

The Successful Elements Implementing the eLearning using Cloud Services Data Centre at Private Institution of Higher Learning in Malaysia

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Abstract—There are a few network environment used for institutions of higher learning for eLearning application. The world financial crises cause institution of higher learning struggling to maintain and update the technologies and infrastructures and try to provide the sufficient budget allocation for the network infrastructure. Cloud Services Data Centre network environment is one of the solution where they does not used physical network technology and infrastructure and cost saving. The purpose of this paper is to identify the success factor elements in implementing the eLearning using Cloud Services Data Centre at Private Institution of Higher Learning in Malaysia. The literature was reviewed and base on the preliminary study a few elements was identified for the success factor elements. The elements are perception, business needs, strategy planning, cost saving, security and vendor capability. Base on the finding the propose framework and hypothesis was derived. To validate the success factor elements of Cloud Services Data Centre the pilot test was been done.

Keywords—Cloud; infrastructure; datacentre

I. INTRODUCTION

The implementation of network technology for electronic learning (eLearning) has started early 1990. The eLearning was expended by 20th country introducing using the computer and it can be accessed using LAN network connectivity, that manage by the Institution of higher Learning at 2000's [1]. Base on Country Report Development for eLearning in Malaysia (2005), the increasing of the user and huge of the teaching material, Institution of higher Learning need a suitable technology and infrastructure to implement the successful network environment [2]. Preparing and managing eLearning is a complex process requires started from how to manage and planning the network infrastructure [3].

One of the main agenda of the ministry of higher education is to ensure at early 2015 all the Institution of higher Learning at Malaysia used the eLearning [4]. Private Institution of Higher Learnings (Private IHL) also seriously willing put an effort to increase the awareness for eLearning implementation

by provide the appropriate network technology and infrastructure to implement the best quality of teaching and learning activities [5]. Private IHL also committed to implement the eLearning because they believe it is effective alternative approach compare to the traditional classroom method for distributing information. The current financial crisis append complication to Private IHL to provide the higher quality of learning service[6].

The network infrastructure services provide an impact on eLearning implementation by preparing the sufficient and up-to-date of network infrastructure equipment to all educational institution and accessibility to web page beside the upgrading of ICT knowledge and skill for students and teachers[7]. Many researchers have reported the increasing cost of hardware, planning and supported from the Private IHL to make successful of eLearning [8, 9, 10].

The Private IHL need to find the other alternative to make efficient Learning by reduce the cost of operation[11]. Moving to Cloud Services Data Centre is a one of the solution to reduce the cost of maintenance where all the network component are maintain and overseen by the Data Centre cloud provider. Blueprint from Mampu [12] in Malaysia environment was used the network technology manage by ownership and Data Centre but the government encourage all the IT system ministry at the government sector move to Cloud environment. The cloud environment are new in Malaysia and lack of research in the cloud environment were done [12]. There are a few Institution of higher Learning has been moved to the Cloud Services for Data Centre in order to get the better benefit service maintenance and reduce the cost of operation. Using the cloud services the data can access anytime and anywhere because the data store in the cloud.

II. LITERATURE REVIEW

The development of IT technology and infrastructure greatly influences the form and shape of education [13]. Network technology and infra supported to enhance teaching

and learning activities[14]. The developments of information and network technologies like as the internet connectivity have benefit to organizations such as the quality of access, cost, availability of computer and communication barriers[15]. Many universities are burden to cater expensive to build and maintain mainly of network technology and infrastructure especially a small Private IHLs. Institution of Higher Learning seriously put an effort to increase the awareness to provide the appropriate network technology and infrastructure to implement the best quality of teaching and learning activities including Private IHL[5].

At 1984, over the past several years, technologies change in IT and telecommunications was got the new demands of business community recognized the important role, responsive, business oriented where IT sector plays in the growth of the economy [16]. According to Malaysian Communication and Multimedia Commission (2013), early 1984, Telekom Malaysia as a provider is leading telecommunication company beginning as the national Telco for fixed line, radio and television broadcasting.

Furthermore, at 1984 government move to privatization and deregulation for elimination the government power in the Telco industry usually enacted to create more competition within the industries. Onward, in 1993 the relaxation of government restrictions market liberalization that opens new service provider. Whereas, at 1996 until 1998 MSC to spearhead development of ICT industries to cyber laws for computer crime act, digital signature act and convergence policy for communication and multimedia act. On 2003 onwards many of connected society for ubiquitous computing.

