

The copyright © of this thesis belongs to its rightful author and/or other copyright owner. Copies can be accessed and downloaded for non-commercial or learning purposes without any charge and permission. The thesis cannot be reproduced or quoted as a whole without the permission from its rightful owner. No alteration or changes in format is allowed without permission from its rightful owner.



**ELECTRONIC INFORMATION SHARING MODEL FOR YEMEN
EDUCATION SECTORS BASED ON LAYERED BEHAVIOUR MODEL**

EMAN YAHYA OTHMAN MAAROF



**DOCTOR OF PHILOSOPHY
UNIVERSITI UTARA MALAYSIA
2020**



Awang Had Salleh
Graduate School
of Arts And Sciences

Universiti Utara Malaysia

PERAKUAN KERJA TESIS / DISERTASI
(*Certification of thesis / dissertation*)

Kami, yang bertandatangan, memperakukan bahawa
(*We, the undersigned, certify that*)

EMAN YAHYA OTHMAN MAAROF

calon untuk Ijazah **PhD**
(*candidate for the degree of*)

telah mengemukakan tesis / disertasi yang bertajuk:
(*has presented his/her thesis / dissertation of the following title:*)

"ELECTRONIC INFORMATION SHARING MODEL FOR YEMEN EDUCATION SECTORS BASED ON LAYERED BEHAVIOUR MODEL"

seperti yang tercatat di muka surat tajuk dan kulit tesis / disertasi.
(*as it appears on the title page and front cover of the thesis / dissertation.*)

Bahawa tesis/disertasi tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan, sebagaimana yang ditunjukkan oleh calon dalam ujian lisan yang diadakan pada : **05 Ogos 2019.**

That the said thesis/dissertation is acceptable in form and content and displays a satisfactory knowledge of the field of study as demonstrated by the candidate through an oral examination held on:
August 05, 2019.

Pengerusi Viva:
(*Chairman for VIVA*)

Assoc. Prof. Dr. Fauziah Baharom

Tandatangan
(*Signature*)

Pemeriksa Luar:
(*External Examiner*)

Prof. Dr. Husnayati Hussin

Tandatangan
(*Signature*)

Pemeriksa Dalam:
(*Internal Examiner*)

Assoc. Prof. Dr. Azizah Hj Ahmad

Tandatangan
(*Signature*)

Nama Penyelia/Penyelia-penyelia:
(*Name of Supervisor/Supervisors*)

Prof. Dr. Huda Hj Ibrahim

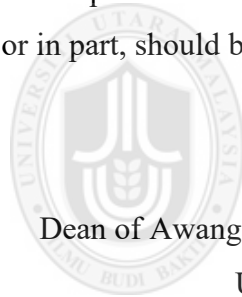
Tandatangan
(*Signature*)

Tarikh:
(*Date*) **August 05, 2019**

Permission to Use

In presenting this thesis in fulfilment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the Universiti Library may make it freely available for inspection. I further agree that permission for the copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence, by the Dean of Awang Had Salleh Graduate School of Arts and Sciences. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to:



Dean of Awang Had Salleh Graduate School of Arts and Sciences
Universiti Utara Malaysia

UUM College of Arts and Sciences

Universiti Utara Malaysia

06010 UUM Sintok

Abstrak

Perkongsian Maklumat Elektronik (EIS) ialah bukti kemajuan ICT yang menyokong transaksi seharian dan pembuatan keputusan termasuk di dalam sektor pengajian tinggi. Di dalam sistem pendidikan di Republik Yemen, perkongsian maklumat elektronik (EIS) ini memberi faedah kepada Pusat Teknologi Maklumat Yemen (YCIT-HE) dan universiti awam Yemen untuk menikmati manfaat dan keuntungan dari pelbagai aspek seperti menggalakkan ketepatan maklumat dan masa, di samping menyediakan perkhidmatan pantas, dengan kadar potongan kos untuk pelajar dan kakitangan universiti awam Yemen. Walaupun menikmati perkongsian maklumat yang tinggi, namun masih terdapat perkongsian maklumat elektronik yang terhad antara universiti awam dan. Kekurangan ini menimbulkan kesukaran dan kelambatan untuk mendapat servis dan membuat keputusan. Kebanyakan kerangkakerja dan model yang lalu memberi fokus kepada EIS di dalam sektor kerajaan, manakala sangat sedikit yang fokus dalam sektor pengajian tinggi. Juga terdapat sangat minima penggunaan Model Tingkah Laku Berlapis (LBM) dalam kajian Perkongsian Maklumat dalam konteks memahami proses tersebut pada tahap berbeza dalam sesuatu organisasi. Oleh itu, kajian ini bertujuan untuk membangun model EIS berasaskan kepada Teori Pertukaran Sosial, Teori Perkongsian Maklumat dan Model Tingkah Laku Berlapis (LBM). Model ini menggabungkan faktor-faktor berkaitan individu, persekitaran, organisasi dan teknologi yang mempengaruhi EIS. Untuk tujuan pengesahan model, Structural Equation Modelling (SEM) telah digunakan. Persampelan Bertujuan digunakan untuk mendapat data termasuk dari kalangan dekan fakulti, jurutera bertanggungjawab kepada system, pengarah pusat computer, Naib Canselor universiti, dan pengurusan kanan universiti dan hal ehwal pelajar. Sebanyak 260 soal selidik diagihkan kepada enam universiti di Yemen melalui emel dan secara bersemuka, dengan 173 (66.53%) respon diterima semula Model memaparkan tiga dimensi dan 10 faktor berpengaruh yang boleh meningkatkan perkongsian maklumat elektronik di antara universiti awam Yemen dan YCIT-HE. Faktor Teknologi yang signifikan ialah Keupayaan IT, Kualiti Maklumat, Keserasian IT, Perkomputeran Awan, dan Media Sosial. Faktor Persekitaran termasuk Kepimpinan Peringkat Tinggi, Polisi dan Undang-Undang. Faktor Organisasi melibatkan Sokongan Pengurusan Atas, Kepercayaan Antara Agensi, dan Keupayaan Kewangan. Model ini boleh membantu pengurusan universiti dalam merancang dan mengurus hal ehwal teknologi, organisasi dan persekitaran universiti dalam usaha penambahbaikan dan peningkatan EIS di masa depan.

Kata kunci: Perkongsian Maklumat Elektronik, Teori Pertukaran Sosial, Teori Perkongsian Maklumat, Model Tingkah Laku Berlapis, Pengajian Tinggi Yemen.

Abstract

Electronic Information Sharing (EIS) is a proof of the advancement of ICT that supports daily transaction and decision making, including in the higher education sector. In the higher education system in the Republic of Yemen, EIS brings benefits to the Yemen Center for Information Technology in Higher Education (YCIT-HE) and Yemen public universities in many aspects including enhancing information accuracy and timeliness while providing fast services at minimal costs to students and employees of public universities. Albeit a high degree of information sharing, there are limited electronic information sharing between Yemen public universities and YCIT-HE. This limitation creates difficulties and delays in getting services and making decisions. The majority of the previous frameworks and models had concentrated on EIS in the government sector, while very few had focused on the higher education sector. There were also very minimum utilization of the Layer Behavior Model (LBM) in Information Sharing studies in the context of understanding the different situations of EIS at different levels of an organization. Thus, this study aims to develop an EIS model based on Social Exchange Theory, Information Sharing Theory and Layered Behavior Model (LBM). This model combines individual, environment, organization and technology factors which influence EIS. In order to validate the model, Structural Equation Modelling (SEM) was applied. A purposive sampling was applied to collect data involving deans of the faculties, engineers responsible for the system, Director of the computer centre, Vice-Chancellor of the University, the senior management of the universities, and the Student Affairs from each of these six universities. A total of 260 questionnaires were distributed to six universities in Yemen via email and face-to-face meeting with 173 (66.53%) returned response. The model demonstrates three dimensions and ten influential factors that can essentially increase the electronic information sharing between Yemen public universities and YCIT-HE. The significant technological factors include IT capability, information quality, IT compatibility, cloud computing, and social media. As for the significant environment factors, they include upper-level leadership as well as policy and law. Organization factors include top management support, interagency trust and Financial Capability. The model can assist the management of university in planning and managing technological, organizational and environmental aspects of the universities in their way forward to improvise and enhance EIS in the future.

Keywords: Information Sharing, Social Exchange Theory, Information Sharing Theory, Layered Behavior Model, Yemen Higher Education.

Acknowledgement

In the name of Allah, the Most Gracious and the Most Merciful. First of all, I would like to thank the Almighty Allah for His blessings in allowing me completing my study, and All gratitude returns to Allah the All-Mighty and Oft-Merciful who gives me strength, patience, ambition, devoted will and continual hard-work, and intellectuality to finish this thesis. I am truly indebted and do appreciate many persons and institutions that have encouraged me through this hard yet challenging journey. Whilst being grateful to all of them, I must register my gratefulness for some particular individuals.

I dedicate this work to myself, and the most important persons in my life; my mother and my father (Yahya Othman Maarof) for their continuous supported me encouragement, support and prayers, and I would like to thank my supervisor, Professor Dr. Huda Bt Hj. Ibrahim from the School of Computing, Universiti Utara Malaysia (UUM). Sincere thanks go to her for her relentless guidance during all the stages of my Ph.D study, also providing constructive comments that has helped me in leading this work to the right track without her assistance, encouragement, support, and valuable comments, the accomplishment of my research would have been more difficult. Besides, I would like to thank Dr. Mohammed Abdulameer Mohammed Al-Dabagh, who has guided me in every stage of the research process. I am praying to God to keep them from all harms.

My thanks and appreciation also go to my husband (Fahad Ahmad Al-Ghamdi), my sister, my brothers, my friends they have contributed in one way or another to help me complete this thesis successfully.

Finally, I would like to thank for staff in YCIT-HE and employees in public universities in Yemen for their encouragement, support, and patience that keep me moving forward in completing this study as without them, I could not have completed this study.

Table of Contents

CHAPTER ONE INTRODUCTION	1
1.1 Research Background.....	1
1.1.1 Higher Education Sector in Yemen	2
1.1.2 Usage of ICT in Higher Education Sector in Yemen.....	3
1.1.3 Electronic Information Sharing.....	5
1.1.4 Cloud Computing.....	7
1.1.5 Social Media	7
1.2 Problem Background.....	8
1.3 Problem Statement	12
1.4 Research Questions	15
1.5 Research Objectives	15
1.6 Scope of Study	16
1.7 Significance of Study	17
1.8 Organization of the Research	19
1.9 Summary	20
CHAPTER TWO LITERATURE REVIEW	22
2.1 Introduction.....	22
2.2 Electronic Information Sharing (EIS)	22
2.2.1 Models and Theories.....	23
2.3 Electronic Information Sharing in the Public Sector	26
2.3.1 Benefits of Electronic Information Sharing in Public Organizations	27
2.4 Electronic Information Sharing Barriers in Public Sector	28
2.4.1 Organizational Constraints.....	29
2.4.2 Information Constraints	29
2.4.3 Managerial Constraints and Cost	30
2.4.4 Technological/Performance Constraints	30
2.5 Previous Studies of Electronic Information Sharing in Developed Countries.....	32
2.5.1 Electronic Information Sharing in the United Kingdom.....	32

2.5.2 Electronic Information Sharing between State and Local Government in the US	37
2.6 Previous Studies of Electronic Information Sharing in Developing Countries ...	42
2.6.1 Electronic Information Sharing in China	42
2.6.2 Performance of Government to Electronic Information Sharing.....	45
2.6.3 Interdepartmental Information Sharing Practice in Electronic Government Agencies in Malaysia.....	47
2.6.4 Electronic Information Sharing in Iraqi Universities.....	51
2.6.4.1 Electronic Information Sharing Characteristics	52
2.6.4.2 Technological Characteristics	52
2.6.4.3 Organizational Characteristics.....	53
2.6.4.4 Environmental Characteristics.....	54
2.7 Research Gaps	55
2.8 Background about the Republic of Yemen	60
2.8.1 History of Yemen Higher Education	61
2.8.2 Information Communication Technology in Yemen.....	62
2.8.3 Information Communication Technology in Yemen Higher Education....	64
2.8.4 Yemen Center for Information Technology in Higher Education (YCIT-HE).....	67
2.8.5 Sharing General Information between YCIT-HE and Public Universities	68
2.8.6 YCIT-HE Services to Public Universities:	70
2.9 Operational Database	75
2.10 Platforms	76
2.10.1 What is Cloud Computing?.....	77
2.10.2 Using Cloud Computing in Higher Education.....	77
2.11 Social Media.....	81
2.12 Types of Social Media	82
2.12.1 Facebook (Social Networking Service)	82
2.12.2 Microblogging Service (Twitter)	83
2.13 Use of Social Media in the Public Sector.....	84
2.14 Theoretical Foundation of Adopting Electronic Information Sharing.....	85
2.14.1 Layered Behavioral Model (LBM)	86

2.14.1.1 Individual-level Layer	86
2.14.1.2 Team Level	87
2.14.1.3 Company Level	87
2.14.1.4 Project Level.....	87
2.14.1.5 Business Milieu	87
2.14.2 Social Exchange Theory	88
2.14.3 Information Sharing Theory	91
2.15 Conclusion	93
CHAPTER THREE THEORETICAL MODEL	94
3.1 Introduction.....	94
3.2 Challenges EIS between Yemeni public universities and YCIT-HE.....	94
3.3 Analytical Model Based on Layered Behavior Model (LBM)	95
3.3.1 External Environment Layer:.....	97
3.3.2 Organizational Layer	100
3.3.3 Individual Layer.....	104
3.4 Formulation of Hypotheses	107
3.4.1 External Environment Layer.....	108
3.4.2 Organizational Layer	109
3.4.3 Technological Layer	112
3.4.4 Individual Layer.....	117
3.5 Conclusion	120
CHAPTER FOUR RESEARCH METHODOLOGY	122
4.1 Introduction.....	122
4.2 Research Design and Approach	122
4.3 Research Process.....	124
4.3.1 First Phase.....	124
4.3.2 Second Phase	124
4.3.3 Third Phase	125
4.4 Data Collection.....	127
4.5 Population and Sample.....	129
4.6 Required Sample Size	130

4.7 Questionnaire Design	132
4.8 Reliability of Questionnaire	134
4.9 Validity of Questionnaire	135
4.10 Pilot Study	136
4.11 Conclusion	139
CHAPTER FIVE DATA ANALYSIS AND RESULTS	140
5.1 Introduction	140
5.2 Data Analysis	140
5.3 Survey Instrument Response Rate and Data Collection Process	142
5.4 Demographic Profile of Respondents (Questionnaire Part 1).....	143
5.5 State of Electronic Information Sharing Practices (Questionnaire Part 2)	145
5.5.1 Use of Electronic Devices.....	146
5.5.2 Percent of Information Shared Electronically between University and YCIT-HE	151
5.5.3 Years of Information Shares Electronically between University and YCIT- HE	152
5.5.4 Type of Information that Public Universities Shared	153
5.6 Descriptive Statistics Analysis (Questionnaire Part 3)	155
5.7 Normality and Outliers.....	157
5.7.1 Histogram.....	157
5.7.2 P-P plot.....	163
5.7.3 Outliers.....	172
5.8 Reflective Measures Reliability	172
5.9 Reflective Measure Validity	176
5.10 Formative Measure Validity	181
5.11 Second-Order Model Assessment.....	182
5.12 Hypothesis Testing.....	186
5.13 Conclusion	192
CHAPTER SIX DISCUSSIONS AND CONCLUSION	193
6.1 Introduction	193
6.2 The Study Achievements	193

6.2.1 Current Issues of EIS	194
6.2.2 External Environment Layer:.....	199
6.2.3 Organizational Layer	200
6.2.4 Technological Layer	202
6.2.5 Individual layer	206
6.3 Theoretical and Practical Contributions.....	208
6.3.1 Theoretical Contribution	209
6.3.2 Practical Contribution	211
6.4 Future Work	213
6.4.1 Geographical Extension for Research.....	214
6.5 Conclusion	217



List of Tables

Table 2.1 Factors Influencing Information Sharing in the previous study	57
Table 2.2 Method and Barriers for Exchange Information between YCIT-HE and Public University.....	70
Table 2.3 Illustrates previous studies that deal with cloud computing in E-learning:	79
Table 2.4 Examples of Researches about Social Media in the Public Sector	85
Table 3.1 Influence factors of external environmental	98
Table 3.2 Influence factors of the organizational layer.....	101
Table 3.3 Influence factors of Technology layer	103
Table 3.4 Influence factors of Individual layer	105
Table 4.1 Research Process.....	125
Table 4.2 Sample size based on the population size	131
Table 4.3 Operationalization of the Factors and Items	133
Table 4.4 Cronbach's alpha and number of items.....	138
Table 5.1 Sample Study Response Rate.....	143
Table 5.2 Demographic Profile of Respondents	144
Table 5.3 Type of Information that Public Universities Shared	154
Table 5.4 Descriptive Statistics of the Constructs	155
Table 5.5 Reflective Constructs Reliability	175
Table 5.6: Outer Loading and AVE for Constructs	176
Table 5.7: Constructs Correlation Matrix	179
Table 5.8: Hetrotrait-Monotrait Ratio of Correlation (HTMT)	180
Table 5.9: Formative Constructs Multi-Collinearity.....	181
Table 5.10: Relationship between First-Order and Second-Order Constructs.....	185
Table 5.11: List of Hypotheses	187
Table 5.12: Path Coefficients.....	189

List of Figures

Figure 2.1: A theoretical model for interagency information sharing (Dawes, 1996)	24
Figure 2.2. An expanded model of information sharing among the agencies (Landsbergen & Worken, 2001)	25
Figure 2.3. The concept of information sharing between organizations (Gil-Garcia et al., 2010).....	26
Figure 2.4. Electronic information sharing in Local Government Authority (Bigdeli et al., 2013).....	36
Figure 2.5. Theoretical Framework of EIS among the agencies (Akbulut, 2011).....	37
Figure 2.6. Model of influencing factors on G2G information sharing (Jing, Pengzhu & Yen, 2014).....	47
Figure 2.7. A conceptual framework for interdepartmental information sharing within EG Agencies in Malaysia is constructed (Kamal, Singh & Ahmad ,2012)....	48
Figure 2.8. The network called YEREnet. (Ministry of Higher Education and Scientific Research, 2006)	63
Figure 2.9. University's information system (Kudrass, 2006).....	65
Figure 2.10. Yemen Higher Education Management information system (YHEMIS)	67
Figure 2.11. Website Yemen Center for Information Technology in Higher Education (YCIT-HE).....	68
Figure 2.12. Process exchange information between YCIT-HE and public University	69
Figure 2.13. One example from the service (University Network).....	72
Figure 2.14. The Online Application Service (OAS).....	73
Figure 2.15. The process exchange information about the registration student between YCIT-HE and public universities	74
Figure 2.16. Stages of the shift to the Internet to cloud	77
Figure 2.18. Illustrates the impact of second-generation Web on the public sector ..	84
Figure 2.19. The layered behavioral model of software development.....	87
Figure 3.1. The Model of this study (The Foundation Model)	96

