

HUMAN FACTORS PERSPECTIVE ADOPTION OF CLOUD-BASED
APPLICATION IN HIGHER EDUCATION AMONG STUDENT IN UTM

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I would like to dedicate this thesis to my Father and specially My beloved Mother,
for her endless supports and encouragements.

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ABSTRACT

Adoption of cloud based applications as a new trend in the field of IT and technology, and identification of key factors influencing this adoption process is of high importance. Currently, dedicated studies on the phase of adoption process in educational domains based on the cloud based applications was not paid attention, and works in this domain are very limited. Moreover, despite of several frameworks offered in the technological aspects and security issues, no suitable framework is offered. In this study, role of human factors as one of the factors influences the adoption process of cloud based applications among students of Universiti Teknologi Malaysia has been examined. The research aims to identify the human factors influencing the cloud based applications adoption in higher education setting, and evaluate the level of impact for each candidate factor on the dependent factor variable. Random sampling and questionnaire method were used to examine the propositions of the study. For a valid methodological background, a modified version of the common Technology Acceptance was used. Factor analysis and Validation tests of sample data; regression and ANOVA analysis were performed to evaluate and model the relationship of the impacts, respectively. The outcome of analysis indicates that the acceptance of cloud based applications in a higher education section such as UTM can be explained and predicted by different human factors and predictors. The data collection method of this study was questionnaire and the findings of this study indicates that some human factors such as Exposure, Motivation and Self-Efficacy can have high impact to this adoption process significantly. The results also revealed useful information for address this issue and eventually a model fit for the adoption of cloud based applications based on human factors in higher education was offered

ABSTRAK

Penggunaan ‘cloud based application’ (CBA) adalah satu trend baru dibidang IT, dan pengenalpastian kunci utama yang mempengaruhi proses peralihan ini adalah amat penting. Sekarang ini, kajian khas dalam fasa proses peralihan dalam domain pendidikan kurang mendapat perhatian, dan hasil kerja yang ada adalah terhad. Walaupun terdapat beberapa rangka kerja dari aspek teknologi dan isu keselamatan, namun masih tiada rangka kerja yang sesuai. Dalam kajian ini, faktor insan yang merupakan salah satu faktor yang mempengaruhi proses peralihan penggunaan CBA di kalangan pelajar Universiti Teknologi Malaysia telah dikaji. Matlamat kajian ini adalah untuk mengenalpasti faktor insan yang mempengaruhi peralihan penggunaan CBA dalam persekitaran pengajian peringkat tinggi, dan menilai tahap impak setiap faktor yang ada terhadap pembolehubah ‘factor variable’. Keadaah persampelan rawak dan jujuran soal selidik telah diguna pakai dalam kajian ini. Untuk asas kaedah yang baik, Technology Acceptance biasa yang diubah digunakan. Analisa faktor dan ujian pengesahan sampel data, regresi dan analisa ANOVA dijalankan untuk mengkaji dan membentuk hubungan impak-impak yang ada. Hasil kajian menunjukkan penerimaan CBA di peringkat pengajian tinggi seperti UTM boleh dihurai dan dijelaskan oleh beberapa faktor insan. Kajian ini yang menggunakan kaedah pengumpulan data secara jujuran soalan soal selidik mendapati faktor insan seperti Exposure (pendedahan), Motivation (motivasi) dan Self efficiency (kewibawaan diri) mempunyai impak yang besar terhadap proses peralihan penggunaan CBA ini. Hasil kajian ini juga memberi maklumat berguna untuk menangani isu CBA dan seterusnya membentuk satu model yang membawa kepada penggunaan CBA berasaskan faktor insan di peringkat pengajian tinggi.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Cloud computing as the latest trend in the area of Information Technology and has gained a major attention during the last couple of years. In general, it is the use of computing resources delivered as services over network. It has been used in many different domains and defined in various ways. Cloud computing enables users to utilize different services without the knowledge or control over the technology infrastructure which supports them. Hence it can be literally named as the service is “on the cloud” (*PT Jaeger, 2008*).

