



**Faculty of Information and Communication Technology**

**CLOUD COMPUTING ADOPTION MODEL FOR HIGHER  
EDUCATION: A COMPARISON STUDY BETWEEN MALAYSIA  
AND JORDAN**

**Morad Yousef Mohammad Othman**

**Master of Computer Science (Multimedia Computing)**

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**CLOUD COMPUTING ADOPTION MODEL FOR HIGHER EDUCATION: A  
COMPARISON STUDY BETWEEN MALAYSIA AND JORDAN**

**MORAD YOUSEF MOHAMMAD OTHMAN**

**A thesis submitted  
in fulfilment of the requirements for the degree of Master of Computer Science  
(Multimedia Computing)**

**Faculty of Information and Communication Technology**

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## DECLARATION

I declare that this project entitled "Cloud Computing Adoption Model for Higher Education: A Comparison Study Between Malaysia and Jordan" is the result of my own research except as cited in the references. The project has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : .....

Name : MORAD YOUSEF OTHMAN

Date : .....

## **APPROVAL**

I hereby declare that I have read this project and in my opinion this project is sufficient in terms of scope and quality for the award of Master of Computer Science (Multimedia Computing).

Signature : .....

Supervisor Name : Dr. MOHD HAFIZ ZAKARIA

Date : .....

## **DEDICATION**

I would like to present my work to those who did not stop their daily support since I was born, my dear mother and my kindness father. They never hesitate to provide me all the facilities to push me foreword as much as they can. This work is a simple and humble reply to their much goodness I have taken over during that time. Also to my brothers, sisters, my Grandfather, my Grandmother, my Aunt, my Uncle, friends and those entire how I love (Allah's bless all of them).

## ABSTRACT

Cloud computing is the solution for e-learning and social learning in Higher education. To provide these needs, this study identified the factors support for cloud computing adoption in Malaysian and Jordan Universities. In the cross-sectional study, respondents from 297 out of 1329 for Universiti Teknikal Malaysia Melaka, Malaysia and 175 out of 323 for Al-Zaytoonah University, Jordan. The objective of this study is to check the main effect and tested the technology, organization and environmental (TOE) factors toward cloud computing adoption in universities. The results show significant support for major effects based on the theory of the TOE theory. The results also show the buffered impact of technology, organization and environmental on cloud computing adoption with institution influence as mediator between them and predicted the level of the adoption increase in universities. Useful recommendations and future research direction.

## ABSTRAK

*Cloud computing merupakan penyelesaian untuk e-pembelajaran dan social pembelajaran dalam bidang pendidikan. Untuk menyediakan keperluan tersebut, kajian ini adalah pening untuk mengenal pasti faktor-faktor yang menyumbang ke arah cloud computing di Malaysia dan Universiti di Jordan. Kajian hirisan lintang, responden terdiri daripada 297 daripada 1329 Universiti Teknikal Malaysia Melaka, Malaysia dan 175 daripada 323 bagi Universiti Al-Zaytoonah, Jordan. Objektif kajian ini adalah untuk mengkaji kesan dan menguji teknologi yang digunakan dalam sebuah organisasi dan mengkaji faktor persekitaran (TOE) yang menyumbang ke arah cloud computing (adaption) yang digunakan di institusi pengajian tinggi awam. Hasil kajian menunjukkan sokongan penting untuk kesan-kesan utama yang mengikut teori TOE. Hasil kajian menunjukkan kesan logam teknologi, organisasi dan persekitaran pada cloud computing yang digunakan institusi mempengaruhi sebagai faktor pengantaraan di kalangan institusi pengajian tinggi awam. Cadangan yang sangat berguna untuk hala tuju penyelidikan pada masa hadapan.*

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background

“Cloud Computing refers to both the application is delivered as a service over the Internet and software systems and hardware in data centres, which provides the service” (Kumar and Murthy 2013). Gartner defines Cyber-style “computing as a topographic map at the cloud and IT-enabled capabilities are delivered as elastic services using Internet technology.” Cloud computing could be the technique that considered a new computing model that helped or allows users to temporarily use the computing infrastructure through a network, provided as cloud service providers may be one or more layers of an abstraction layer (Kumar and Murthy 2013).