Figure 3.2. The dependent and independent variables.....	120
Figure 5.1. Phone Line / Mobile Usage	147
Figure 5.2. E-Mail Usage	147
Figure 5.3. Website Usage	148
Figure 5.4. Facebook Usage.....	149
Figure 5.5. WhatsApp Usage	150
.....	151
Figure 5.6. The Use of Electronic Devices to Share Information between Universities and YCIT-HE.....	151
Figure 5.7. Percent of Information Shared Electronically between University and YCIT-HE.....	152
Figure 5.8. Years of Information Shared Electronically between University and YCIT-HE.....	153
Figure 5.9. Histogram of Upper-level leadership	158
Figure 5.10. Histogram of Law and Policy.....	158
Figure 5.11. Histogram of Top Management Support.....	159
Figure 5.12. Histogram of Financial capability	159
Figure 5.13. Histogram of Trust.....	160
Figure 5.14. Histogram of IT capability.....	160
Figure 5.15. Histogram of IT Compatibility	161
Figure 5.16. Histogram of Information quality.....	161
Figure 5.17. Histogram of Social media	162
Figure 5.18. Histogram of Cloud computing	162
Figure 5.19. Histogram of Benefits.....	163
Figure 5.20. Histogram of Information stewardship.....	163
Figure 5.21. P-P plot of Upper-level leadership	164
Figure 5.22. P-P plot of Law and Policy.....	165
Figure 5.23. P-P plot of Top Management Support.....	165
Figure 5.24. P-P plot of Financial capability	166
Figure 5.25. P-P plot of Trust	167
Figure 5.26. P-P plot of IT capability	167
Figure 5.27. P-P plot of IT Compatibly	168

Figure 5.28. P-P plot of Information quality.....	169
Figure 5.29. P-P plot of Social media	169
Figure 5.30. P-P plot of Cloud computing	170
Figure 5.31. P-P plot of Benefits.....	171
Figure 5.32. P-P plot of Information stewardship.....	171
Figure 5.33. Measurement Model with Constructs and Indicators	173
Figure 5.34. Measurement Model with Factor Loading	174
Figure 5.35: Measurement Model A-1: Direct relationship between First-order and Second-order External Environment layer.....	183
Figure 5.36: Measurement Model A-2: Direct relationship between First-order and Second-order Organizational layer	183
Figure 5.37: Measurement Model A-3: Direct relationship between First-order and Second-order Technology layer	184
Figure 5.38: Measurement Model A-4: Direct relationship between First-order and Second-order Individual layer.....	185
Figure 5.39: Structural Model with Path Coefficient.....	189
Figure 5.40: Structural Model with T-Values	190
Figure 6.1. The suggested factors of electronic information sharing.....	197
Figure 6.2. A summary of the survey.....	198

List of Appendices

Appendix A Questionnaire	247
Appendix B Official Letter	260
Appendix C Interview Questions.....	262
Appendix D Discriminant Validity Results.....	270
Appendix F Questionnaire Submission.....	285



List of Abbreviations

EIS	Electronic Information Sharing
YCIT-HE	Yemen Center Information Technology Higher Education
LBM	Layerd Bahavior Model
MOHESR	Ministry of Higher Education and Scientific Research



List of Publications

Mohammed, M. A., **Maroof, E.**, Huda, I. and Thamir, (2015). **What are the Electronic Information Sharing Factors that Influence the Participation Behavior of Employees in Higher Education?** *Journal of Procedia Computer Science*, [Published].

Mohammed, M. A., **Maroof, E.**, Huda, I. and Thamir, (2015). **Can or Can not? Electronic information sharing Factors Influence the Behavior**, The 2nd Innovation and Analytics Conference & Exhibition, Alor Setar, Kedah, Malaysia.

Mohammed, M. A., Huda, I. and **Eman Y.**, (2016). Electronic Information Sharing Barriers in Higher Education Sector, International Conference on Computer Science, Engineering and Technology. will be published in Scopus Journal

Y. Eman and Huda , (2016). **Advanced Technological Factors of Information Sharing for Government Organizations.** *Journal of The Social Sciences*, 11: 4295-4300. [Published]

Y. Eman and I. Huda, (2018). **Electronic Information Sharing in Transforming the Provision of Education Services to the Yemeni Public Universities.** *Journal of Engineering and Applied Sciences*, 13: 2330-2338. [Published]

Eman.Y., and Huda, I. (2017) Factors Influencing Success of Increasing Participation in Using Electronic Information Sharing between a Yemen Ministry and University. 5th International Conference on Research & Innovation in Information Systems, ICRIIS, IEEE, Langkawi, Malaysia.

Eman.Y., and Huda, I. (2017) Electronic Information Sharing Between Yemen Public Universities and Yemen Center Information Technology Higher Education (YCIT-HE). International Conference on Science and Technology PICOST 2017, Penang, Malaysia.

CHAPTER ONE

INTRODUCTION

1.1 Research Background

Information being an important and strategic asset of businesses is a pertinent factor in delivering public services to people, organizations and businesses. (Bigdeli, 2012). It plays an important role for stockholders (for instance customers, private and public sectors) in which there is a huge need to transfer this information among them. The adoption of Information and Communication Technologies (ICT) was initiated to speed up the transfer and exchange of information in government organizations (Stahl, 2019) as well as between government agencies and public and private sectors. Electronic information sharing (EIS) appear to be the best way that provides the public sector with the information at the accurate location and time as well as at the cheapest rate (Bigdeli, Kamal and de Cesare, 2013). Electronic information sharing (EIS) is an important asset to support decision-making and provide better services in any public organization in general or in a public university more specifically. These organizations are applying a reasonable amount of money to build an excellent sharing environment, especially in developing countries. For example, in Yemen, public universities are looking forward to providing technical support with low costs and high-speed internet so as to allow the exchanging of data and information (e.g., text, sound, video, graphics and so on) both inside and outside of the university (Alhamassy, 2012). The studies by Alsurori and Salim (2010) and Alhamassy (2012) have indicated the importance of higher education institutions or universities to provide better and higher quality education for students while delivering better services to the staff and students of public universities. In this scenario, EIS is thus viewed as the mechanism or platform

for public universities in Yemen to improve information exchange and sharing among stakeholders, which inadvertently will upgrade the delivery of services and quality of education.

This chapter begins with the introduction of Higher Education in Yemen and the information sharing electronically in public sector. It follows a discussion on technologies supporting electronic information sharing, such as cloud computing and social media. With the concerns on issues faced in information sharing in the public universities, this chapter presents the research problems with the related research questions and research objectives. The chapter proceeds with the presentation of the research significance, importance, and usefulness, and finally the limitations and scope of the study.

1.1.1 Higher Education Sector in Yemen

In 1990, the Ministry of Higher Education and Scientific Research (MOHESR) was established in Yemen when the government felt the need for a specialized ministry to oversee the national and private universities and community colleges. Accordingly, expenditures on education increased over the years to expand educational institutions at different levels. This move had improved the educational situation in Yemen considerably.

The number of universities in Yemen rose considerably, from only two public universities (Sana'a & Eden) in 1990, to 15 universities in 2004 (Ministry of Finance, 2005; Ministry of higher education, 2006), 29 universities in 2008, and to 31 universities in 2012, of which ten are public universities (Sana'a, Aden, Taiz, Hodeida,

Hadhramaut, Dhamar, Amran, Ibb, Hijah and Al Mkala) and 21 are private universities. The number of faculties in the public universities thus increased from 14 to 180 (109 in the public universities and 71 in the private universities). In addition, the number of students has increased from 39,990 (in the two public universities) in 1990/1991 to 242,510 (188,145 in the public universities and 54,365 in the private universities) in 2007/2008, with female students making up a total of 30% (Alhamassy, 2012).

In 2004, an alliance was created between institutions of higher education and MoHESR which sanctioned a national ICT policy in association to higher education sector of Yemen. The main focus of ICT policy is on achieving strategic goals and plans that are aimed by the higher education institutions and MoHESR in Yemen. In addition, ICT policy also aims to consolidate the volume of higher education sectors throughout Yemen.

1.1.2 Usage of ICT in Higher Education Sector in Yemen

The Yemen Government has done some improvement in upgrading the higher education performance. This has been supported in the previous studies of (Alhamassy, 2012; Alsurori & Salim, 2009, Ministry of Higher Education and Scientific Research, 2006). In Yemen, ICT can be used to provide a stable platform to improve the information sharing electronically to increase the services and enhance the delivery mechanism (Alsurori & Salim, 2009; Alghushami, Zakaria, & Aji, 2018).

The higher education sector in Yemen needs to share its information electronically if it is to provide more information together with better services and to make a strategic

decision at the institutional level (Alghushami, Zakaria, & Aji, 2018; Alhamassy, 2012; Al-sultan, 2006; Ministry of Higher Education and Scientific Research, 2006).

For example, the MOHESR could strategically use ICT to improve the information sharing between the ministry and public universities. EIS can play an important role in providing services to the ministry, universities, their employees and their students in Yemen (Alsurori & Salim, 2009). Even though there is a need for EIS in the higher education sector institution, there is still a limited sharing of information electronically between public universities and the Ministry (Alsurori & Salim, 2009). For example, Yemeni public universities mostly share their information with the Yemen Center for Information Technology in Higher Education (YCIT-HE) through traditional methods such as using paper, fax, and email. These methods nonetheless present some challenges which make the higher education sector in general and YCIT-HE in particular face difficulties in receiving up-to-date information to deliver services effectively and efficiently to its staff, students, and the public sector. Rather than depending on the traditional method, the use of ICT could change the way in which information is shared and it could bring about better and faster results. This study intends to assess the possibility of extending the standard practices of paper, fax, and email to new technology, such as social media and cloud computing. This study focuses on electronic information sharing between the YCIT-HE and Yemen's public universities. The YCIT-HE is functioning under the MOHESR.

The e-services that MOHESR provided are web services, e-applying for students, e-learning and electronic management information system for the staff (Alhamassy, 2012). However, the vast growth in the higher education services field has

demonstrated the need for more information (UNESCO, 2011). Hence, the increment of EIS between the Yemen public universities of and MOHESR is very important (Alhamassy, 2012).

1.1.3 Electronic Information Sharing

The first definition of information sharing was given by Dawes (1996) as an "exchange of information among employees within and outside an organization or giving them access to information to provide effective decision making." Information sharing provides many benefits, such as providing high-quality services, enhancing the policy-making process, improving the overall decision-making process, creating a high-quality product, reducing the work process, developing the formulation, and implementing and evaluating the organization's policies (Yan et al., 2009). With the advances in ICT, electronic information sharing became a significant tool in the information exchange and played an important role in transferring information.

According to Akbulut, Kelle, Pawlowski and Schneider (2009), Electronic Information Sharing (EIS) is defined as the information being shared by using technologies such as websites, emails, mobile phones, intranets, extranets, shared databases, and so on. EIS has the perspective to support public organizations to augment performance alongside productivity, ameliorate policy-making and supply better public services to the citizens (Akbulut, 2003; Gil-Garcia et al., 2009). In public sector, three main contexts of EIS were highlighted by Akbulut et al., (2009): (a) intra-organizational sharing of information refers to personal sharing of information, (b) inter-organizational information sharing is defined as the information being shared

between at least two organizations and (c) inter-agency/department information sharing, which refers to information shared across departments inside an organization.

Electronic information sharing has two types of functions, which are horizontal functions and vertical functions. The difference is in terms of the scope covered. The vertical functioning information sharing refers to sharing information within the organizations starting from the top level to the bottom while horizontal information sharing means sharing information within organizations with the same level such as sharing information between local governments (Jing, Pengzhu & Yen, 2014). The purpose of this type of information sharing is the directives given by the top management, which will be followed and used by the lower management.

Electronic information sharing is based on sharing and accessing information from multi data sources, such as several databases, documents, images and text files. These multi data sources create challenges because of the limited accessibility and availability of information as well as unstructured uninterrupted information (Pardo & Tayi, 2007; Kamal, Singh & Ahmed, 2012; Bigdeli et al., 2013b). Moreover, the costs of providing software, hardware and training are also considered as huge challenges. These challenges open up for a possibility of using different technology or tools such as cloud computing services and also social media streams in order to increase EIS between YCIT-HE and public universities with a minimal cost.

1.1.4 Cloud Computing

Cloud computing delivers services, infrastructure, and software on demand through the networks and this tool offers luring incentives to the public sector (Manoharan & McQuiston, 2016). Some organizations in the public sector have made initiations towards cloud computing (Gupta & Badve, 2017). For example, the Ministry of Internal Affairs and Communications in Japan has proclaimed plans that by 2015 all government agencies will be converted into a private cloud environment.

Among of the most important cloud computing benefits for the public sector, is the ability to ease sharing information and ICT assets amidst several organizations that lead non-stagnant employees to gain from these applications. Given this scenario, the application can be accessible to workers anywhere with the use of smart devices (Youssef, 2013). Moreover, now many public universities in Yemen adoption of cloud computing. cloud computing decreases the cost of IT infrastructure maintenance and reduces (Alghushami, Zakaria, & Aji, ,2018) offers easy and quick access to information with more efficient and effective public sectors, especially in developing countries which do not have enough good technology, skilled workers, or assets to generate first-class ICT infrastructures. As a result, cloud computing may be more suitable for them (Pocatilu et al., 2009).

1.1.5 Social Media

Social Media is referred as “a group of Internet-based applications that are built on the technological foundations of the web which allow the creation and exchange of user-generated content” (Ho et al., 2013). Web-based and mobile applications allow people

to communicate and share their information across multiple platforms. Social media is rapidly growing and is now being adopted by many organizations. People make use of social media to talk about their day-to-day events and to pursue and/or share information (Hughes & Palen, 2009). Therefore, it has also added new dimensions to human interactions and relationships.

There are several types of social media streams, such as social networking, wikis, weblogs and discussion environments (Laroche et al., 2013). According to Lewis (2009), social media is composed of online social networking sites such as Facebook, LinkedIn, and Twitter, as well as miscellaneous blogs. During the past five years, Social Network Sites (SNS) have turned out to be one of the most important types of social platform. It is promoted by the Facebook applications that now have hundreds of millions of applicants. SNS are personal internet spaces for online discussions and chats, as well as the exchange of content (Selwyn, 2012). Use social media in Yemen are on the rise (International Monetary Fund, 2015). Higher education Institution in Yemen use social media offers the capability for managers, academic, staff and students to link with each other and form groups to socialize, share information, or to attain a common goal or interest. Social media can be endowing to its handlers since it provides them with a platform to access.

1.2 Problem Background

Previous researches have reported the limited usage of electronic information sharing (EIS) among public organizations in developed (Akbulut, et al., 2009; Bigdeli, Kamal & de Cesare, 2011; Jing et al., 2014) and developing countries (Kamal, Singh &

Ahmed, 2012; Ouma, 2014; Mohammed, Huda & Maslinda, 2014). The limitation of electronic information sharing brings a negative effect on public sector services (Estevez, Fillottorani & Janowaski, 2010; Yang & Maxwell, 2011; Kamal, Singh & Ahmed, 2012), and on the decision-making process in government organizations, which eventually leads to the wastage of time, services and money (Kamal, Singh & Ahmed, 2012; Bigdeli, Kamal & deCesare, 2013a). According to Kamal, Singh and Ahmed (2012); and Mohammed, Huda and Maslinda (2014), the implementation of EIS in public organizations faces challenges with regards to technological, organizational, environmental and behavioral issues. Higher education institutions might also share similar issues. However, according to Mohammed, Huda and Maslinda (2015), there are limited studies on EIS in the higher education sector in developing countries. This provides room for future researches to acquire more understanding on EIS in the higher education sector.

The limitation to share information electronically amongst government agencies could risk the safety and security of a country and its citizens, as well as other human lives. Disasters such as the Big Tsunami in 2004, the terrifying incident of September 11th in New York, and more other incidents including the Turkey Flood in May 2018, have illustrated excellent examples related to some limitations of information sharing among government agencies and other related entities. Information might not be efficiently and optimally shared with the public, which led to slow and unorganized actions when it came to helping them. As for the September 11th incident, many speculations emerged, including the kind of information received by the various agencies, how much the government agencies knew beforehand, and how fast

information could save or destroy lives. Rumors spread that some government agencies had actually received information about the terrorist attack, while other agencies were not aware of it (Akbulut, 2003; Atabakhsh et al., 2004; Jing & Pengzhu, 2007a, 2009; Akbulut et al., 2009; Abaas, Shibghatullah & Jaber, 2014). The situation could have been different and risks could have been mitigated earlier if relevant information had been electronically shared and actions quickly strategized.

EIS also addresses the issue of ICT infrastructure, which is essential for maintaining proficient and effective cooperation among higher education institutions which in turn allows for the accessibility of data and information resources. Previous studies had indicated technological barriers in electronic information-sharing among government organizations as the main challenge in this matter (Pardo & Tayi, 2007; Jing, Pengzhu & Yen, 2014). These technical barriers refer to the lack of IT capability, low information quality and poor IT compatibility (Pardo & Tayi, 2007; Bigdeli, 2012; Sayogo & Gil-Garcia, 2014).

One of the big challenges faced by the public sectors entail the use of multi-databases to store huge amounts of data and information, before and after being shared among them. Multi-databases generate technical incompatibility standards, such as, differences related to the data format, assortment of data definitions (Nash, 2008), standards of data transmission and the integration of information, as well as the quality of information in public sectors (Dos Santos & Reinhard, 2007). All these create several limitations, such as the potential lack of availability and accessibility, as well as seeing data and information be transferred immediately.

Like any other public organizations or institutions, the higher education institutions in the Republic of Yemen rely on information to help in decisions-making and operations. Communication with external entities is important in supporting the public universities.

Providing services with the support of EIS will create high impact results in the higher education sector in Yemen. However, using EIS without the enhancement of ICT is deemed to be rather complex (Alsurori & Salim, 2009). While technological barrier is the most obvious, this study decided to nonetheless focus on the technological point of view in order to solve the limitation of electronic information sharing in the Yemen higher education sector. Technological factors of EIS such as IT capability, information quality, and IT compatibility which could be the major barriers in higher education institutions in the Republic of Yemen, and thus were further investigated in this study.

