdf>
- IBM (2016). What is cloud computing. Available from: <https://www.ibm.com/cloud-computing/what-is-cloud-computing>

- Ishaq, A. & Brohi, M. N., (2015). Cloud Computing in Education Sector with Security and Privacy Issue: A Proposed Framework. *International Journal of Advances in Engineering & Technology*, 8(6), pp.889-898.
- Ishaq, A. and Brohi, M.N., (2015). Cloud computing in education sector with security and privacy issue: a proposed framework.
- Ishaq, A. and Brohi, M.N., (2015). Literature Review of Cloud Computing in Education Sector: A survey with respect to Qatar. *International Journal of Computer Applications*, 132(17), pp.9-14.
- Jaeger, P.T., Lin, J. and Grimes, J.M., (2008). Cloud Computing and Information Policy: Computing in a Policy Cloud? *Journal of Information Technology & Politics*, 5(3), pp.269-283.
- Kumar, A., (n.d). *Organizational Change: An Overview*. [online] Available at: <http://www.ddegiust.ac.in/studymaterial/mba/obh-413.pdf> [21 June 2016]
- Kumar, R. (2010). *Research Methodology: A Step-by-Step Guide for Beginners*. SAGE Publications Ltd; Third Edition
- Laisheng, X. and Zhengxia, W., (2011). Cloud computing: a new business paradigm for E-learning. In *Measuring Technology and Mechatronics Automation (ICMTMA), 2011 Third International Conference on* (Vol. 1, pp. 716-719). IEEE.
- Low, G., Chen, Y. and Wu, M., (2011). Understanding the determinants of cloud computing adoption. *Industrial management & data systems*, 111(7), pp.1006-1023.
- Mariethoz, G., Renard, P., & Straubhaar, J. (2010). The Direct Sampling method to perform multiple-point geostatistical simulations. *Water Resources Research*, 46(11).

- Mathew, S., (2012). Implementation of cloud computing in education-A Revolution. *International Journal of Computer Theory and Engineering*, 4(3), pp.473-475.
- Matthews, B., & Ross, L. (2014). *Research methods*. Pearson Higher Ed.
- Maxwell, J. A. (2012). *Qualitative research design: An Interactive Approach: An Interactive Approach*. Sage.
- Mell, P. and Grance, T., (2011). The NIST definition of cloud computing.
- Merriam, S. B. (2012). *Qualitative Research: A Guide to Design and Implementation*. Jossey-Bass.
- Miller, M., (2009). Cloud computing pros and cons for end users. Available from [microsoftpartnercommunity.co.uk](http://microsoftpartnercommunity.co.uk).
- Mircea, M. and Andreescu, A.I., (2011). Using cloud computing in higher education: A strategy to improve agility in the current financial crisis. *Communications of the IBIMA*.
- Myers, J. L., Well, A., & Lorch, R. F. (2010). *Research design and statistical analysis*. Routledge, pp.123-129
- Palian, J., (2016). How cloud computing adoption varies across industries. Available from: <https://www.expedient.com/blog/how-cloud-computing-adoption-varies-across-industries/>
- PC, (2015). What is Cloud Computing. Available from: <http://me.pcmag.com/networking-communications-software-products/1758/feature/what-is-cloud-computing>
- Renda, A., (2012). Competition, neutrality and diversity in the cloud. *Communications & Strategies*, (85), pp.23-44.

- Rolim, C.O., Koch, F.L., Westphall, C.B., Werner, J., Fracalossi, A. and Salvador, G.S., (2010). A cloud computing solution for patient's data collection in health care institutions. In *eHealth, Telemedicine, and Social Medicine, 2010. ETELEMED'10. Second International Conference on* (pp. 95-99). IEEE.
- Rouse, M., (2016). *Cloud Computing*. [Online] Available from: <http://searchcloudcomputing.techtarget.com/definition/cloud-computing> [11 June 2016]
- Safonov, V.O., (2016). *Trustworthy Cloud Computing*. John Wiley & Sons
- Saunders, M., Lewis, P. & Thornhill, A. (2012). *Research Methods for Business Students*, (6th Ed.) Pearson.
- Schubert, L. & Jeffery, K. (2012). *Advances in Clouds: Research in Future Cloud Computing. Expert Group Report. Public Version 1.0*. Luxembourg: European Commission.
- Sultan, N., (2010). Cloud computing for education: A new dawn?. *International Journal of Information Management*, 30(2), pp.109-116.
- Vaquero, L.M., Rodero-Merino, L., Caceres, J. and Lindner, M., (2008). A Break in the Clouds: Towards a Cloud Definition. *ACM SIGCOMM Computer Communication Review*, 39(1), pp.50-55.
- Voiculescu, A., Belu, N., Papandele, D.E. and Rizea, I.C., (2010). The impact of external environment on organizational development strategy. *MPRA Paper No. 26303*. Constantin Brancoveanu University.
- Vouk, M., (2008). Cloud computing—issues, research and implementations. *CIT. Journal of Computing and Information Technology*, 16(4), pp.235-246.
- Yadav, (2014). Role of cloud computing in education. *International Journal of Innovative Research in Computer and Communication Engineering*, 2(2), p.3111.

Yadav, K., (2014). Role of Cloud Computing in Education. *International Journal of Innovative Research in Computer and Communication Engineering*, 2(2), pp.3108-3112.

Yin, R. K. (2013). *Case study research: Design and methods*. Sage publications, pp.15-34.

Yuvaraj, M., (2015). Problems and Prospects of Implementing Cloud Computing in University Libraries: A Case Study of Banaras Hindu University Library System. *Library Review*, 64(8/9), pp.567-582.

Zhang, Q., Cheng, L. and Boutaba, R., (2010). Cloud computing: state-of-the-art and research challenges. *Journal of internet services and applications*, 1(1), pp.7-18.

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*Appendix A: Interview Questions (For IT Team: Group A)*

1. As a professional belonging to the field of IT, how do you see the growth of Cloud Computing, in terms of its implementation?
2. Since the Inception of Cloud computing, do you feel that it has lived up to the expectation of people and delivered as promise?
3. At present, there are different methods of implementing Cloud computing technology, in your opinion which is the best way to decide what type of cloud computing technology to adopt?
4. Will there be a positive or a negative impact on the workforce of the university after the implementation of Cloud Computing?
5. With respect to hosted servers, what are some of the benefits of using cloud computing?
6. Do you feel that the structure of the organizations plays a key role in deciding whether or not to implement cloud computing technology?
7. What would be the drawbacks to DAIS, if they do not incorporate cloud computing technology in their technical and operational system?
8. Do you feel that the usage of cloud computing in the education sector is different from the implementation of cloud computing in normal business or IT processes?

*Appendix B: Interview Questions (For Other Staff: Group B)*

1. Are you evaluating Cloud computing technology for your company?
2. Do you believe that cloud computing would cut down costs for your company?
3. In which area do you expect potential cost savings?
4. What are your concerns with respect to cloud computing?
5. What are the drawbacks to the implementation of cloud computing?
6. How would the morale and motivation of staff be effected by the introduction of cloud computing?

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