Some specialists and traders characterize processing such as adaptation upgraded utility barely suitable virtual server cloud computing essentially through the Internet. Others go hold, any reason you eat outside a firewall "in the cloud," including custom outsourcing (Kumar and Murthy 2013). Processing may be similarly categorized as the use of that, taking into account the model of virtualization, where assets, basics, applications and information will be sent over the Internet as a cloud service spread by one or several service providers. The service is able to adapt at interest and may be estimated based on the salary of the use of each. Register can be categorized as, long-term to cloud computing as a utility to.



Through partnerships among universities, Governments and industries, researchers and the students have now proven their contributions leading to a transformed society and economically throughout the world (Mircea & Andreescu, 2011). Over the past few years the tendency been observed in the higher-education sector (Kumar and Murthy 2013), is the transformation of universities into research Universities and a continuous upgrading infrastructure of (information technology) as our basis for both educational and a scientific researching activity. With the rapid evolution of the technology, number of services are changing from the traditional form into a swift grow.

This particular form of services is providing bigger space of the cloud environment, using appropriate technologies, ensuring access a significant number of users, payment service that quickly and safely. Because of this aspect, at this point the University will be faced with a substantial increase of the cost of higher education, more than the rate of inflation (Kumar and Murthy 2013) and a decrease of University budgets, leading to pressure to find alternative ways to achieve their purpose, namely the education students and access research. In response to this pressure, Universities need to make changes to Services-oriented Web site and optimizing the effectiveness with efficiency of the internal operations on all the interactions with main stakeholders(Mircea and Andreescu 2011). The service orientations could be applied to the individuals (including the capabilities, characteristics and roles), of universities (with regards to culture, strategy, processes and structure,) also to technology (“according to semantics, applications, architecture and infrastructure modern institutions”).

In organizations, cloud computing SOA could be considered as an extension of subsidiary “service oriented architecture” (Mircea and Andreescu 2011) also an alternative IT used for educational environments, especially in the financial crisis state at present. In

this vein, it is significant identifying the factors influencing the cloud computing use standpoint, and the challenges faced by Universities.

## **1.2 Introduction**

The higher-Education sector plays an important role in the development of culture and scientific progress of the country. Higher-education sector has begun to modernize from centuries ago. The Universities plays an important role in the scientific and cultural development; and has their own section for students and faculty, which will help to solve the problem of the social, economic and political country (Mahmud, 2013). Higher Education is the key to the success of any State in the following section: scientifically, socially and economically. Higher Education can help the Government to improve the educational system and development. It can also stimulate economic development in the country. The University can play an important role in improving education in the field in: science, technology, business management training, administration & public renaissance society and the development of a procession took place in the world (Mahmud, 2013).

Computing allows the University to reduce costs and provide the technical infrastructure to the enterprise and the industry to develop cloud research. In addition, cloud computing enables the University to teach students, administrative staff and faculty a wide range of innovative ways to help them organize and challenging projects in the face and heavy workload. Permit processing and understudies for educators to use applications and sophisticated path without applications introduced in their PC, and access to document records from any PC with Internet Association. Computing in the cloud-higher education institutions provides access to infrastructure and content, as well as support for teaching and learning.

Furthermore, cloud solution has ability used to support education and social learning theory-oriented, by using computer technology that supported with teaching methods (Thorsteinsson et al., 2010). Computing provides many benefits to become e-learning by giving the platform, infrastructure and service's education directly over the cloud provider, using centralized data-storage virtualization and cloud monitoring data accessibility (Mircea & Andreescu, 2011). To achieve success within e-learning, the University must be using the system to determine the effectiveness the solutions provided to use e-learning between universities based on technique of the cloud.