In addition to technology, financial factors could be another aspect that can support fast information sharing. Information sharing and procedures in various departments are deemed to be highly expensive. Higher education institutions in Yemen also face financial capability barriers which could significantly affect barrier to the implementation of EIS. Unpredicted budget restraints are likely to influence the development of EIS projects (Kapur & Crowley, 2008).

Information sharing between the Yemen Center Information Technology Higher Education (YCIT-HE) and the public universities in Yemen mostly transpires with the help of fax machines. Some of the challenges include information was acquired not in

real time, which affects the decision making process (Alhamassy, 2012). Making a decision and acquiring services in public universities takes a longer time than expected, which could affect mutual approval from both side, YCIT-HE and universities. This, therefore, affects the learning process, student registration, or any requirement they need such as scholarship, all this while bringing about a negative effect on the administrative, teaching, and academic development. The lack of EIS between universities and YCIT-HE is considered a huge gap in the effort to increase the usage and exchange information among the universities.

1.3 Problem Statement

The Yemen Center Information Technology Higher Education (YCIT-HE) has adopted EIS in order to provide better services to public universities, including updating their services and facilitating in decisions making.

However, there exist some challenges in which not all the public universities in Yemen are able to perform EIS due to some challenges. However, not much have been reported about these challenges, especially on the dimensions and factors at the universities' level that have communication with YCIT-HE.

With the insufficient data to further support this study on Yemen situation of EIS, a preliminary study was conducted with the manager of YCIT-HE, Dr. Khaled ba Salim, on July 25th, 2014. The study gathered initial information regarding the current situation of the use of EIS between YCIT-HE and Yemen public universities. It is evidenced from this initial study that the barriers are connected to the environmental, technical, organizational and individual concerns. One significant challenge occurs

when different universities in different locations share vast amounts of data and information with YCIT-HE, as huge amounts of data and information which came in different formats and stored on different platforms. The multi-databases cannot provide compatibility standards for the information system and information quality among the organizations.

The second issue faced by the Yemeni higher education institutions is the lack of support (e.g training, facilities) from the top management in their institutions. The previous study of Al-Mamary et al. (2014) highlighted that some managements in public universities in Yemen do not encourage electronic information sharing. Moreover, higher education institutions need to restructure their environment so as to make it more flexible and suitable for new changes, and to be able to adopt new technologies (Alhamassy, 2012). Additionally, the manager of YCIT-HE said that the greatest challenge faced by higher education institutions is the lack of policies and rules to protect the employees while sharing their information electronically. The Yemeni higher education institution should be safe and trustworthy to encourage EIS among employees.

The other issue in this context is that the universities' employees do not have a clear view and understanding of what new technologies can contribute to the development of their institutions and their abilities. They believe that they can accomplish their work without technological support. Moreover, the staff considers information as power and they feel that the information belongs to them (they own it). This is consistent with a study by Alsurori and Salim (2010), which reveals that some of the problems EIS are partly due to the lack of understanding regarding its benefits of the

electronic information sharing. Therefore, there is a tendency that they are not willing to share the information as they don't want to lose that power or the social influence (Yang & Maxwell, 2011).

There are four notable issues that hindered EIS between YCIT-HE and public universities in Yemen. The first and the most influential factor is related to environmental aspects including policy constraints, legal limitations and leadership barriers. The second factor entails technological barriers including the lack of advanced technology, technological awareness, lack of ICT. The third factor is related to organizational issues including lack of top management support and financial constraints. The fourth factor is related to individual issues such as employees lack of understanding about the benefits using electronic information sharing between YCIT-HE and public universities in Yemen.

In summary, some challenges have arisen in the sharing of information between the Yemen Center Information Technology Higher Education (YCIT-HE) and the higher education institutions in Yemen. In providing services to Yemen public universities, not all the public universities are able to benefit from EIS due to several reasons. The lack of electronic information sharing between public universities and YCIT-HE is considered a huge gap in order to increase the use and exchange of universities' information.

1.4 Research Questions

The problems as discussed in the previous section point out three research questions that need urgent answers:

1. What is the current Issues of electronic information sharing with in Yemen public universities and YCIT-HE?
2. What are the factors which could be used to influence the participation of Electronic information sharing with in Yemen public universities and YCIT-HE?
3. What is the potential electronic information sharing model with in Yemen public universities and YCIT-HE?

1.5 Research Objectives

The primary aim of this study is to propose an electronic information model between public universities in Yemen and YCIT-HE. Thus, the following are a few research objectives which are to be fulfilled in a way to reach the primary aim:

1. To identify the current issues of electronic information sharing between Yemen public universities and YCIT-HE.
2. To determine the factors that will increase the electronic information sharing between Yemen public universities and YCIT-HE.
3. To propose a theoretical model of electronic information sharing between of Electronic information sharing between Yemen public universities and YCIT-HE.

1.6 Scope of Study

The primary focus of this study is the higher education sector in Yemen. This is, specifically, the "Yemen Center for Information Technology in Higher Education (YCIT-HE), a department under the Ministry of Higher Education and Scientific Research and public universities in Yemen. From 12 public universities in Yemen, this study will focus only on six public universities that are dealing with YCIT-HE. The selection of the education sector is based on several reasons. The education sector is one of the major institutions which contribute to any country's economy. The development and growth in other sectors are firmly connected with the development in the education sector and quality of the education services provided.

For this study, the scope is limited to those universities that have good interaction, communication, and sharing with YCIT-HE, such as Sana'a University, Aden University, and Dahmar University. On the other hand are those that have a lack of interaction communication and sharing with YCIT-HE, such as Ibb University, Taz University, and AlHodeidah University. Moreover, the study also focused on the participation of EIS among administrative staff in the presidency office of the university, the computer center, Student Affairs, and those also responsible for the system engineer. There is an understanding that these kinds of employees have a good idea and knowledge of the information sharing.

In the context of information sharing structure, this study was based on vertical functioning as well as inter-organizational information sharing, due to the intention to

explore the information-sharing scenarios at different levels between YCIT-HE and Yemen public universities.

The lack of electronic databases and networks in Yemen public universities has resulted in a lack of quality information for decision making (Alhamassy, 2012). The university's management mostly uses the manual (traditional) documentation systems to perform tasks and transactions, as well as to make decisions. They also used multi-separated databases to support the e-services that are provided to the university staff and students (Hamad & Asman, 2010; Abbas, 2012). On this aspect, the cloud computing platform is suggested instead of traditional databases due to the database limitation issues surrounding electronic information sharing. Therefore, this study will focus on cloud computing and social media as a potential factor in increasing the electronic information sharing between Yemen public universities and YCIT-HE.

1.7 Significance of Study

Electronic sharing of information can reduce the cost , save time, reducing the effort of sharing the information and improving services while increasing the effectiveness and efficiency in the public universities system in Yemen. Moreover, it improves the decision making so as to enhance the services provided by YCIT_HE for public universities in Yemen.

The Ministry of Higher Education in Yemen is one of the ministries that want to improve electronic information sharing so as to provide services for the public

universities. The findings of this study will be a significant effort to guide the future implementation of EIS in the Education sector.

The idea of providing excellent quality and efficient services in the public universities depends on the quality and availability of information. The public universities in Yemen will have difficulties in supplying high-quality services within a suitable timeframe if they have insufficient and inefficient information. Hence, the universities require the support of sufficient information, which can be accessed and shared at any time by using electronic devices.

Increase information in the universities can help and support their decision makers in order to make better decisions. Thus, the ability to make a better decision can provide a good environment which supports the universities to make better, quality and fast decision on their own. Moreover, increase information in the YCIT-HE can help the center to provide better services for public universities.

Therefore, this study determined the factors that increase electronic information sharing among YCIT-HE and the public universities. Consequently, a model proposed to improve electronic information sharing between YCIT-HE and public universities. This theoretical model identified the factors which positively and negatively affect electronic information sharing between the Yemen Center Information Technology in Higher Education and public universities. Therefore, the framework may serve as a roadmap for the Ministry of Higher Education to improve electronic information sharing between them.

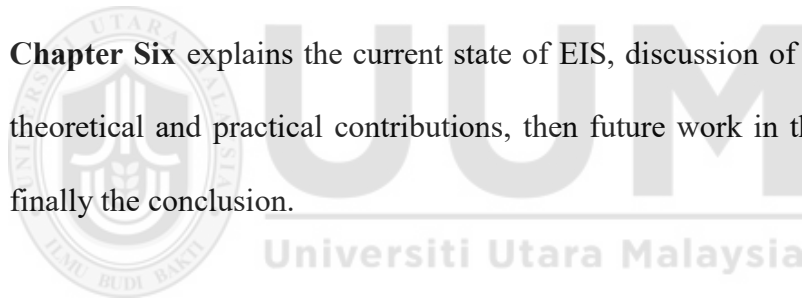
1.8 Organization of the Research

The flow of the thesis is as follows:

- **Chapter One** conveys an overview of this study. It describes the research background and outlines the problem statement, research question, research objectives, and the significance of this study, the limitations, and the scope.
- **Chapter Two** includes the background of Information sharing, electronic information sharing, the previous studies on the influence factors of electronic information sharing, cloud computing, cloud computing implementation in the higher education sector, information systems for universities, social media (including its implementation within in the higher education sector) and the framework of electronic information sharing. It also presents the social exchange theory and Information sharing theory too.
- **Chapter Three** describes the theoretical research model of the study, explains the four layers of the theoretical model (environmental layer, organizational layer, technological layer, and individual layer), including the comparison of the electronic information sharing influence factors, and additionally includes the twelve hypotheses which have been examined. It also later explains the dependent and independent variables.
- **Chapter Four** describes the research methodology that will be used in this study, the research process, including research model, sample, and population,

questionnaire design, validity and reliability of the research, pilot study, data collection, and data analysis.

- **Chapter Five** presents the analysis section of the study, including Data Analysis, survey instrument response rate and the data collection process, in addition to normality and outliers. Then, demographic information has been analyzed, including the state of electronic information sharing, Construct Validity, Principal Component Analysis (PCA), Kaiser-Mayer-Olkin and Bartlett's Test, Factor Loading, total variance explained and correlation tests, in addition to multi-regression analysis.
- **Chapter Six** explains the current state of EIS, discussion of each factor, the theoretical and practical contributions, then future work in this chapter, and finally the conclusion.



1.9 Summary

This study proposes a model of electronic information sharing for Yemen public universities, which is expected to highlight useful information of factors to increase electronic information sharing between these public universities and Yemen Center for Information Technology Higher Education (YCIT-HE).

This chapter begins with the flow of an overview of this research, primarily about the research background related to the higher education sector in Yemen, electronic information sharing, in addition to cloud computing and social media. It continues with the statement of the research problem, research questions, objective, and

significance of the study and scope of the study. Lastly, the chapter concludes with an overview of the next five chapters.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter describes the literature reviews on the relevant topics of Electronic Information Sharing (EIS) among public sector agencies, including the general concept of EIS, the benefits of EIS in general, the challenges of EIS in the higher education sector of Yemen, and finally the related theories and models applied in the previous studies.

The information from the previous studies have been analyzed and presented to provide a foundation for the creation of a research framework of this study.

2.2 Electronic Information Sharing (EIS)

As defined by Akbulut et al. (2009), Electronic Information Sharing (EIS) is defined as information being exchanged among employees within and/or outside a body or organization or giving them access to information, being sharing by using the technologies such as website, email, mobile phone, intranet, extranet, shared database and so on. With these technologies, sharing information across government agencies and between ministries, departmental divisions, sections, and units are made feasible. The EIS practice can be created amongst ministries, departmental division, section, and unit.

Electronic information sharing is increasingly important in almost all organizations and institutions. According to Yang and Maxwell (2011), there are several reasons for

the importance of electronic information sharing in public organizations. Government agencies coordination to improve efficiency and reduce waste. It also brings about alterations in technology that will enable agencies to interchange information. Therefore, agencies can use the standard transmission of information that they previously agreed upon. Electronic information sharing increases the amount of information that is provided, which can help the leaders make better decisions (Akbulut et al., 2009; Bigdeli, Kamal & de Cesare, 2013b) and to provide citizens to get a service in right location, at the suitable time and at the low cost (Bigdeli,2012).

2.2.1 Models and Theories

The revolution of information system and the advanced of information technology has transformed information sharing into EIS or the sharing of information electronically (Landsbergen & Wolken, 2001). Theoretical models proposed by Dawes (1996) and Landsbergen and Wolken (2001) are considered as the first information sharing and electronic information sharing models, respectively (Estevez et al., 2010). These models adopt information sharing of government agencies to make information sharing possible.

Based on his survey involving public managers in New York, Dawes (1996) proposed a theoretical model for information sharing between agencies (Figure 2.1). The model show cases how government agencies learn through information sharing specifically via the elements of benefit promotion, risk mitigation, and identification of information sharing barriers. The model also explicates how experience sharing can be triggered by the search for solutions on issues hindering information sharing. A

clear demonstration of information sharing is the willingness of employees to share their respective opinions and experiences. A governmental policy and management framework plays the main role in governing such sharing process. The framework can be enhanced to promote benefits and mitigate future risks through the presentation of new policy and management ideas.

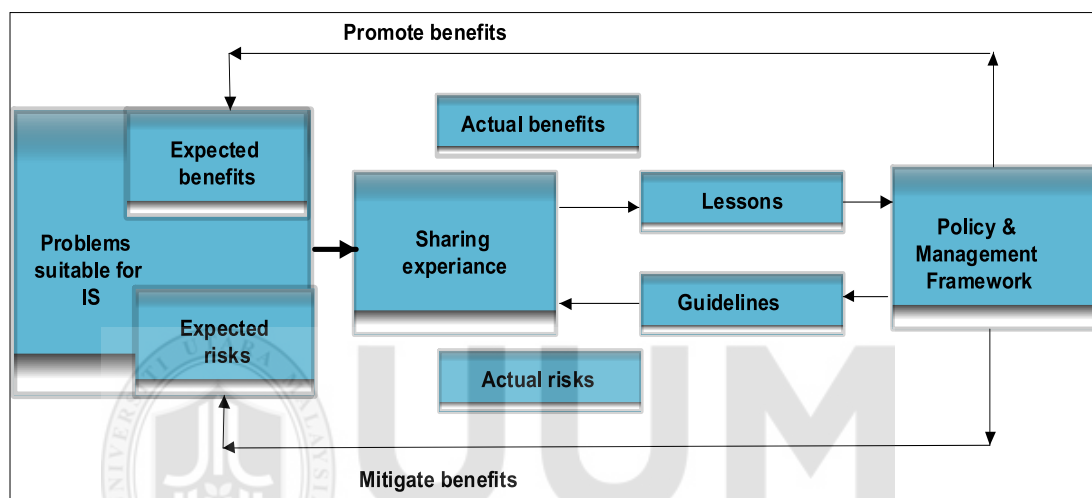


Figure 2.1: A theoretical model for interagency information sharing (Dawes, 1996)

Figure 2.2 shows the theoretical model of Landsbergen and Wolken (2001) which was drawn from the theoretical model and information system environment introduced by Dawes. In this model, the three components supporting the IS infrastructure are compared: first, the technical guidelines which entail the compatibility of the software and hardware in each agency; second, the interoperability element which concerns the metadata and interagency architecture; and third, institutional policies which concern the provision of clear and best practices for information system support. This model uses five tools of information system:

- Metadata to provide the nature, presence, and quality of information

- Law and policy of sharing time and conditions among government agencies
- Budgetary and economic implications of information system costs and benefits
- Demonstration of successful information sharing
- Management of support to control sharing and encouragements

However, Dawes' work had neglected the technical factors concerning contemporary issues as her work was carried out in the early 1990s and published in 1996. Therefore, the study by Landsbergen and Wolken had only focused on technical-related factors. However, both studies did not consider the individual factors in government agencies.

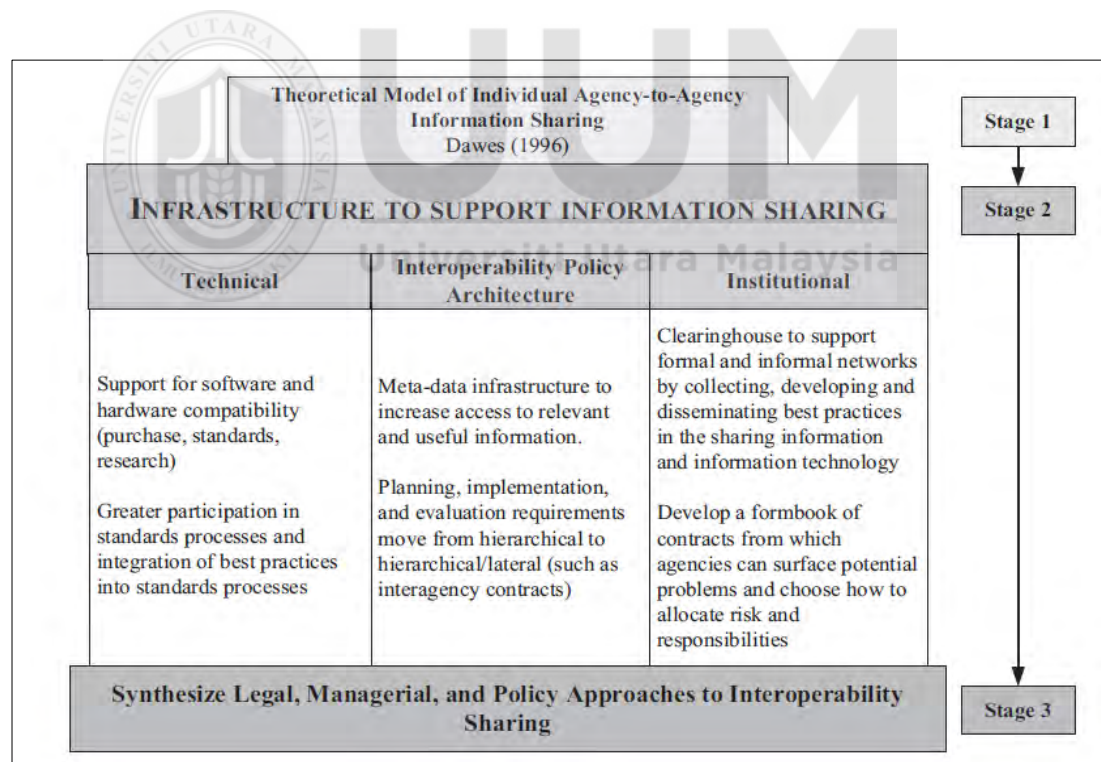


Figure 2.2. An expanded model of information sharing among the agencies (Landsbergen & Worken, 2001)

2.3 Electronic Information Sharing in the Public Sector

According to Gil-Garcia et al. (2010), sharing information in the public organization is seen as a social and technical phenomenon because inter-organizational sharing and integration information is a mixture of both technical elements and social elements. They found four related aspects starting from social to technical which can provide a better comprehension of sharing perception: shared knowledge and information, trusted social network, interoperable technical infrastructure and integrated data (Figure 2.3).