Since Cloud Computing has been introduced, many studies tried to provide a conceptual definition for this trend. In addition, several other studies have been done to highlight its advantages, and many other tried to challenge the consequences of its implementation such as security threads and abuses. Nonetheless, none to date has looked at its implementation and Adoption in higher education domain. The purpose of this work to is to identify and examine the factors influencing the Adoption of Cloud Computing in higher education setting, and offer a sustainable framework for this issue (*Behrend, T.S. et al., 2011.*)

1.2 Problem Background

Since 1960 that the concept of Cloud Computing was offered by telecommunication companies, several organizations contributed in the effort of its Adoption in various domains from none to small and small to larger scale (*Janakiram, 2010*). Amazon as the leading company played a vital role in introducing this trend. Afterward, Google and IBM started to migrate to this platform and several remarkable universities adopted it. It is obvious that Cloud Computing is becoming an adoptable technology for many of organizations with its dynamic scalability and usage of virtualized resources as a service through the Internet. It will likely have a significant impact on the educational environment in the future either as several universities had made some attempts on this adoption, and few cloud based applications useful in higher education level have been developed respectively.

Parallel to all the efforts made for definition, implementation and adoption of cloud computing, some frameworks and strategies have been offered (*Buyya, 2009*). While each proposed instruction and guideline had its own strengths and weaknesses, some studies for identification of factors- mainly technological- influencing the adoption process seeking for the most proper and suitable model have been done. Nonetheless, works in this area have been limited to small businesses; and the proposed models are just covering few aspects of this phenomenon (*Chorafas, 2011*). In this work, it was tried to cover a broader aspects of cloud based applications' adoption rather than only being limited to the technological aspects.

Moreover, despite of several studies on implementation of Cloud Computing in organizations have been done, unfortunately, few studies on adoption of cloud computing in higher education and acceptance of this new trend in higher education level are performed, and almost no suitable platform for such area is provided (*Vouk, 2008*).

On the other hand, despite of several factors playing roles in Cloud Computing Adoption and deployment, technological factors (such as security) are receiving increasing focus rather than the others while human factors have been paid very limited attention comparatively (*Shimba, 2010*). In addition, role of human factors in adoption of cloud computing has not been clearly stated in any study; and a no model analysis to identify its importance for this issue was not yet proposed.

In this work, considering the adoption of cloud computing in the higher education setting as our scope of study, role of human factors and their impact on the adoption of cloud based applications will be studied.

1.3 Research Questions

The research questions of the study are as follow:

- What are the main human factors influencing cloud-based application adoption in higher education domain?
- What is the model for adoption of cloud-based applications in UTM with regard to human factors?
- What are the recommendations to UTM for better adoption of the cloud-based applications with regard to human factors dependency?

1.4 Objectives

The objectives of the study are as follow:

- To identify the human factors in adoption of cloud-based application in higher education setting.
- To develop a suitable framework for adoption of cloud-based applications in higher education domain with reference to human factors.
- To provide recommendations for adoption of cloud based applications in higher education setting.

1.5 Scope of Study

This study focus on the adoption of cloud based applications in the higher education setting, and the acceptance of cloud-base applications by students in universities will be discussed respectively. Human factors as one of the parameters with impact on this matter will be analyzed. The method of the data collection for this research is based on questionnaires. Questionnaires identifying the impact of important human factors will be randomly distributed between the students of Universiti Teknologi Malaysia (UTM) as the case study of this research. The appealed results will be analyzed respectively.

1.6 Significant of Study

Academic research on the adoption of cloud based applications in the domain of higher education is minimal, and still no reliable and suitable framework for this

deployment is provided. On the other hand, the major studies for adoption of cloud based applications are dedicated to technological and non-human factors and few works on the human factors have been made. By identification of human factors contributing in cloud based applications adoption in higher education setting, and providing a comprehensive analysis of their impact on this issue, a reliable framework and model can be provided which can be a great approach -useful to students and deplorers- in this area.

1.7 Organization of Chapters

In this chapter as the introduction to our study, a brief and clear overview of the current problem which will be discussed in this work is presented. In chapter 2, a comprehensive literature review on the definitions, principles and comparative studies will be as followed. In chapter 3, the methodology used in this study will be then presented, and our research framework will be defined in details. In chapter 4, the model development will be discussed in details. In chapter 5, the results of model comparison on our questionnaire's' outcome will be presented, and a comprehensive discussion on the results will be provided. In chapter 6, summary of the study will be presented and the final asses on our work will be provided.

1.8 Chapter Summary

At present, the movement to the cloud-base applications as a new technological trend in higher education has already started. Students as the main users of such services are one of the most elements of this migration. In this study, the adoption of cloud-base applications by students will be reviewed; and the role of human factors as one of the least considered issues in this area will be analyzed.

Using some models, it is tried that at the end of this research work, a suitable framework for adoption of cloud-base applications in higher education level will be provided.

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