Presently, there are lots of methods as well as types of using cloud computing, For instance, within smart phone, SMSs, Google drive and GPS, scientific and industrial fields, numerous Universities and colleges possess the ability to establishment factual computing lab with the different number for computers (Salleh, Teoh, & Chan, 2012). This allows universities to reduce IT spending (by reducing license requirements and software updates) and maintains own center data and improving the resources for studies and students.

On the other hand, the people of Jordan that was young, with 70% under the age of 30 and the literacy rate of 94%. Education system strong discipline and innovating starting in primary schools (i.e.: one laptop per child initiative), provides specific information and communication technology song choices to a high school diploma, and a variety of Advanced Degrees in information and communication technology and engineering at the University of Jordan. Jordan has been higher than university graduates in the field of Technology than any other countries in the region.

In a study on Cloud Computing in Higher Education in Jordan by Massadeh and Meslah (2013) it is proposed that universities Jordan considered thinking demand as a method to expand cloud Services Act and deal with tight spending plan in view of the very

limited money-related assistance from the Government. Scientists trust that registration will the system action plan to reach the University of Jordan, because they don't have sufficient assets to deal with the cloud support needed for repair, instructions and training examinations, should be given in an environment of perfect further education.

With development sought after innovation for data Administration, University of Jordan that was supposed to think about embracing as procedures to manage this demand gradually a variety. It is the success of efforts in order to issue spending cuts, distributed computing distributed computing can offer a plan of action to Jordan College given the fact that colleges mainly don't have enough assets and learn to deal with that important IT support for innovative courses, exercise works in the domain should be given qualified further education, while distributed computing is expected to dispose of such multifaceted by customers.

This study will talk about cloud computing acceptance in an institution of higher education Malaysia and Jordan to clean use of attractive chairs the nature and advantages of fix distributed computing innovation in higher education establishments.

### **1.2.1 Using Cloud Computing in Higher Education**

The actual possible as well as effectiveness associated with utilizing cloud computing within higher education may be identified by numerous colleges and universities. Cloud options may be used to support cooperative solutions and understanding as well as socially and scientifically, utilizing computer technologies that will help to develop ways of instruction in universities (Thorsteinsson et al., 2010). Cloud computing provides benefits for e-learning solutions by giving the actual and suitable infrastructure higher education, platform and educational services directly during the

providers of cloud and by utilizing virtualization, centralized information storage and facilities for information access monitoring (Mircea & Andreescu, 2011). In order to ensure success in e-learning, universities use metrics systems adapted to measuring the effectiveness of e-learning solutions based on the cloud.

Using Cloud Computing in higher education must be analyzed both from the benefits point of view, as well as from that of the risks and limitations. After the analysis, one or more models of Cloud Computing may be chosen to be used. The decision should look at the actual requirements and aligned with the university's strategy, the decision getting of utilizing Cloud Computing should also look at the dangers associated with non-implementing, but additionally the actual execution danger connected with the solution. Through applying the solution an increase which surpasses the administrative centre expenses as well as makes up the actual connected dangers should be acquired. Most of the dangers particular in order to cloud environment might be transferred to cloud providers.

According to Patterson (2010) might be can transfer several of risks specific to cloud providers of cloud environment. IDC Enterprise Panel conducted research for regards the implementation risks concluded the main issues that relate adoption within higher education are: availability, security and performance, insufficient capability to customize, concerned on-demand will definitely cost much more, getting back again in-house might be hard, regulating needs prohibit cloud and never sufficient main providers yet (Nist, 2011).

#### **1.2.1.1 Cloud computing in Malaysian Universities**

Despite the fact that innovation, the use of cloud computing is still young in Malaysian universities, there is a lot of focus and theoretical in addition wonder difficulty

while it framework University of Malaysia and the expected advantages of computing such as managing to adapt the difficulty of this cloud. Most of the findings under review in Malaysia focusing accessibility, access and data services and training in the University of Malaysia in distributed computing service. Namely as it that, standout among the difficulties most important in Malaysian universities are vast quantities of understudy information and data services required and data intended understudy training (Razak, 2009).