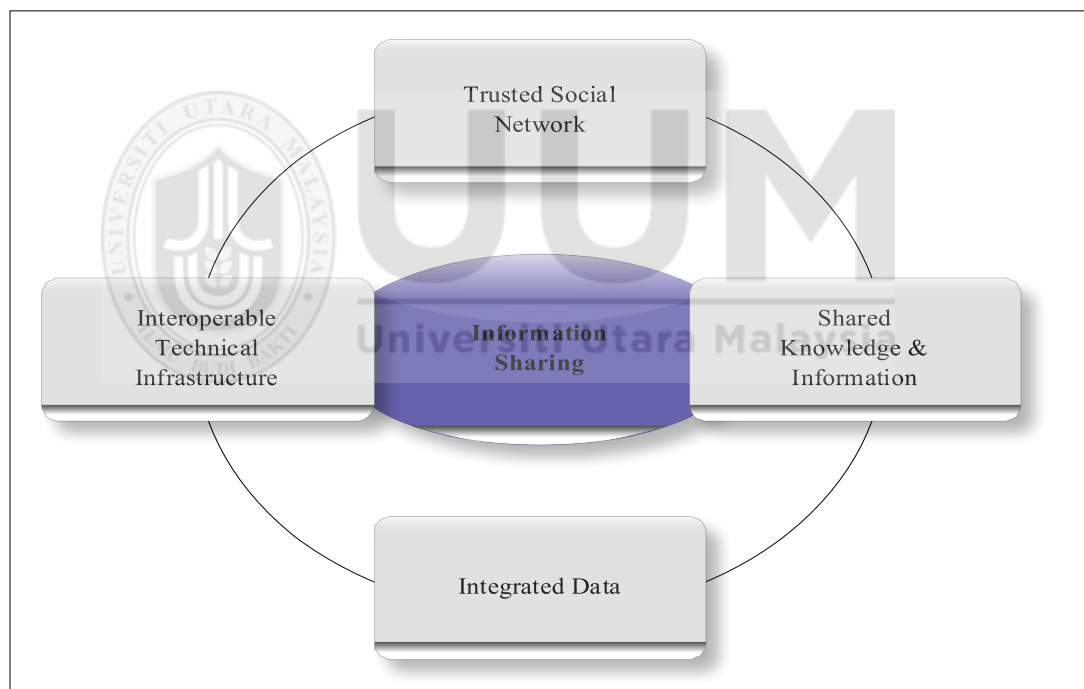


Figure 2.3. The concept of information sharing between organizations (Gil-Garcia et al., 2010)

The trusted social network is considered as an initial step to information sharing in inter-organization. Moreover, it refers to the collaborations between employees who use teamwork when their sharing information and maintain trust with each other.

Shared information and knowledge are categorized as explicit and tacit knowledge which is in the form of general information, such as formal documents, email, messages and information relationships. Integrated data means to integrate data in different levels of organizations depending on standards of networking between them. Lastly, interoperable technical infrastructure refers to information systems that are used to communicate and exchange information between organizations (Gil-Garcia et al., 2010). This study considers the four aspects to gain a clearer comprehension of electronic information sharing between Yemen public universities and YCIT-HE. Thus, this study needs to understand the collaboration and trust between staff. It also needs to measure the information that is shared between them with the percentages of sharing. Finally, data and information should be integrated, and infrastructure needs to be compatible between public universities and YCIT-HE.

2.3.1 Benefits of Electronic Information Sharing in Public Organizations

The benefits of information sharing within the government could be recognized by comprehending the commitments of digital government (Gottschalk, 2009). Researchers have found that information sharing amongst government organizations is essential, specifically in the field of e-government systems (Dawes, 1996; Cresswell, Pardo, Canestrato, Dawes & Juraga, 2005; Pardo, Cresswell, Thompson & Zhang, 2006; Pardo & Tayi, 2007). According to Akbulut et al. (2009), "Electronic Information Sharing" among agencies of the government agencies assists them to attain benefits namely: better services, increased information resources, increased program effectiveness, decreased cost and diminished paperwork, augmented accuracy of information, completed information for decisions making (Gil-Garcia et

al., 2009). Additionally, successful EIS can achieve many benefits such as improved collaborations among government organizations (Bigdeli et al., 2011), increased productivity shared and integrated public services delivery (Bigdeli et al., 2013a).

According to Estevez, Fillottrani, Janowski and Ojo (2011), EIS has various classes of benefits including organizational, technical, inter-organizational and environmental:-

- **Technical** electronic information sharing can improve the use of ICT as solutions for issues arising in government organization in relation to the exchange data.
- **Organizational** electronic information sharing can increase the quality, quantity, and availability of data and information.
- **Inter-Organizational** electronic information sharing benefits increase by interacting with others because that can improve professional relationships or enhance collaborative networks.
- **Environmental** electronic information sharing helps public administrations in delivering better services, such as better understanding of economic and demographic trends.

In the context of higher education environment, public universities can gain all of these benefits if they build successful electronic information sharing projects.

2.4 Electronic Information Sharing Barriers in Public Sector

Scholl and Klischewski (2007) identified several constrictions that affect EIS in the circumstance of the public sector. These constraints come from the electronic

information sharing among different type of public organizations within different levels and backgrounds such as central organization and its sub. Thus, the need to create collaborations between public sectors to provide better public services to citizens (Bigdeli, 2012). This collaboration can be achieved by crossing many barriers as discussed by Scholl and Klischewski (2007), as follows:

2.4.1 Organizational Constraints

In several circumstances, government organizations and divisions have their own business procedures and assets. Therefore, Interoperability turns out to be incredibly complicated as no distinctive standard on policies, systems and processes (Klischewski & Scholl, 2006). In addition, researchers designate that to share information can implicate difficult connections amongst participating agencies due to their diverse origins, values, and cultures (Gil-Garcia et al., 2007a; Pardo & Tayi, 2007; Pardo et al., 2004).

2.4.2 Information Constraints

There is enthusiasm in the sharing of transactional information which may not be visible when it comes to the sharing of organizational and strategic information. This is particularly true for strategic information sharing which is regarded as a specific governmental entity of which interchange and sharing would prove to be problematical. Furthermore, Dawes (1996) disagreed with the view that there would be more limitations to information quality when the information or data is delivered from various sources with different quality and control standards.

2.4.3 Managerial Constraints and Cost

Information sharing involves the collaborative effort of various governmental agencies with diverse structures, attitudes and cultures. Therefore, the management and scrutiny of information sharing practices could cause a holdup in the implementation of e-government processes (Bigdeli, 2012). As information sharing and processes throughout various government organizations and branches are costly, it is highly reliant upon the financial status. Besides, unanticipated budget restraints are likely to disturb the advancement of long-term Electronic information sharing projects.

2.4.4 Technological/Performance Constraints

Defining standards for shared information within the public sector is a composite assignment that involves specialized technical knowledge. Various organizations consist of numerous varieties of software and hardware. Different organizations have different varieties of software and hardware for their respective information systems, which proves to be a real challenge when incorporating various information systems on different platforms with different standards, schemas and qualities of data (Gil-Garcia et al., 2009; Klischewski & Scholl, 2008). Additionally, the implementation of IT in the information sharing systems of governmental agencies also proves to be another challenging task (Lee & Rao, 2007) owing to security and privacy concerns; therefore, it is important to build a proper system that can manage authorization and authenticate the access for information sharing (Chau et al., 2001).

Higher education institutions in Yemen faces challenges of sharing information electronically between the public universities and the Ministry of Higher Education and the Scientific Research in general and YCIT-HE in practical. According to (Alsurori & Salim, 2009), it shows explicitly concern over the implementation of its operations and services. The first challenge in the organization is: - the universities' employees do not have a clear view and understanding of what new technologies can contribute to the development of their institutions and abilities, but they believe that they can accomplish their work without technological support (Al-sultan, 2006). The second challenge is sharing information and processes across and between a public university and YCIT-HE highly reliable upon the financial status. Besides, unexpected budget restraints possibly influence the advancement of procedures in Electronic information sharing projects. The third challenge in the varieties and incompatibilities of the hardware and software deployed across the universities.

Additionally, the Yemeni public universities mostly share their information with Yemen Center Information Technology in Higher Education in a traditional way such as (using paper, fax, and email). These scenarios provide some challenges that make higher education sector in general and YCIT-HE in practical faces difficulties getting accurate, timely information to deliver services.

This study will focus on technology barriers that highlight, the technological issues of electronic information sharing between public sectors and YCIT-HE. When considering the use of the latest trend in technology to increase EIS, this study views using cloud computing and social media as one of the technological solutions to solve the issues.

2.5 Previous Studies of Electronic Information Sharing in Developed Countries

2.5.1 Electronic Information Sharing in the United Kingdom

Bigdeli, Kamal, and Cesare (2012) identified sharing factors of electronic information in order to enhance the decision making in Local Authority Government (LAG) residing in United Kingdom. The five characteristics that are described by the existing literature are influence Inter-Organizational System (IOS); (i) External Environment, (ii) Capability of Organization, (iii) Technology Environment, (iv) Electronic Information Sharing Characteristics and Inter-departmental Environment. The factors under each characteristic were determined by conducting a thorough literature review on studies on implementation of public sector innovations, information sharing among governmental agencies, systems adoption among organizations, collaboration among departments and Enterprise Application Integration.

- **External Environment:**

Information sharing among local government agency (LGA) divisions is influenced directly affected by the external environment where the authority functions (Akbulut et al., 2009; Pardo & Tayi, 2007). The external environment factor group is classified into four main groups: Economic Pressures, Political Pressure, Legalization, Community Pressures and Policy Principles. Political pressure is defined as the effects of Central Government on decision-making procedures of local authorities. Economic pressures means that the economics of central government might disturb inter-department cooperation at a local level (Fedorowicz et al., 2007). Information sharing requires to have policies in place so as to generate an environment that will share

information effectively and legitimately among departments (Bigdeli et al., 2012). Community pressures refer to protection of data privacy because decision making of sharing of personal information to public divisions is effected by it. (Bigdeli et al., 2012).

- **Capacity of Organization**

Information sharing amongst other departments in an association directly relies on the construction and preservation of a network of relationships as well as teamwork (Gil-Garcia et al., 2009; Fedorowicz et al., 2007; Pardo & Tayi, 2007). There are four clusters to this factor namely: Inter-organizational Leadership, Return on Investment (ROI), Network Collaboration Culture and Organizational Size.

- Inter-organizational Leadership entails the prevalence, capability and assurance of having top management support specifically in the provision of a conducive environment for a fully-functioning inter-departmental EIS.
- Return on Investment (ROI): it points to the analysis of costs and benefits that are both tangible and intangible which can influence the decision-making of information sharing.
- Network Collaboration Culture entails the progressive provision and management of public services which is reliant upon the combined network relationships between numerous divisions and organizations (Gil-Garcia et al., 2007), which in turn enables a smooth where information sharing process.

- Organizational Size entails the resources of the organization, its transaction capabilities and size of workflow (Kimberly & Evanisko, 1981).

- **Technological Environment**

Tornatzky and Fleischer (1990) delineate the technological context as consisting of internal and external technologies associated with the procedures of the organization. There are four main technological factors namely: IT Capabilities, Data Security and Privacy, Information Quality and Interoperability Framework. IT capabilities entail the department's competency in implementing IT tools in an effective manner so as to enable EIS (Akbulut et al., 2009). The prevalence of security and privacy concerns would diminish public trust and optimism towards a department due to fears of having their personal information leaked (Bellamy & Raba, 2005; Nash, 2008). Information sharing success in an inter-department setting is dependent upon the quality of the information being shared (Klischewski & Scholl, 2006). The collaboration between the LGA branches and public service quality can be enhanced and enriched with high information quality. Interoperability Framework which delineates the compatibility standards to be applied in the agencies' information systems is a crucial element for expanding the practice of information sharing among public sector departments (Dos Santos & Reinhard, 2007).

- **Electronic information sharing characteristics**

Various factors may encourage organizations to participate in EIS. The EIS characteristics are subdivided into three grouping: (a) Costs of EIS, (b) Benefits of EIS and (c) Risk of EIS.

Costs of electronic information sharing refer to all impending professed charges of contributing in sharing of information comprising the rate of acquiring appropriate software and hardware, the price of relocation from the old systems to the original ones along with a charge of staff training (Akbulut et al., 2009; Akbulut, 2003). The benefits of EIS in public sector departments can motivate the departments to engage in information sharing practices (Gil-Garcia et al., 2007). However, there are certain possible risks related to EIS which organizations must identify and assess (Dawes, 1996). There are two types of EIS risks namely technological risks and non-technological risks (Evangelidis, 2005). The former is delineated as applied and assumed risks related to new information systems that are used for building a conducive environment for information sharing (Bellamy et al., 2007).

- **Inter-departmental Environment of Electronic Information Sharing**

Bigdeli et al., (2012) it indicates the relationship among departments in collaboration with their operational and business processes. Based on literature of electronic information sharing in inter-department, three factors had been highlighted: Business Process Compatibility, Inter-departmental Trust, and Critical Mass. The benefits of electronic information sharing in public organization would not be able to save finance and enhance performance if the business procedures and decisions are not affiliated and amalgamated. (Pardo & Tayi, 2007). Trust can lessen the struggles and menaces between departments when they share their information (Gil-Garcia et al., 2009). Thus, three kinds of trust have been found, companion trust, commitment trust, and competence trust. The critical mass means a number of participants can encourage

additional branches that do not have initiations to information sharing by far (Akbulut et al., 2009). The framework of Bigdile et al. study is shown in Figure 2.4.

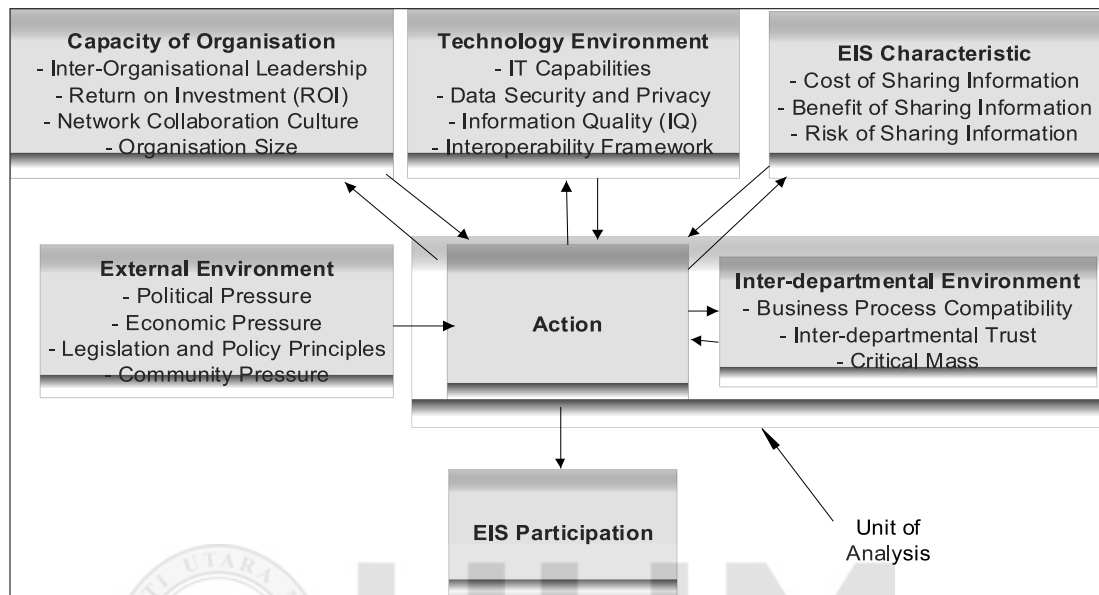


Figure 2.4. Electronic information sharing in Local Government Authority (Bigdeli et al., 2013)

In summary, based on Bigdeli et al., (2012), several important factors have been identified that increase the electronic information sharing. The information quality and IT capabilities factors have been adopted due to frequent use and application by researchers who studied these factors and their finding relevant to the quality of information and IT capabilities that contribute to the ability of increased electronic information sharing effectively. These factors have an optimistic influence on electronic information sharing between Yemen public universities and YCIT-HE that will help them in decision making and delivery services.

Moreover, Bigdeli et al., (2012) have mentioned the electronic information sharing issue by using multi-databases. The issues with multi data sources and its different

format incompatibility with software and hardware will make they study much more challenging. Therefore, this study anticipates solving these issues by utilizing cloud computing and social media as a factor to be used in solving these issues.

2.5.2 Electronic Information Sharing between State and Local Government in the US

The study of Akbulut (2011) on EIS practices with state organizations was conducted with the focus on native law enforcement agencies. In this study, the researcher discovered that many factors can positively or negatively influence the process of sharing electronic information amongst the local law enforcement agencies. According to Akbulut (2011); native agency information sharing will have an impact by factors concerning the technological perspective, the organization circumstance, and the environmental setting (Figure 2.5).

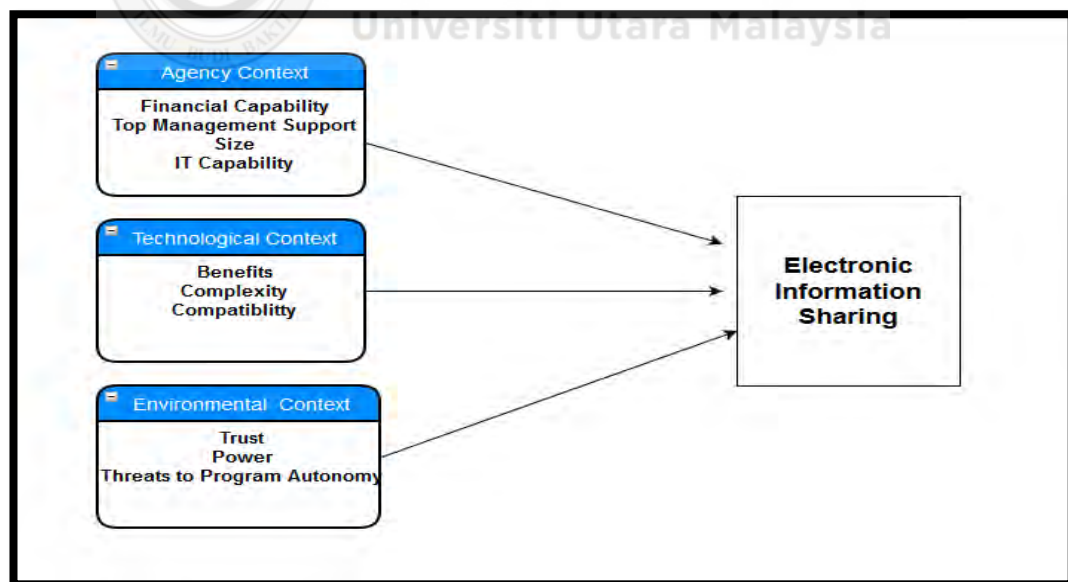


Figure 2.5. Theoretical Framework of EIS among the agencies (Akbulut, 2011)

Technological Context: This context refers to the perceptions of a local agency concerning the features of EIS. Importantly, the sharing of information by the local organization is influenced by three factors such as compatibility, benefits, and complexity.