With the development of technology, network technology and infrastructure business driven also move for enhancing service, information sharing, IT sustainability, cost effective and IT resiliency. The current policy has resulted in inefficiencies in IT infrastructure operations, non-optimized resources utilization, and high cost of maintenance, disparate network service and connectivity. At Malaysia the Data Centre network environment help the organization to manage the server efficiently and reduce the cost compare to ownership whereas the cloud computer is new to adopted [12]. Next is the explanation about the eLearning network environment normally used by the institution of higher learning in Malaysia:

i) Ownership

The concept of ownership by Institution of Higher Learning (IHL) are manage and handle the IT infra by their IT experts[18]. Hereby the IHL must provide the appropriate bandwidth for easy upload and download [19]. The infrastructure resources that must be provided by IHL consist of server requirement, internet connectivity at local area network (LAN), computer operating system and all the network infrastructure. Whenever IHL must provide at least

two servers, development and live deployment server. Thus IHL must provide and design the appropriate LAN in whole campus in order to get the better internet connectivity's. Private IHLs must provide the adequate infrastructure to smoothen the accessing process.

ii) Data center

One way to solve the IHLs problem is to move the server to Data Centre. Data Centre is a set of many servers together and housed within the same physical facilities to given an effective service[6]. The Data Centre provides the efficient process by combined computing power for many servers by simultaneous executing one or more applications [20]. Server farms are ubiquitous in manufacturing system call centres and service centres[21].

One of the service at the Data Centre is a co-location, which the IHLs rent the space for server and other of computer hardware. It helps the IHLs to make the proper plan with the appropriate budget. Data Centre provider provide the building space, cooling, power, bandwidth, physical storage, physical security, with the minimum cost and complexity. The Malaysia Data Centre 2016 mention that Data Centre can predictable and operational expenditure model, provide additional capacity, can be rent with easy, quick and cheapest prices, provide better access to space and power, having experienced professionals to manage the data centre facility and a better road map for disaster recovery. The co-location facilitates is a retail rental business usually on term contract such as lockable rack cabinets, power in variety of format, network connectivity, cooling and real time live monitoring of all the functions for failures. Even the Data Centre have many advantages but to implement the data centre it is very costly to small Private IHLs. Private IHLs still to find other alternatives to reduce of the cost of buying infrastructures and cost of operations. However, the Data Centre of cloud service is the other another way to reduce the cost of network technology and infrastructure.

iii) Cloud Services Data Centre

The Cloud Services Data Centre is an off-premise that stores the data as a physical unit on the internet. The cloud services outsourced the conservation to the third-party cloud providers who perform all the updates and maintenance. Cloud providers use data centres has a cloud services and cloud based resources. Cloud provider enable a multiple data centres in several geographic locations to save data availability and to avoid other data centre failures. Cloud services is scalable to business need and can change the capacity amount of storage. For small Private IHLs, the cloud is a more cost-effective because it will be build an infrastructure from the ground up and will be responsible for own maintenance and administration[9].

Cloud services is revolution of the industry to manage the asset using Information Technology tools. The cloud is

quickly being adopted in numerous domains worldwide including healthcare, commerce and education. Recently cloud services is an invention with a huge to integrate between software and hardware components. It is most beneficial of IT revolution and enable to services across the world.

Cloud Services is a model for enabling ubiquitous, convenient, on-demand on network access to share a pool of configurable computing resources that can be quickly provided and released with minimal management effort by service provider and cloud services can provide[23] [24]:

- i. Ubiquitous network access, which functions in the presence of internet-enabled devices.
- ii. Location independent resource pooling, which does not require dedicated infrastructure to allocate resources.
- iii. Rapid elasticity, a characteristic component that enables the end users' to increase or decrease the capacity at will.
- iv. Pay per use, which charges the end users' a nominal fee based on their usage.

In moving to Cloud Services Data Centre as a network environment, the perception, business needs, strategy planning, cost saving, security and vendor/provider capability is the big challenges for Private IHL.

III. RESEARCH METHODOLOGY

The study involve mixed method approach quantitative and qualitative method. The mixed method is a combination of quantitative and qualitative, data collection, analysis, procedure and the inference at the end of the research [25]. First the previous study was been review. The preliminary study are been conduct to initial exploration of the problem related to the proposed quality review of previous study. Second is the data collection for statistical analysis due the some questions are only answerable via quantitative methods.

The aim is to identify the success factor elements of Cloud Services Data Centre for implementing the eLearning in Private IHL in Malaysia for purpose of developing the Cloud Services Data Centre Framework.

This research is work enclosed the questions that the result is for developing the framework. The pilot test was conducted to get the primary data. When the data collection using pilot test was completed it would be analysed using statistical tools.