#### **1.2.1.2 Cloud Computing in Higher Education in Jordan**

At the University of Jordan, the difficulty that some way or another is not the same as Malaysian universities. Namely as it's emitted understudies and services a bit contrary and Malaysian universities. With this, the issue is not an issue that challenging to adservice at the University of Jordan; There are two major problems that lead to universities in Jordan to consider cloud computing, which will; reduce costs and provide accessibility services. For the most part, the framework in the Organization Jordan IT spending plans was low and issuance cash assets in Jordan. Furthermore, the universities that try to provide productive with at least cost (Samah, Massadeh, & Muhammad, 2013).

#### **1.2.2 Cloud Services in Higher Education**

Training pattern of "cloud computing" has been embraced with a lot of drive it organization. Microsoft, Google, Amazon and IBM have set up various activities to enhance basic education with basic learning device. Among the activities are free of charge with no expense. With the most up-to-date materials online, it is a little bit for the instructor to print materials that educate. Today, the alternative to get understudies has

homework projects, experience notes as well as another material on line through the cloud. Part of the main cloud administration in training described under.

#### **1.2.2.1 Microsoft Education Cloud**

Microsoft has been effective in creating instructions cloud facilities for instance "Microsoft Office 365". It provides college's free email, website by changing as well as storerooms, texting, web conference and 25 GB individual stockpiling (Jay, 2014). In addition, faculty and students will be capable to usage any browser to generate forms by usage "Microsoft Office (David, 2013)". A weakness into the side to Microsoft 365 is expenses. Whereas options can be achieved (contracts signed), month to month expenses each customer to get a component, for example, Mobile Office, PC or Mac Office applications, e-mail messages and voice unlimited capacity. An extra is due to failure to insist on the Microsoft guarantee 99.9% uptime without expenses month to month (Jay, 2014).

#### **1.2.2.2 Google Education Cloud**

Google Applications for tutoring is one of the greatest used app like it does not contain the real charge"(Jay, 2014)". It's open with no charge shrouded. Between the components that combine e-mail cloud, 30 GB stockpiling, facilitate, conduct and coordinated efforts of the word device (Google, 2015). Google is promising Microsoft can afford. At the point when contrasted with Microsoft Office Suite, there is recognition at the time with a variety of items, for example, Google Gmail, and schedule. In each case, the basic weakness is that it needs its clients to take (or generate) "a Google account". It is mandatory for mature people between 13 years and under to gain parental permission.

### **1.2.2.3 Earth Browser**

Programming of Earth browser virtual world has been created by the product of the month. It is accessible online as application sparkle or introduce locally as application (browser Earth 2015a). It focuses on geophysical data show essentially, for example, climatic, vibration etc. This shows the Earth as a satellite picture. Programs of the earth can be used as part of the constant. It shows the items in the three-dimensional model with happy going for and data redesigns (Earth browsers, 2015b). Representatives on earth that is provided along with information that is said to be accurate. Items can be pivoted and zoomed to the given.

### **1.2.2.4 Socratica**

Socratica produce video high quality education for people of all ages (Socratica, 2015). Video high definition is developed, clear, simple and attractive. "Socratica" collect as well as organize the finest open learning video to be subjects that can be usage by the user. The task was toward arrange video Socratica education. So, this can be usage through the browser to generate an optimal education practises. Also they have limited video appropriate for ages with different channels in YouTube.

### **1.2.2.5 Virtual Desktops**

In "computing, virtual desktop", identified as one of the faces of other users that can provide users through a virtual space atmosphere desktop computer by the use of software applications installed on the material computer users" (VMware, 2015)". Overall, there are double approaches to extend practical on screen. The virtual desktop may allow the customer to make a duplicate virtual desktop they can change. This should be done with