Benefits refer to the desired merits that a local sector can derive from EIS (Chwelos, Benbasat & Dexter, 2001). When this exercise is achieved accurately within the given time frame, it does help in reducing paperwork, while the decision process is ultimately improved (Dawes, 1996; Landsbergen & Wolken, 2001). The apparent benefits play an important role in motivating government agencies.

Complexity refers to the extent to which EIS process is professed to be challenging. Importantly the content of such information and the technology required to disseminate it may be complicated and challenging respectively. This fact has been substantiated by Akbulut et al. (2009) when the researchers asserted that complexity is a significant impediment to the adoption of electronic information sharing among government agencies (Akbulut et al., 2009).

Compatibility is regarded as the rate at which EIS is compatible with the current system of the local organization (Premkumar, Ramamurthy & Nilakanta, 1994). Empirical evidence has shown that lack of compatible data structures and standardized systems can impede the successful implementation of the information sharing activities (Akbulut & Motwani, 2008).

Agency Context: This represents the features of the local agency because the body is responsible for the provision of a rich structure that can smooth, facilitate or inhibit the information sharing process. In this view, these factors are critically essential as they are expected to affect the process of information sharing by the local agency. These factors include top management support, IT capability, financial capability, and size.

Top management support: An environment that is conducive is expected to aid electronic information sharing, and this kind of environment can only be achieved if the top management provides necessary resources (Premkumar & Ramamurthy, 1995; Gefen, Straub & Boudreau, 2000). Research evidence has therefore revealed that when the local agency has at its helm a manager that can provide such resources, the whole process of information sharing would be more natural and likely obstacles may be overcome. However, as noted by Akbulut et al., (2009), little success may be achieved if administrators have less or no interest in the information sharing process.

IT capability for successful electronic information sharing, the local agency must have IT resources with a certain level of Information Technology resources and infrastructures. These are required as the local agency engages in interagency information sharing activities (Premkumar & Ramamurthy, 1995). Importantly, any local agency that refuses to engage in information sharing might not have enough IT resources and other equipment that may be required to participate in information sharing activities (Akbulut et al., 2009).

Financial capability: This explains the possession of economic assets that can assist the local organization in its function of electronic information sharing. Evidence has however shown that many of the local agencies have insufficient funds and this may pose a severe challenge to their budget and their activities (Norris, 2003; Norris & Moon, 2005). Importantly, agencies that engage in sharing are always more solvent and can have access to government grants to support information sharing.

Size can be considered from the number of staff and aspect of the amount of assets which a particular agency has. Based on their size, smaller agencies often face the challenge of lack of technologies and resources while large agencies on the other hand, usually have more considerable superior ability and financial resources to support information sharing (Norris & Moon, 2005).

Environmental Context: This refers to features of the uncontrollable environment where the agency operates and which inhibit or promotes the information sharing activities of the agency. Fundamentally, the five known environmental factors are: trust, threats to program integrity and power, critical mass and policy/legal framework.

Trust: this is described as the degree of belief which the local agency has in State agency concerning the performance of acts that will bring about a positive result and which will not jeopardize the interest of the local agency (Anderson & Narus, 1990). Evidence from previous research shows that shared interagency trust is a condition that precedes information sharing and cooperation (Landsbergen & Wolken, 2001). However, as a result of lack of the mutual trust, relationships between state and local governments have often been strained. The absence of reciprocated trust,

organizations tend to work in a disjointed fashion and fail to share information even when they have a common goal (Landsbergen & Wolken, 2001).

Power is the ability of the state organization to influence the local agency to perform in a particular order (Hart & Saunders, 1997). In their capacity, experience has shown that the State agencies have influenced the local agencies through encouragement, recommendations, and provisions of incentives to increase the information sharing activities of the local agencies.

Threats to Program Autonomy indicates potential or presence of threats and which can cause misinterpretation and misuse of information (Dawes, 1996). Government agencies generally perceive internally generated information as a form of power that has a strong possibility of helping them in hoarding to guard their power of decision making (Akbulut et al., 2009). Based on this, they often resist information sharing since they believe that it may be a potential threat to their territory and even go the extra mile to ensure the protection of that territory from external intrusion (Akbulut et al., 2009; Dawes, 1996)

Policy/Legal Framework is one of the environmental factors that cannot be controlled by the local agencies as they pose uncertainties to the collection and dissemination of information exercise. In most cases, the local agencies are faced with lack of specific requirements on how to share information with the state agencies. Therefore, this has been a source of worry as they do not feel motivated in complying with this information sharing initiatives since involvement in it is discretionary (Akbulut et al., 2009; Akbulut & Motwani, 2008). Additionally, the agencies are equally worried that

when there are no proper policies in place, sharing of information may lead to a violation of constitutional rights of individuals (Akbulut et al., 2009; Akbulut & Motwani, 2008).

Critical mass is regarded as the number or quantity of agencies which are planning or partaking in electronic information sharing (Akbulut, 2003). By the findings of Akbulut (2003), the number of agencies that partake in such exercise has more impact on the success or otherwise of the information sharing.

Based on the preceding discussion and the findings of Akbulut (2011), it has been noticed that several factors such as top management support, and trust have significant influence on EIS between the local and state organizations. Given this, this study have adopted power, top management support and trust since their veracity has been proved by the previous studies. It is the expectation of the researcher that these factors will have a positive influence on EIS between YCIT-HE and Yemen public universities in decision making and service delivery.

2.6 Previous Studies of Electronic Information Sharing in Developing Countries

2.6.1 Electronic Information Sharing in China

The study of Jing, Pengzhu and Yen (2014) identified some influential factors that affect EIS amid government organizations to deliver better public services in China. Jing, Pengzhu and Yen (2014), developed a four-layer model of information sharing across agencies within the horizontal functional based on layered behavior model

(Figure 2.6). Each layer has defined some electronic information sharing factors within Chinese contexts; these layers are discussed as follows:

- **External environment layer**

This layer refers to the factors that are important to develop the electronic information sharing between the local and central governments. These factors are named laws and policies, and upper-level leadership. The law and policy are not satisfactory in guiding the government organization to adopt electronic information sharing project. Thus, there is a need for formal law and policies of electronic information sharing between public organizations to build right environment of electronic sharing (Jing, Pengzhu & Yen, 2014). There is a need for a high level of authorities to collect and coordinate all the functions in the public organizations (Jing, Pengzhu & Yen, 2014). For example, in China, due to the improper government structure, most of the super-managerial organizations excluding State Council do not have direct leadership on functional organization, which eventually cause unnecessary complications for their work.

- **Interagency partnership layer**

It refers to the factors that affect the connection between agencies' participants to build a good environment to achieve their aims. The factors are interagency trust, Guanxi, and compatibility. The trust is based on the validity and accuracy of information that is collected from other public organizations (Jing & Pengzhu, 2009). The organization is not sure that other will use its data or information in the right way. Guanxi is a Chinese word refers to inter-personal or inter-organizational relationships, social

networks, trust, commitment, favor, mutuality, reciprocity and long-term benefits (Shin, Ishman & Sanders, 2007). Good Guanxi among public organizations can increase inter-organizational trust and encourage cooperation ability during the EIS (Jing & Pengzhu, 2009). Organizational compatibility refers to existing needs, aims, processes, and cultures in electronic information sharing among government organizations (Jing et al., 2014). Technical compatibility denotes to the integrated level of information system and application between organizations. The challenge in electronic information sharing is public organizations' use of different information systems. Moreover, data in the public organizations use a different format; there is no organization ready to change the format of its data (Jing & Pengzhu, 2009). Electronic information sharing is so difficult due to organizations following different data definitions standards of data transmission (Jing & Pengzhu, 2007b). Furthermore, organizations can solve these issues by integrating their information systems, but that will cost a lot (Jing & Pengzhu, 2009).

- **Organizational readiness layer**

It refers to the capability of the organization to participate in electronic information sharing project. It consists of top management support, IT capability, economic cost, and process security. Electronic information sharing gives low beneficial feedback without top manager support (Jing & Pengzhu, 2007). For example, managers of government organizations in China are ready to contribute to EIS, particularly in electronic business undertakings (Jing & Pengzhu, 2009; Jing et al., 2014). Most public organizations are limited to software, hardware and also lack of information sharing skills (Jing & Pengzhu, 2009; Jing et al., 2014). Costs of electronic information

sharing in inter-organizational consist of running cost, integration cost, setup cost, maintaining cost along with training cost and communication cost (Jing & Pengzhu, 2009; Jing, Pengzhu & Yen, 2014). Process Security is clarified as the ability to secure the information while sharing them because public organizations have massive amount of personal information and sensitive information (Jing & Pengzhu, 2007b). One organization can not control information security in inter-organizational electronic information sharing because it is shared between them (Jing & Pengzhu, 2009).

- **Individual expectation layer**

It refers to individual factors that affect electronic information sharing among the local and central government. Organizational staffs' behavior and expectations before the initiation of electronic information sharing influence the sharing process between the organizations' members. This layer consists of two factors such as expected benefits and expected risks. Electronic information sharing project assists government organizations to achieve several benefits, such as rationalized data management, augmented information precision and aptness, and upgraded decision making (Jing & Pengzhu, 2009). The risk of electronic information sharing in a government organization is a decentralized power of organization (Jing & Pengzhu, 2009).

2.6.2 Performance of Government to Electronic Information Sharing

It refers to the achievement of government organization from EIS project, such as the degree of administrative, financial, and other benefits (Jing, Pengzhu & Yen, 2014). There are three aspects which are considered as important ones of government to government electronic information sharing. First, the volume of information obtained

from other agencies. Second, the value of information that is provided to other organizations. Third, the degree of information that is shared electronically between organizations. The model of Jing's study is shown in Figure 2.6.

Based on Jing, Pengzhu and Yen, (2014) study there are many vital factors which increase the electronic information sharing. Upper-level leadership and Law and police factors have been adopted in this study (Jing, Pengzhu and Yen, 2014). Upper-level leadership and law and police have been found as significant factors to increase the participate in electronic information sharing in the Chinese government. The Higher education sector has independence roles from the government. Therefore, this study investigated these factors in different environment such as higher education sector in Yemen. Moreover, the LBM model which have been adopted in this study is derived from Jing, Pengzhu and Yen, (2014). Moreover, Jing, Pengzhu and Yen, (2014) research has also mentioned that the technological electronic information sharing issue is in using multi-databases. The problems are multi data sources, different format, incompatibility of software and hardware. Therefore, in this study, a different data storage for example cloud computing will be tested as factors increase EIS as a factor instead of multi-database to solve these issues.

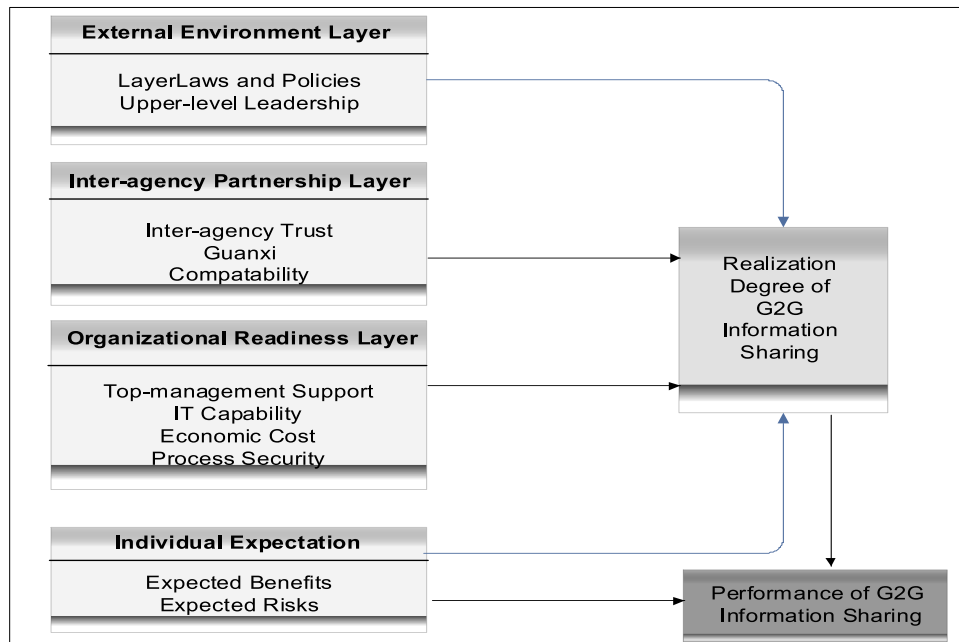


Figure 2.6. Model of influencing factors on G2G information sharing (Jing, Pengzhu & Yen, 2014)

2.6.3 Interdepartmental Information Sharing Practice in Electronic Government Agencies in Malaysia

Kamal, Singh and Ahmad (2012) recognized factors influencing the sharing of information between sectors of Malaysian electronic government organizations. The conceptual framework focused on three factors: individual factors, organizational factors, and technological factors. The model of Kamal, Singh and Ahmad study is shown in Figure 2.7. A combination of quantitative and qualitative methods has been used as research methods. The observations, questionnaires and semi-structured interviews are selected as the data collection technique in this study.

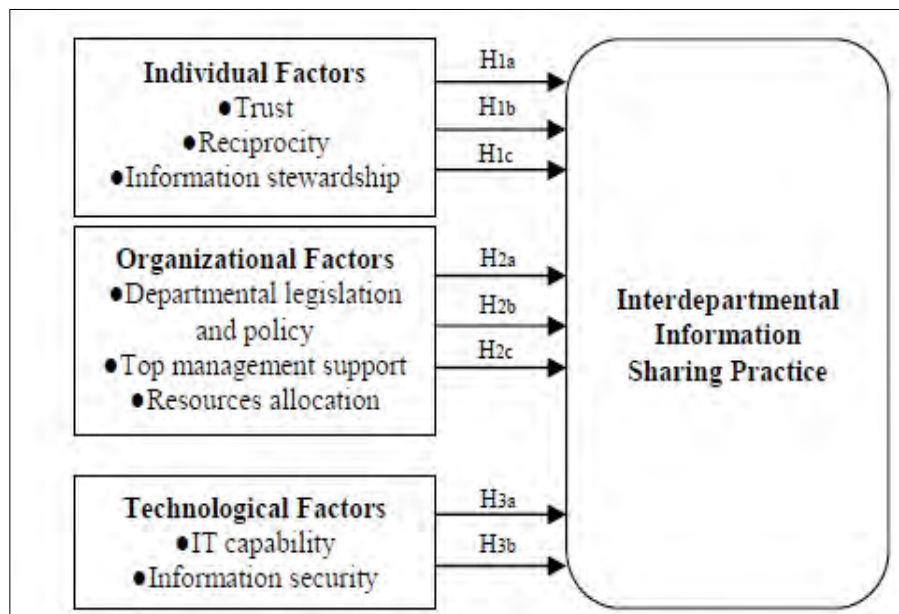


Figure 2.7. A conceptual framework for interdepartmental information sharing within EG Agencies in Malaysia is constructed (Kamal, Singh & Ahmad, 2012)

- **Individual Factors**

Individual factors entail the employees of the departments. These factors are made up of the three constructs of information stewardship, trust and reciprocity. When the employees have trust in the information sharing process, their ability and precision in doing so will increase as well. On the other hand, the lack of trust will cause holdups in the information sharing process (Ardichvill et al., 2003). The employees' response towards other employees in other departments signifies their keenness to engage in information sharing. Bock et al. (2005) highlighted anticipated reciprocity as a crucial factor in determining how the employees conduct the information sharing procedure. Based on the theory of exchange, reciprocity significantly drives the employees' activities related to information sharing (Tung-Mou Yang, 2011; Julibert, 2008; Constant et al., 1994). According to exchange theory, an essential vigor to enhance

information sharing among members of organizations is the reciprocity. In account to the information theory, information stewardship is elucidated as an individual ought to manage information as a representative of others whereby information is belonging of the whole organization and not as a subjective resource (Tung-Mou Yang, 2011; Kolekofski & Heminger, 2003; Constant et al., 1994).

Information should be shares freely among the departments even though some of the employees consider having information as having power that cannot be shared and if it has to be shared, they feel like the loss of social influence and power (Kolekofski & Heminger, 2003; Ardichvill et al., 2003).

- **Organizational Factors**

Every division will have its own information. To share information amongst branches, Branches initiate information sharing by considering three key organizational factors namely: departmental legislation and policy, support from top management, and allocation of resources. The first factor entails the regulatory framework in each department which summarizes the standards and regulations that must be adhered to by the departments when engaging in information sharing. Such protocols facilitate departmental involvement, lessen risks, improve trust, as well as generate funds and assets to support the information sharing process (Gil-Garcia et al., 2007; Zhang & Dawes, 2006; Dawes, 1996). The second factor entails the commitment displayed by the top management in providing a conducive environment that eases the sharing of information between the participating departments. Such support is crucial in ensuring smooth inter-department information sharing with the provision of the needed

resources, supervision and vision (Akbulut et al., 2009). The third factor entails the allocation of resources which involves fund and workforce readiness among the participating departments while engaging in information sharing activities. The productivity of such activities will rely on the availability of the needed funding, workforce and time (Wixom & Watson; 2001). Without sufficient resources, government organizations may emphasize on critical matters within its association when the instant benefits of sharing information cannot be anticipated (Zhang & Dawes, 2006; Landsbergen & Wolken, 2001).