The study will be testing eight hypotheses shown below:

H1: Main concerns in the perception has significant association with successful factor for implementing Cloud Services Data Centre at Private IHL.

H2: Benefit in the perception has significant association with successful factor for implementing Cloud Services Data Centre at Private IHL.

H3: Motivation in the perception has significant association with successful factor for implementing Cloud Services Data Centre at Private IHL.

H4: Business need has significant association with successful factor for implementing Cloud Services Data Centre at Private IHL.

H5: Cost saving has significant association with successful factor for implementing Cloud Services Data Centre at Private IHL.

H6: Security has significant association with successful of Cloud Services Data Centre implementing for Private IHL.

H7: Strategy Planning has significant association with successful of Cloud Services Data Centre implementing for Private IHL.

H8: Criteria of vendor or provider selection has significant association with successful of Cloud Services Data Centre implementing for Private IHL.

The pilot study will be distribute after the content validity, construct validity and estimating reliability terminology was been done. The populations consists of the Data Centre Experts at Data Centre cloud services that have an experiences in a few years handling the Cloud Services Data Centre. The survey of questionnaire will be used as a main data gathering instrument for this study.

IV. CONCEPTUAL STUDY AND PRILIMENAY STUDY

The study was show, from the previous study the important success factor elements was identify and some were repeated in many studies. The table shows the summary of success factor elements for Cloud Services Data Centre network environment get from the conceptual study.

Table 1: Summary the success factor elements for using Cloud services data centre from the literature review

Authors	Elements
Q. Zhang, L. Cheng, and R. Boutaba, [26]	Perception, business needs, security, cost saving, strategies, innovation
F. Sabahi,[27]	Perception, business need, cost saving, strategy, useful, security
NIST[9]	Business needs, security, cost saving, strategies
El-Sofany et al.,[28]	Security, cost saving, control, innovation
Falatah & Batarfi, [29]	Security, cost saving, strategies, useful, control

Authors	Elements
Mallu & Ezhilarasie,[31]	Perception, business needs, security, strategies
Frost & Sullivan [32]	Perception, business needs, security, strategy, control, vendor

After document analysis was review a few important element was identified. From the conceptual study, preliminary study was conducted. The preliminary study provides the groundwork study that covers in particular statements regarding the initial situation, opinion and problems. The goals is too achieved the combination of the research question, methodology and ways to proceed the research design. The preliminary study is to determine the validation of elements that reach out in conceptual study, before propose the Cloud Services Data Centre Framework.

The analysis shown by using the Cloud Services Data Centre there have many benefit for Private IHL to succeed in eLearning. Figure 1 shown the process of evaluation to getting the success factor that influence the successful of Cloud Services Data Centre onwards to propose Cloud Services Data Centre framework.

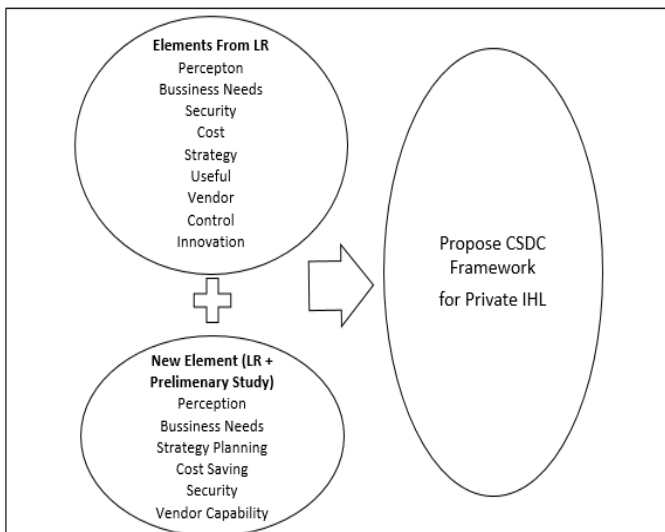


Figure 1: The success factor elements and propose the Cloud Services Data Centre framework

V. LIMITATION AND CONCLUSION

The selection of location for Private IHL as a case study for data collection is difficult because many of private and public institution at Malaysia still not move to cloud computing. There have a few IHL that use a Cloud Services Data Centre and the Data Centre Expert is limited. Thus for getting the more data in Cloud Services a few SME was identified because they have an expert and knowledge in using cloud services Data Centre.

As a conclusion, this paper discuss the successful elements implementing the eLearning using Cloud Services Data Centre at Private IHL in Malaysia. The findings hopes be able to

make a significant contribution to Private IHL and to produce the successfully implementing eLearning by using Cloud Services Data Centre at Private IHL in Malaysia.

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