- **Technological Factors**

There is a close interrelationship between information sharing and technology. Proper technology is needed to ensure a safe environment for sharing information. This factor entails the constructs of IT capability and information security. The former refers to the availability of technological resources and expertise that support the information sharing activities between the participating departments. Advanced technological applications such as e-government and other networks as well as the availability of adequate and proficient IT experts facilitate a smooth flow of information and provide further information sharing alternatives (Tung-Mou Yang, 2011; Zheng, 2009). Meanwhile, the construct of information security entails information systems that are adequately designed to facilitate, control, approve and track the accessibility and sharing of information among departments. Chau et al. (2001) mentioned that securing information is a critical factor in sharing information. The access to information must be curbed since admission to inappropriate users may cause a problem for departments (Fan & Zhang, 2007).

Based on the preceding discussion, it has been noted that there are several factors such as individual factors, organizational factors, and technological factors. Given this, this current study has adopted only "information stewardship." It is the expectation of the researcher that these factors shall have an affirmative influence on electronic information sharing between YCIT-HE and Yemen public universities in service delivery.

2.6.4 Electronic Information Sharing in Iraqi Universities

EIS has been practiced in Iraqi universities in collaboration with the Ministry of Higher Education and Scientific Research (MOHESR). Mohammed, Huda and Maslinda (2015) had highlighted the efficacy and significant effect of the identified factors in enhancing EIS among public organizations. The possible benefits of EIS for organizations include cost savings, lesser time in dispersing information, and more accurate information. Risk entails the dangers and threats that the government agencies may be exposed to when using EIS. This include the possible exposure of sensitive government information to unwanted parties (Estevez et al., 2010).

Mohammed, Huda and Maslinda (2017) identified the factors of EIS that enhance the decision making capability of the public universities in Iraq and MOHESR. The authors highlighted four key characteristics in their study namely: i) Electronic information sharing characteristics, ii) Technological characteristics, (iii) Organizational characteristics, and (iv) Environmental characteristics. The factors under each characteristic were determined by conducting a thorough literature review on studies on implementation of public sector innovations, information sharing among

governmental agencies, systems adoption among organizations, and collaboration among departments.

2.6.4.1 Electronic Information Sharing Characteristics

EIS has several characteristics that affect the way information is shared electronically between the Iraqi universities and MOHESR namely cost, benefits and risks. Previous studies on Iraq have proven the efficacy and significance of these factors in improving EIS among public organizations. The possible benefits of EIS include reduced costs, lesser time in sharing information, and more accurate information. Risk entails the possible dangers and threats that could befall the government agencies when using EIS. One of the risks includes the accidental exposure of sensitive governmental information to unwanted parties (Estevez *et al.*, 2010). Meanwhile, the costs of EIS refer the expenditures involved in attaining the needed technology that supports proper information sharing i.e. the system itself as well as its installation, application, relocation, incorporation, interface, training, maintenance, and communication (Landsbergen & Wolken, 2001; Akbulut, 2003; Jian & Pengzhu, 2007b, 2009).

2.6.4.2 Technological Characteristics

Technological characteristics entail the internal and external technologies needed in enabling the establishment of relationships and collaborations among the government agencies (Bigdeli *et al.*, 2012). With proper technology, a safe environment for information sharing can be created with appropriate platforms to measure security (Kamal *et al.*, 2012). There are five factors under this characteristic namely IT capability, quality of information, compatibility, complexity and data warehouse.

IT capability entails the competence to implement IT effectively in performing EIS including the provision of the needed software, hardware, and IT skills to the participants in public organization. In short, it is the technological expertise and sources that must be provided to the government agencies to facilitate them in using EIS (Kamal et al., 2012). Information quality entails the superiority of the information being shared among the participants in terms of its value. Compatibility entails the ability of the organizations in providing equivalent levels of software, hardware, and skills among all the government agencies (Estevez et al., 2010; Lu, Liu & Pei, 2011; Bigdeli et al., 2012). However, information sharing between organizations comes with its own complexities. Complexity entails the perceived difficulty in engaging in EIS (Akbulut *et al.*, 2009). Data warehouse is the platform that enables EIS by providing solutions to related issues in its implementation. All the aforementioned factors are significant in governing the systems of public organizations particularly in Iraq (Alwan & Abdurrahman, 2010; Mahmoud, 2010; Abdul-Alrahman, 2011; Ahmed, Jasem, & Hassan, 2012; Fadhelalla, 2012).

2.6.4.3 Organizational Characteristics

Organizational characteristics refer to the internal factors that prompt the staff of public universities in sharing information with MOHESR. There are three factors under this category namely top management support, concept of collaboration, and size. Top management support is highly significant as this is the factor that drives the employees to share information with others. It entails the backing provided by the top managers in creating a better environment that drives employees to share information with other agencies information sharing (Kamal et al., 2012). Collaboration between

the staffs in the Iraqi government and other organizations is highly pertinent (Al-Taie & Kadry, 2013) as it can improve and organize the delivery of public services. Lastly, the factor of size entails the influence of the organization's size in the implementation of EIS. Top management support, collaboration and organization size the aforementioned factors have been proven to increase EIS between public universities in Iraq and MOHESR.

2.6.4.4 Environmental Characteristics

Environmental characteristics entail the influences of the environment on how the government agencies operate (Akbulut, 2003). Various external environment influences must be taken into consideration by the agencies (Jing & Pengzhu, 2007b, 2009; Bigdeli *et al.*, 2012).

Mohammed, Huda and Maslinda (2017) studied the factors of policy/legal framework, trust, upper-level leadership, critical mass and social network as important factors in increasing the EIS between public universities in Iraq and MOHESR. The public organizations in Iraq should have the relevant policies and laws in place to facilitate and drive their employees to share information electronically (Alwan & Abdurrahman, 2010; Abdul-Alrahman, 2011; Fadhelalla, 2012). Inter-agency trust is the conviction that the right information has been delivered to the right agency and is deemed to be useful for the agency. Upper-level leadership entails the ability of an outside leadership to affect an organization to adhere and perform according to a certain way. Critical mass entails the organizations that are presently engaging in or will engage in EIS (Akbulut, 2003). An organization is likely to engage in EIS when

other organizations have decided to do so (Bigdeli, 2012b). Social network is the personal relationships established between organizations (Jing & Pengzhu1, 2007a). Good inter-organizational social network can create a trustworthy environment and improve the capability of corporations in sharing information electronically (Jing & Pengzhu1, 2009). In sum, the findings illustrate the significance of the abovementioned factors in increasing EIS between public universities in Iraq and MOHESR.

Based on the findings of **Mohammed**, Huda and Maslinda (2017), several significant factors in increasing the EIS between public Iraqi universities and MOHESR have been identified. The factors of information quality and IT capabilities have been applied because of their frequent usage by researchers and their ability to effectively increase the usage of EIS. The identified factors have positively affected the EIS between public universities in Yemen and YCIT-HE which in turn facilitates them in their decision making and provision of services. The abovementioned study also outlined the problem of data warehouse which involves high costs and further challenges. Hence, this study aims to solve the highlighted issues via the use of cloud computing and social media.

2.7 Research Gaps

As a summary, six research gaps are concluded from the previous studies of electronic information sharing, summarized as follows:

- Limited information sharing refers to sharing studies in horizontal and vertical functioning among governmental organizations (Chong et al., 2009; Akbulut, 2011).
- Previous research pieces are focused mostly on the organizational, technological and environmental perspectives, however, they are limited with regard to the human factors (Kamal et al., 2012).
- Prior research on EIS was carried out with the availability of less advanced information technologies compared to the latest facilities of the present era. As such, they did not make any differences to the comparison of non-electronic and electronic information-sharing methods.
- The majority of the suggested frameworks and models concentrate on EIS between the government sector, while a minimal number focused on the higher education sector.
- The application of multi-databases as data storage, which created several limitations of availability and accessibility, brought some technical incompatibilities, such as different data definitions and format, different data transmission formats and integration and quality of information.
- Minimum uses of Layer behavior model (LBM) in Information Sharing studies, in the context of understanding the different situation of EIS at different levels.

This study, therefore, was conducted to investigate the factors that can increase electronic information sharing between each university in Yemen and YCIT-HE. As

the technological factor presents the most obvious challenge, this study includes a technological point of view so as to solve the limitation of electronic information sharing in the Yemen higher education sector. Table 2.1 classifies all the factors that have been utilized in previous studies which might contribute to the formulation of the research problems for this study.

Table 2.1

Factors Influencing Information Sharing in the previous study

Researchers	Factors	Method
Dawes, 1996	Benefits, Risks	Literature review Survey Or A theoretical model of interagency information sharing
Landsbergen and Wolken 2001	Compatibility, Interoperability, Lack of Resources, Lack of experience, Trust, Lack of awareness of opportunities to share information	Extended Theoretical Model of Interagency Information Sharing
Asli Yagmur Akbulut (2011)	Technological Context <ul style="list-style-type: none"> • Benefits • Complexity • Compatibility Agency Context <ul style="list-style-type: none"> • top management support • IT capability • financial capability • Size Environmental Context <ul style="list-style-type: none"> • trust • power • threats to program integrity 	Technology-Organisation-Environment (TOE) framework with DOI and Critical Mass Theory to across Interorganizational, Questionnaire

Table 2.1 continued

	<ul style="list-style-type: none"> • policy/legal framework • Critical mass. 	
Bigdeli et al. (2012)	<p>External Environment</p> <ul style="list-style-type: none"> • Political Pressure • Economic Pressure • Legislation and Policy Principles • Community Pressure <p>Capacity of Organisation</p> <ul style="list-style-type: none"> • Inter-Organisational Leadership • Return on Investment(ROI) • Network Collaboration Culture • Organisation Size <p>Technology Environment</p> <ul style="list-style-type: none"> • IT Capabilities • Data Security and Privacy • Information Quality(IQ) • Interoperability Framework <p>EIS Characteristic</p> <ul style="list-style-type: none"> • Cost of Sharing Information • The benefit of Sharing Information • Risk of Sharing Information <p>Inter_departmental Environment</p> <ul style="list-style-type: none"> • Business Process Compatability • Inter-departmental Trust • Critical Mass 	<p>Typical Adoption Model with Factor Approach with Social Exchange theory and Critical Mass Theory to share information among local government authorities, Interview</p>
Jing Fan & Pengzhu Zhang (2014)	<p>External Environment Layer</p> <ul style="list-style-type: none"> • Layer Laws and Policies • Upper-level Leadership 	<p>Layered Behavioral Model with DOI to across horizontal functional agencies, Questionnaire</p>

Table 2.1 continued

	<p>Inter-agency Partnership Layer</p> <ul style="list-style-type: none"> • Inter-agency Trust • Guanxi • Compatibility <p>Organizational Readiness Layer</p> <ul style="list-style-type: none"> • Top-management Support • IT Capability • Economic Cost • Process Security <p>Individual Exception</p> <ul style="list-style-type: none"> • Expected Benefits • Expected Risks 	
Kamal et al., (2012)	<p>Individual Factors</p> <ul style="list-style-type: none"> • Trust • Reciprocity • Information stewardship <p>Organizational Factors</p> <ul style="list-style-type: none"> • Departmental legislation and policy • Top management support • Resources allocation <p>Technological Factors</p> <ul style="list-style-type: none"> • IT capability • Information security 	<p>Social Exchange Theory</p> <p>Information sharing theory</p>
Mohammed, Huda, and Maslinda (2017)	<p>Electronic Information Sharing Characteristics</p> <ul style="list-style-type: none"> • Cost • Benefit • Risk <p>Technological Characteristics</p> <ul style="list-style-type: none"> • IT capability • Compatibility • Information Quality(IQ) • Complexity 	<p>Typical Adoption TOE Framework with Social Exchange theory and Critical Mass Theory to share information Interview.</p>

Table 2.1 continued

-
- Data warehouse
- Organizational Characteristics
- Size
 - Top management Support
 - Collaboration Environment Characteristics
 - Policies/ Legal framework
 - Upper-level Leadership
 - Interagency trust
 - Critical mass
 - Social network
-

2.8 Background about the Republic of Yemen

The Republic of Yemen is situated at the south-western area of Asia and in the south of the Arabian Peninsula. It is circumscribed by Saudi Arabia on the north; by the Arab Sea, Aden Gulf and the Indian Ocean on the south; by Oman on the east and by the Red Sea on the west. Until today the total area of Yemen has not yet been specified. Nevertheless, references estimate the Republic of Yemen has an area of nearly 555,000 square kilometers, without the inclusion of Rub-al-Khali Desert. The demographic estimation for the population in Yemen was 25 797 109 from 1st January 2015. The population size has shown a rise of 2.65 % (665 241 individuals) compared to the preceding year where the population was 25 131 868.

2.8.1 History of Yemen Higher Education

It is worth mentioning that the initial Ministry of Higher Education and Scientific Research (MOHESR) in Yemen was founded in 1990 when the government felt the need for a specialized ministry to oversee the national and private universities and community colleges. Accordingly, expenditures on education increased over the years to expand educational institutions at different levels. This move had improved the educational situation in Yemen considerably.

The number of universities has risen from only two public universities (Sana'a and Aden) in 1990 and 15 in 2004 to 29 universities in 2008, of which eight are public universities (Sana'a University, Aden University, Taiz University, Hodeida University, Hadhramaut University, Ibb University, Dhamar University, and Amran University) and 21 are private universities. The number of faculties in the public universities increased from 14 to 180 (109 in the public universities and 71 in the private universities). Accordingly, the number of students increased from 39,990 (in the two public universities) in 1990/1991 to 242,510 (188,145 in the public universities and 54,365 in the private universities) in 2007/2008, with 30% female students (Yemen Ministry of Finance, 2010). This is because of the economic and social developments boom in Yemen that have transitioned to prompt increment in population size, specifically among those who are eligible to be in labor force.

In addition to universities, community colleges were established in Sana'a, Marib, Aden, Seyoun, Socotra Island, and Taiz. Work is also in progress in setting up other

community colleges in all provinces that focus on specific fields of education to meet the needs of the labor market.

2.8.2 Information Communication Technology in Yemen

Information and communication technologies (ICT) in general have drawn the attention of the Republic of Yemen due to its significance and great roles in several aspects (National Strategy for the Development of Higher Education, 2010). Particularly the MOHESR in Yemen uses ICT to provide high-quality education, to support the e-governance system, to enhance the service quality as well as to improve the delivery mechanism and information sharing (Ministry of Higher Education and Scientific Research, 2006; Alsurori & Salim .2009). ICT is a powerful means for the progress of the country.

In Yemen, it can be said that the system of public administration is not equipped with the essential, active working environment (Alsurori & Salim, 2009; Alhamassy, 2012); the higher education organizational structure needs to change its structure of public and institutional mechanisms and its operations as well as its philosophy of managing them. Moreover, MOHESR should restructure its system to solve the challenges that Yemen public universities face (Alhamassy, 2012).

In fact, the Republic of Yemen in general and MOHESR more specifically identify such roles and thus, introduced a process for improvement of ICT Policy for higher education to benefits from the current ICT technologies to support its vision and strategic plan as it grows. Yemen made extraordinary exertions to announce the ICT technologies to be utilized throughout specific segments. Nevertheless, access to

necessary ICT facilities and equipment are limited; limited internet connectivity is usually evident at public facilities and premises in the country (Ministry of Higher Education and Scientific Research, 2006). However, Yemeni' Education sector is currently interested in the establishment of several projects for the development of ICT between the Ministry of Higher Education and public universities (Alsurori & Salim, 2010).

Yemen's higher education sector possesses a national data communication network that provides better data communication connectivity for the public HEIs and the Ministry of Higher Education. The network is named YERE net Figure 2.8.

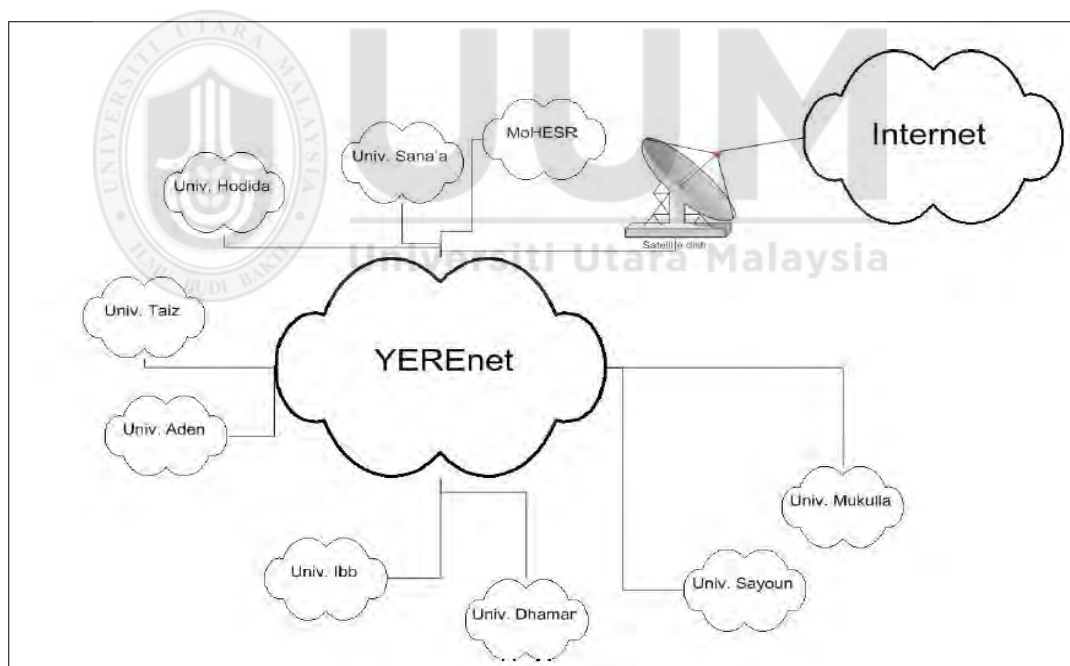


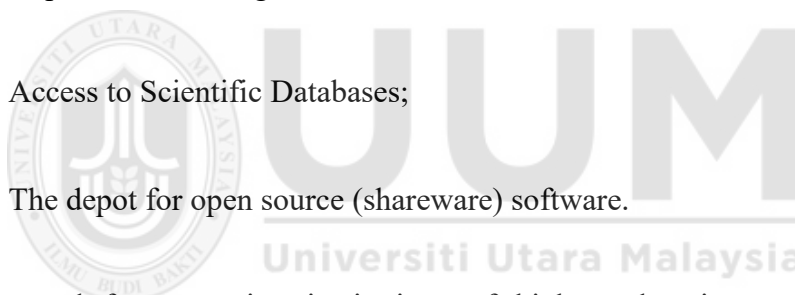
Figure 2.8. The network called YERE net. (Ministry of Higher Education and Scientific Research, 2006)

Web links make up the national data communication network. They connect the HEI and MoHESR networks. Each university has a Point of Presence (PoP) of YERE net.

The PoP delineates the national network (YEREnet) from the institutional network and connects the YEREnet to a router. Other institutions that want to participate in the network and willing to comply to the YEREnet's acceptable use policy (AUP) will be linked to this router as well.

The Information Services shared by the participating institutions will have to pass through the critical phase of the national data communication network. The shared information services entail:

- National portal for the sector of higher education;
- Depot for e-learning materials;
- Access to Scientific Databases;
- The depot for open source (shareware) software.



ICT is used for managing institutions of higher education and its resources. Management information systems are developed and applied for the management and administration of curricula, students, staff, financial resources, learning resources, student facilities and so on.

2.8.3 Information Communication Technology in Yemen Higher Education

Universities are regarded as vital organizations which comprise numerous academic, administrative staff and students. The academic institutions play an essential part in the progression of any nation in the world.

As such, the Yemeni Government attempts its best to have significant concentration towards universities on which the development of the country is reliant. A high-quality university needs a sense of community and a common culture and this demands the presence of a dynamic communication process for such aim to be accomplished (Mohammed, Syd & Syd Zin, 2011). For proper communication between two organizations, they used Information system technology to help it or them to adopt sudden changes to the needs of organization environment (Lv, 2010). Universities adopt information systems to provide services to its staff (Dai & Kumar, 2010). According to Dai and Kumar (2010), information system supplies the universities' staff with information by providing access to the database. Moreover, information system makes the work management easy and decrease process time.

Figure 2.9 shows the information system in the university; the university can use its information systems to connect with government, universities, companies, students, staff and so on.

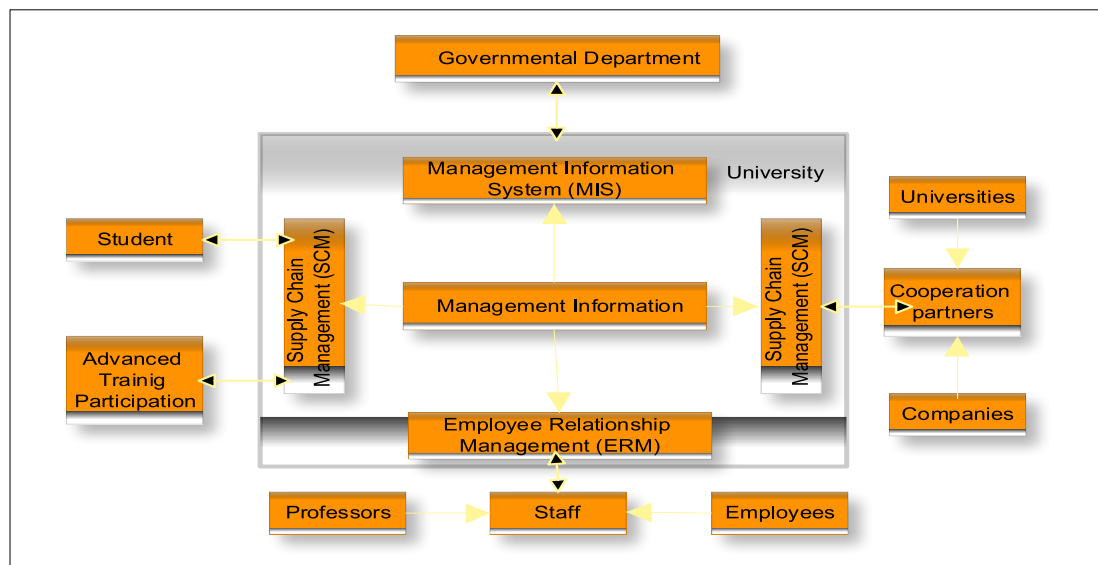


Figure 2.9. University's information system (Kudrass, 2006)

Multi-information systems have made a lot of complicated issues such as Integration issues in the management among universities (all management departments in universities worked independently; they care only about their needs, and there is no centralized planning) (Liang & Lan, 2010). Moreover, university information systems have more kind of problems, for example; different departments have different levels of information technology, information isolated among the universities and finally, there is no system can support the decision makers and e-service (Kudrass, 2006; Liang & Lan, 2010; Liu, Li & Lu, 2011). Universities have adopted internet to integrate their information systems because the internet can help them to share their information (Sohn, Yoo, & Lee, 2007; Zhou, Wang, Han & Zhang, 2010). To increase the electronic information sharing among multi-information systems needs to integrate the software, hardware and staff's skill (Landsbergn & Wolken, 2001; Yang & Maxwell, 2011). Integration issues of information systems have been appeared because of the multi-databases (Kudrass, 2006; Yang & Maxwell, 2011). Integration issues of information systems have been appeared because of the multi-databases (Kudrass, 2006; Yang & Maxwell, 2011). Many higher education IT organizational design relocations to cloud computing. In some cases, this explains that colleges and universities used cloud computing to solve integration issues (Mircea & Andreescu, 2011).

Public Universities in Yemen are using ICT in their environment for managing its operation and resources. Management information systems are developed and applied for the management and administration of curricula, students, staff, financial resources, learning resources, student facilities and so on (Ministry of Higher

Education and Scientific Research, 2006). Moreover, public universities in Yemen are using ICT to be streamlining and simplifying administrative processes both in academic departments (faculties) and in the universities' supportive departments such as admission, university's registrar, examination, etc. They planned to improved provision of timely, complete and reliable management control information, to all relevant management levels to provide better service for the student. Figure 2.10 shows the new service the YCIT-HE planned to apply in the public universities.



Figure 2.10. Yemen Higher Education Management information system (YHEMIS)

2.8.4 Yemen Center for Information Technology in Higher Education (YCIT-HE)

The main objective behind the establishment of the Yemen Center for Information Technology in Higher Education (YCIT-HE) is to improve the potentials of the higher education sector and the field of scientific research in Yemen by utilizing various ICT services available.

The partnership between the MoHESR and Dutch experts leads to the initiation of the efforts to host ICT services for higher education institutions. Hence, YCIT-HE is a collaborative effort between the education ministry and the universities to improve the higher education sector in Yemen. This is made possible by making use of available ICT services shared between the ministry and the universities. This collaboration will lead to desirable results including greater efficiency, lesser costs, and more consistent managerial services. The welcoming page for YCIT-HE's website is shown in Figure 2.11 below.



Figure 2.11. Website Yemen Center for Information Technology in Higher Education (YCIT-HE).

2.8.5 Sharing General Information between YCIT-HE and Public Universities

YCIT-HE provides universities with some services. Thus there is a need to exchange information between them. Figure 2.12 shows the communication and information sharing between the public universities and YCIT-HE. Among the information shared

is, when the universities face challenges from this service, the universities send the Objections or Ideas, and the YCIT-HE reply to the suggestion and recommendation to universities.

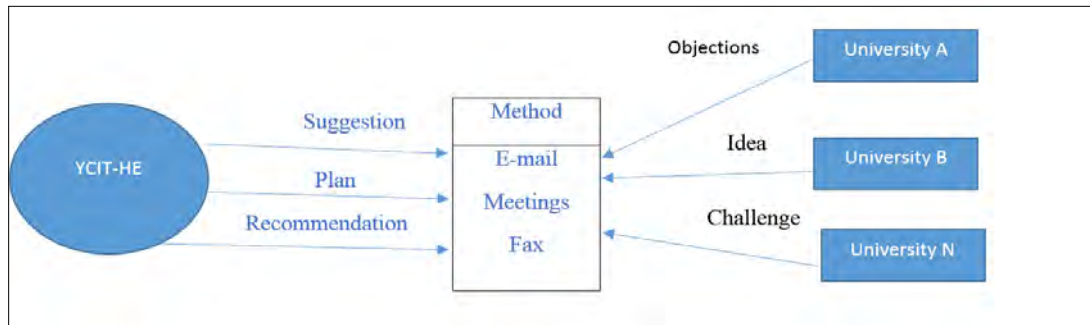


Figure 2.12. Process exchange information between YCIT-HE and public University

They mostly share their information using a traditional method such as using paper, fax, and email. The YCIT-HE stores this information (objections, ideas, suggestion, and recommendation) in the MS excel programs. According to Akbulut et al., (2009) local agencies that failed to share information often have limited IT resources and lack the equipment required to engage in information sharing initiatives. The use of these traditional ways, however, create barriers and produce limitation in the information sharing between YCIT-HE and public universities.

For instance, not all staff members will actively read e-mails. Table 2.2 lists the barriers associated with these conventional methods. Also, with this method, YCIT-HE faces difficulties in getting this information promptly. They took times longer than expected, to get their important work done and thus affect the delivery of services to staffs and students effectively and efficiently. An alternative technology should be

considered to increase the quality of information being shared besides accelerating the time managed to send and receive information.

Table 2.2

Method and Barriers for Exchange Information between YCIT-HE and Public

University

Method	Barriers	Storage
E-mail	Not all staff actively read e-mail No central storage of information	The YCIT-HE stores information such as objection, Idea, and challenges from the universities in the MS Excel programs
Meetings	Unavailability of staff to attend meetings	
Fax	Paper works increase paperwork Documents lost	

2.8.6 YCIT-HE Services to Public Universities:

The services provided such as: "YHEMIS, ELODE, UNIVERSITY NETWORK, YERNET, LIBS, IT Training, Software Licensing" are as follows:

- **Yemen Higher Education Management Information System (YHEMIS):**

The **YHEMIS** is a unified Information System serving all Yemeni public universities used as a development center with a joint effort between YCIT-HE technical team and some specialized consultants from TUDelft University in Netherland. The system is proposed to facilitate and enforce the student's affairs practices and procedures such as student application and admission, tracking the academic and financial records of

the students from the time of admission until graduation. It also helps in class scheduling, student's attendance, and student's marks or grades, and facilitates various types of reporting.

Project Status: Currently Under Implementation.

- **E-Learning and Online Distance Education (ELODE)**

This study aims to launch and implement a communal technology framework for all public institutions of higher education with proficient organizational and management structure, correct attitudes, ample skills and expertise, and sufficient time of access for staffs and students. Those universities with the aspiration to sanction distance learning programmers will be able to apply these technologies to deliver high quality and reliable online education services.

Project Status: Looking for Funds

- **University Network**

The study aims to form a computer network for all public universities in Yemen. The network will allow all faculties, libraries, administrative units, research centers and other facilities located at the several buildings and campuses of the university to have access and links with each other.

The university network projects will have immense significance as it supplies the infrastructure required to work simultaneously with other electronic services like shared internet. (Figure 2.13).



Figure 2.13. One example from the service (University Network)

- **Online Application Service (OAS) for Five Public Universities:**

YCIT-HE has consistently made efforts to implement IT services within public universities in Yemen, and it has founded the Online Application Services that enables both local and overseas applicants to submit the online applications to the university from 1st June 2013. During that time, there were five universities (Ibb, Sana'a, Thamar, Taiz, Hadramout) that made a subscription for the service. The website obtained more than 5500 applications with its first week of the establishment.

During the admission process in 2012, this service was productively piloted with the universities of Ibb and Thamar. An applicant who has used OAS provided positive feedback about the convenience and secure use of the service. It saved them time rather than traveling from their hometowns to various government offices and queuing up for applications submission which shall take more than a day. Response from admission officers and administrators of the pilot universities was overwhelming with

the usefulness of the service that helped them to receive applications well organized and saved from the numerous students who came to apply within a short period. Figure 2.14 shows this application.



Figure 2.14. The Online Application Service (OAS)

From this page, the student can choose the university from the right menu. Next, he/she submits the registration form in YCIT-HE through the website. This website shares information about students between the YCIT-HE and public universities. The universities process the registration for students. After completing the procedures of registration, the university sends the result to YCIT-HE. The center stores the result in the website, and finally, students can check their results through the website. Figure 2.15 process for the registration for the student.

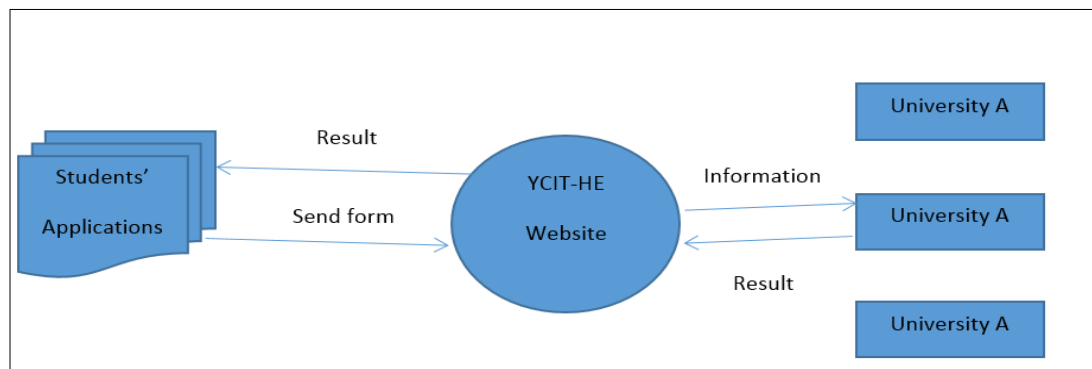


Figure 2.15. The process exchange information about the registration student between YCIT-HE and public universities

Although this system is very suitable for student registration in universities, some students have been using the traditional way, which is going to the universities in person for registration. In this situation, the university registers these students without sending any information to the center. So, the process of registration is being done without communicating with YCIT-HE, which ends up with an imbalance number of students in some universities.

After asking the students about the reason for not using this application, they claimed that the usability of this system is not beneficial. A few universities now want to stop using this application for the following reasons:

- *The high cost of application:* after asking about the reason of canceling this application to one of the university's staff, it is realized that universities are being asked to pay 200YER during the registration by the center for each student to be able to organize information electronically.
- *Lack of communication:* students need to gather all the requirements to be able to register but sometimes they could miss some requirements, and the center does

not pay enough attention whether the requirements are complete or not so they send it to the universities. Moreover, when universities realize that the requirements are missing, they have to communicate with the center to get in touch with students to ask them to complete all the requirements.

- *Time-consuming:* having difficulties with communication can take a lot of time which can cause students to miss their registration date. The university has to contact the center to tell them that the requirements are incomplete then wait for the center to contact the students and get the missing requirements and send them back to the university which consumes much time. The universities want to cancel using this application because of having too much unnecessary communication chain.

2.9 Operational Database

The operational database (DB) or traditional DB is a storage of the collection of background and event data from one or more organizations. The traditional DB is independently established for each organization, thus causing several issues in data management such as resources are wasted (Xu, Lu & Zhao, 2011). For example, each college in any university employs a different information system. The information system stores data in separate DBs; this form of storage leads to data management issues such as data inconsistency and data redundancy (Xu, Lu & Zhao, 2011).

Currently, each higher education sector In Yemen uses traditional DB to store data and thus saves data and information separately. Moreover, information stored in separated DBs in one location may not be available to another location. Also, multiple

DBs are not designed to support the systems of a university, including its data management systems, data mining (DM) systems, analysis systems, and online services.

This problem is central to the present research, but the study will focus on the data separated between public university and YCIT-HE. The use of separated databases creates the need to share information electronically between public University and YCIT-HE. Thus, this research investigated the factors that could increase the EIS between public universities and YCIT-HE.

2.10 Platforms

The IT industry of today revolves around the creation and implementation of new platforms that are cloud-based, mobile, and with fast service delivery (Hurbean & Fotache, 2013) such as cloud computing services, mobile technology, social networking and enterprise-oriented applications. Cloud computing is currently new platform for personal and enterprise use. It entails programming interfaces and technical standards that allow for data exchange, whilst its infrastructures enable widespread service deliveries at any given time. Cloud computing has formed the basis of a new information system (Cusumano, 2010).

Social media platforms with the likes of Facebook, Twitter and LinkedIn have led to the creation of an environment where opinion sharing and information exchange are greatly facilitated (Smith, 2009). This current study proposes the usage of cloud computing and social media as new platforms for the electronic exchange of information between the public universities in Yemen and YCIT-HE.

2.10.1 What is Cloud Computing?

Cloud computing is a technology that carries a role to support and accelerate an initiation to shared services and potentially cloud services are inexpensive and more flexible (Malliga, 2012). According to Rittinghouse & Ransome (2017), cloud computing is an approach to supply the services and shall become a crucial shared services approach. Moreover, according to Leavitt (2009), cloud computing is defined as “a business model which delivers IT applications and resources as a service which can be accessed remotely over the internet. While, in the traditional model, IT resources and applications are considered products which are sold or licensed from a vendor and then exploited locally on a local computer infrastructure (Evbuomwan & Omwansa, 2017). Figure 2.16 depicts the stages that led to the access of Cloud Computing:

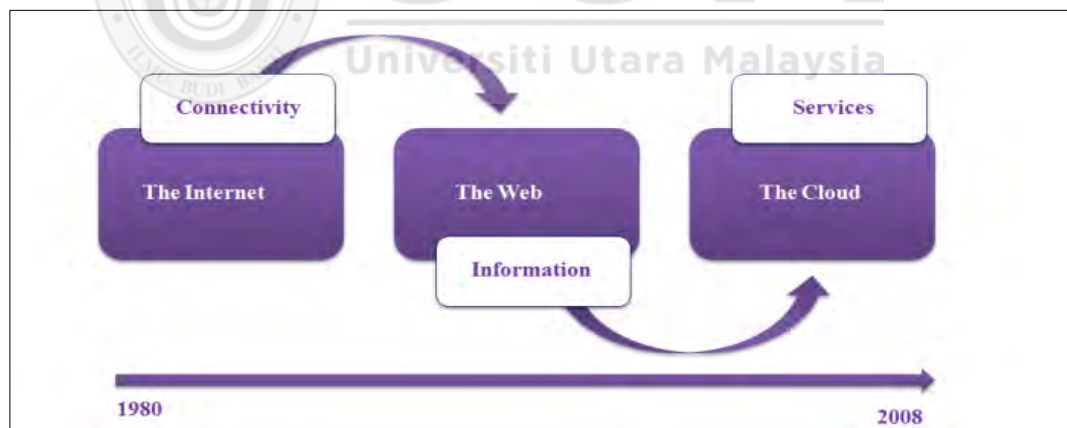


Figure 2.16. Stages of the shift to the Internet to cloud

2.10.2 Using Cloud Computing in Higher Education

Many universities have acknowledged the potentials and capability of utilizing cloud computing for higher education.

Among the many benefits of using cloud computing in higher education institutions include the direct provision of the required infrastructures, platforms, and educational services from the cloud providers as well as the capabilities of virtualization, centralized data storage and data access monitoring facilities (Malik & Rana, 2018). Cloud computing also offers easy access to applications from virtually anywhere, facilitates the process of teaching and learning, provides infrastructural and content accessibility, protects the environment via green technologies, and improves functional capabilities. Also, cloud solutions can be utilized to help compliant learning by using computer technologies to sustain collaborative approaches to instruction (Day & Erturk, 2017). There are now abundant practices and illustrations concerning the utility of cloud computing. For example, in Commonwealth, various colleges and universities had cooperated at the development of Virginia Virtual Computing Lab (Wyld, 2009). This allows institutions to reduce IT-related costs i.e. through the minimized need for licensing and software updating, to sustain its own data centers, and to improve IT-related resources for the students and researchers. In the context of the North Carolina State University, the utilization of cloud services had significantly reduced costs related to software licensing which in turn lessens the need for full time IT staff i.e. from 15 to 3 (Wyld, 2009). Another example of a higher education institution that utilizes cloud services is Quali Ready (Bristow et al., 2010), a community-based project that provides business continuity planning services. Quali Ready is a brilliant example of evolving basic principles that guide the developments of cloud. A list of past studies on the usage of cloud computing in e-learning is shown in Table 2.3.

Table 2.3

Illustrates previous studies that deal with cloud computing in E-learning:

Area	Authors (year)	Title
E-learning	Pocatilu, Alecu & Vetrici (2009)	Using cloud computing for E-learning systems,
	Pocatilu, Alecu & Vetrici (2010)	Measuring the efficiency of cloud computing for e-learning systems,
	Ghazizadeh (2012)	Cloud Computing Benefits and Architecture in E-Learning
	Selviandro, Suryani & Hasibuan (2014)	Open learning optimization based on cloud technology: Case study implementation in personalization e-learning,
	Day& Erturk (2017).	E-Learning objects in the cloud: SCORM compliance, creation and deployment options.

The main problems of information sharing are due to separate DBs. Yang, Zheng and Pardo (2012) stated that information sharing can be enhanced by the central information systems of government agencies such as cloud computing. Recent studies (Kochan, Nowicki, Sauser& Randall, 2018) have also mentioned the benefits of cloud computing in information sharing. Cloud computing provides the centralized data storage, data access and monitoring facilities from anywhere (Kochan, Nowicki, Sauser& Randall, 2018). Additionally, it increases the data availability and information access for users which can ultimately increase the information sharing.

The basis of this present study are these studies conducted by Pocatilu et al. (2009), Lin et al. (2009), Youssef (2012), Youssef (2013) and Mohammed and Ibrahim (2013). Cloud computing is considered as the perfect platform for information sharing

because it provides a centralized data storage and data access monitoring facilities among YCIT-HE and Yemen public universities. Moreover, cloud computing serves as a channel in supplying the services and become indispensable shared services approach (Jeffreys, 2011). Cloud computing also makes colossal information available to the users by making it accessible to the authorized person providing high-quality information and compatibility with hardware and software. It also integrates information by using standard format and mainly by improving data efficiency hence, achieving the maximum information sharing.

(Over the last few years, studies have used technology of cloud computing in order to solve government problems. Similarly, organizations have also utilized cloud computing for inauguration of shared services centers in order to attain huge amount of cost savings and flexibility (Miskon, 2013). The benefits that Yemen public universities and YCIT-HE gets from using cloud computing are reduced costs of maintenance and implementation, enhanced collaboration means enhanced accessibility and mobility (Hayes, 2008). Moreover, central information systems as cloud computing can enhance the YCIT-HE and Yemen universities in information sharing among them. However, the studies conducted on information sharing have not mentioned the use of common data warehouse techniques in place of traditional databases to increase the information sharing electronically (Kamal, Singh & Ahmed, 2012; Bigdeli, Kamal, & DeCesare, 2011, 2012, 2013a).

Chen, Chen, Huang and Ching (2006) stated that developing countries should learn from e-government systems of developed countries such as successful e-government implementation strategies. They should then work with e-government implementation

strategies that can fit with characteristics and conditions of their country. Yemen government is just in the beginning of developing ICT infrastructures. Thus, government sectors especially Yemen higher education sector should learn from the developed countries in order to move a step ahead from the beginning level to the advanced level and resolve the issues faced while using multi-databases for storage of data and information. Therefore, technologies like cloud computing can help and support the Yemen government in decreasing the problems by saving time, cost and effort.

2.11 Social Media

Several definitions have been proposed to define the term of social media. According to Panahi, Watson and Partridge (2012), social media is “collaborative online applications and technologies which enable and encourage participation, conversation, openness, creation and socialization amongst a community of users.”

Social media is a great platform for discussing about the facilitating tools and technology as well as social media-generated contents. Social media entails social networking services such as Facebook and Google+, microblogging services such as Twitter and wikis, as well as media sharing sites such as YouTube and Flickr. Social media is often associated with user-created content, crowdsourcing, and Web 2.0 (Magro, 2012).

Social media offers the capability for operators to link with each other and form groups to socialize, share information, or to attain a common goal or interest. Social media can be endowing to its handlers since it provides them with a platform to access.

Anyone who is having internet access the able to broadcast or publish information, effectually democratizing media economically. With regards to time, social media allows users to publish their content instantaneously at almost real time (Bertot et al., 2010).

2.12 Types of Social Media

2.12.1 Facebook (Social Networking Service)

Facebook is explained as a “social utility that helps people share information and communicate more efficiently with their friends, family and co-workers” (Baro et al., 2013). It permits users to create and share their rich online personal identity with networking friends, through posting pictures, and wall posts. Furthermore, Facebook members can create and join groups based on their interests and can share their, information, knowledge, experiences and issues through the built-in applications (Wang et al., 2012).

Furthermore, some interaction and collaboration technology forms have assisted learners in educational contexts. Facebook assisted learners to exchange information and create knowledge amongst each other within the group environment (Ractham & Firpo, 2011). There are also many beneficial offerings by using social Networking service (Facebook), such as, sharing the documents between users, modify and save it, and retrieve it anytime and anywhere (Siriwardana, 2012).

2.12.2 Microblogging Service (Twitter)

Microblogging is a novel method of communication in which users can pronounce their current status in short posts disseminated by prompt messages, mobile phones, email or the Web (Java et al., 2007). It is known as “a form of blogging that lets you write brief text updates (usually less than 200 characters) about your life on the go and send them to friends and interested observers via text messaging, instant messaging (IM), email or the web.” it is delivered by numerous services such as Twitter. Twitter is One of the most popular platforms in microblogging platforms that offers a light-weight, accessible form of communication that allows users to broadcast and share information about their opinions, activities, and status (Jason, 2009).

Twitter can be recognized as a directed social network, where each member has a set of subscribers or followers. Each applicant uploads and share regular status updates, called tweets that contain short messages of maximum size 140 characters. These updates normally entail the personal information of the members, news or links including images, videos, and articles (Ho et al., 2013). Students and the faculty members can use Twitter for education without being limited to the semester terms' schedule. Hence, continuous relationships and communications can be maintained even outside of class or after the end of the course/semester. Hence, the faculty can continue giving out academic and professional advice to the students. On top of that, the teacher-learner relationship can progress more naturally rather than end immediately after the semester concludes. Students are able to stay in community by learning from each other and sharing their experiences regularly (Dunlap & Lowenthal, 2009). It has been observed that social media such as twitter, facebook and

WhatsApp helps in improving relationships among the employees working in public sector universities and YCIT-HE by communicating and sharing information across multiple platforms. Moreover, social media plays an important role in improving public services and providing more innovative mechanisms for service delivery in different public universities.

2.13 Use of Social Media in the Public Sector

According to Hearn, Foth and Gray (2009), the public sector can improve the relationship with another sector with the aid of social media. The key benefit to the public sector from the second-generation web is the transparency and participation of citizens. Also, the public sector can make use of the gain of the heyday of this new participative culture that is evolving in many citizens to ameliorate the interactions of government-to-Citizens (G2C). Figure 2.17 shows the impact of second-generation Web on the public sector.

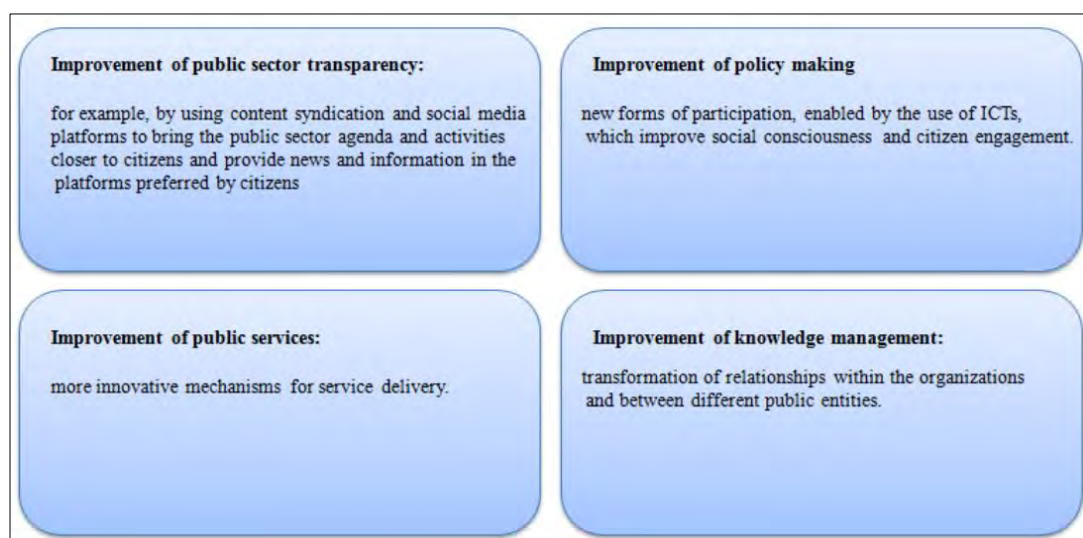


Figure 2.17. Illustrates the impact of second-generation Web on the public sector

Unfortunately, the study about the influence of social media on the public sector, particularly local government is still extremely tentative and exploratory (Huijboom et al., 2009). Furthermore, Bonsón, Torres, Royo and Flores (2012) specified that social media with the public sector is still in early stages. Table 2.4 shows the previous study about social media in the public sector.

Table 2.4

Examples of Researches about Social Media in the Public Sector

Author (s)	Year	Title
Molinari and Ferro	2009	Framing Web 2.0 in the process of public sector innovation: Going down the participation ladder
Ghannam	2011	Social Media in the Arab World: Leading up to the Uprisings of 2011
Bonsón, Torres, Royo and Flores	2012	Local e-government 2.0: Social media and corporate transparency in municipalities.
Levy, Bagby and Trauth	2013	E-government evolution in small municipalities in Pennsylvania in web 2.0 social environment: a poster.
Lee and Park	2014	Introduction to the special issue: social media interaction between the public and government in Asia-Pacific

2.14 Theoretical Foundation of Adopting Electronic Information Sharing

Series of studies have been completed in the field of EIS. However, as discussed earlier, ample of limitations are noted in many of these studies and which necessitated the development of a theoretical model that can further assist in explaining those factors that are influencing public organizations electronic information sharing and its subsequent categorization (Akbulut et al., 2009; Bigdeli et al., 2013b). Therefore, in this study, EIS is considered from the perspective of innovation. Innovation has

generally been explained as a practice, an idea and/or object that can be viewed or considered to be novel by those who implement it (Rogers, 1995). Therefore, an innovation could be seen as a new technology or a renewed concept regarding thought and action (Thong, 1999). From the perspectives above, it is quite apparent that electronic information sharing between universities and Ministry of Higher Education and Scientific Research (MOHESR) importantly needs the introduction of latest technologies and novel ways of thought and action. Also, organizations make decisions concerning the adoption of inter-organizational systems which helps all the members to help one another is germane to all researchers in the field of Information Systems (Pardo & Tayi, 2007). In the last ten years or so, many studies have been conducted describing and analyzing different factors that affect the environment, inter-organizational, and intra-organizational of information adoption and sharing in government institutions (Bigdeli, 2012b).

2.14.1 Layered Behavioral Model (LBM)

Consequently, a model known as Layered Behavioral Model (LBM) was chosen as the analytical framework of this study. LBM was used to measure the influence of the development software processes at numerous levels such as individual, team and project level to the external. (Curtis, 1988) refer to figure 2.18.

2.14.1.1 Individual-level Layer

The individual level refers to the effect of a person on the use the software or any technological project the how the differences in individual talents and skills influence project performance.

2.14.1.2 Team Level

This level refers to the team ability to impact on processes of a group through superior knowledge, like decision-making, happening at the team level. Owing to the broad skill ranges on design teams, expert power (French and Raven, 1959; Curtis, 1988)

2.14.1.3 Company Level

The company-level refers to the organization, cost of new application in the organization, and affected the migration from old system to new system.

2.14.1.4 Project Level

The project level refers to requirements the project, such as functionality needed for the system, the processing or storage capacity of the required hardware and software.

2.14.1.5 Business Milieu

Refers to external environment influences from outside the organization

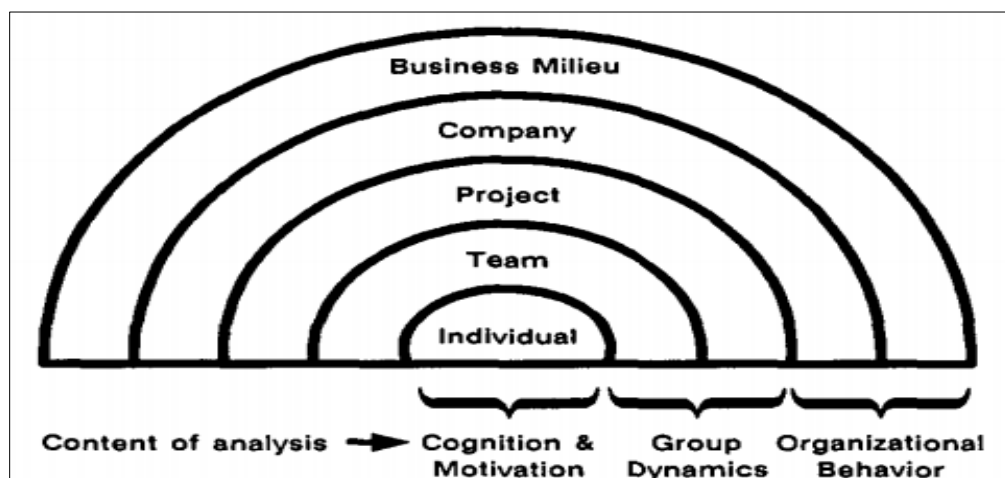


Figure 2.18. The layered behavioral model of software development

The main reason for selecting this model is that this method can address the problems of this research. According to Kurnia and Johnston (2000), any adjusted framework or model has to be generated and refined to an advanced version in order match the context that it applies to in a certain period. There is a difference between software projects and EIS, but there are enough reasons to implement the layered Behavior Model in this study. First, the EIS is multi-layered original deeds as a software project. Second, both software projects and electronic sharing of information aims are to discover what and how the problems (factors) influence the activity processes at various levels. Third, layered behavioral model (LBM) is applied to the study of EIS, has helped the researcher to extend the scope from the individual organizational project into the inter-organizational project. Fourth, the LBM includes the individual context which can be used to provide explanation and understanding on the effect of the behavior or participation in electronic information sharing which has not been studied in electronic information sharing in higher education sector before. Fifth, this model was successfully tested in electronic information sharing among public organizations (Jing & Pengzhu, 2009) and not yet in higher education. Finally, it can be set up to assist the research to analyze and response the research questions of this study. Therefore, LBM can be more suitable for this study.

2.14.2 Social Exchange Theory

Social exchange theory (SET) is amongst the most persuasive conceptual paradigm for understanding workplace behavior (Cropanzano & Mitchell, 2005). The theory vital principle is that humans in social situations select conduct that augment their likelihood of achieving self-interests in those circumstances. The consequence of a

member's behavior relies on the approachable behavior of other members in the affiliation (Son et al., 1999). According to Premkumar and Ramamurthy (1995), SET supplies the fundamental in the study of relationships among organizations (Humphreys et al., 2001). Moreover, the theory of social exchange theory adopts social exchanges amid two or more individuals are determinations by contributors to accomplish simple requirements (Ensher, Thomas & Murphy, 2001). According to Wu, Chuang and Hsu (2014), it is essential to determine information sharing and collaboration. The heart of the Social Exchange Theory is the concepts of equity and reciprocity.

IS researchers have initially utilized this theory as a basis to explore and observe the factors that influence inter-organizational relationship from a non-economic perspective (Premkumar & Ramamurthy, 1995). Humphreys et al., (2001) debated that the theory of social exchange forms a theoretical background to study and scrutinize non-profit inter-organizational transactions. According to this dispute, this theory can be applied when the relationship and partnership amongst various entities need not necessarily result in any economic outcome. According to Son et al., (2001) the factors derived from this theory, namely: power, trust, reciprocity, interdependence and conflict, have been observed in different empirical research to analyze different features of inter-organizational relationship and collaboration.

“Trust” is recognized as essential social factors that lead essential role in the process of providing service towards participation in EIS concerning inter-organizational information sharing (Akbulut et al., 2009; Jing et al.,2014). Inter-organizational trust is explained as a company’s faith that a different company or department will execute

the activities that will provide positive results, and simultaneously not undergo unpredicted actions that could give negative results for the company (Anderson & Narus, 1986).

“Power” is also a factor that manipulates any kind of inter-organizational, and it is defined as the ability of a field to apply control on a different field to perform in a predicted circumstance (Hart & Saunders, 1997). It is considered that based on its own needs, the low power side of the relationship can be highly manipulated by the other powerful organization (Saunders & Clark, 1992). The role of power in inter-organizational relationships has been premeditated with regards to the interdependency among organizations. According to Ganesan (1994), to achieve an aim and ambition, dependency between organizations in a networked collaboration environment must be preserved. Most of the studies do not point out the limit that power can manipulate in inter-organizational relationships and they explained that anyhow an organization should have considered some activities; power could not be the reason to the action is happening.

Another key factor that influences in this theory is reciprocity. Reciprocity is a vital force to channel information-sharing behaviors amongst member's organization (Tung-Mou Yang, 2011; Julibert, 2008; Constant et al., 1994). When the staff's response to other staffs in a different division, this displays the readiness to embrace the concept of share information. Bock et al. (2005) disputed that predicted reciprocity serves as an important factor manipulating attitudes of members of organizations towards information sharing.

2.14.3 Information Sharing Theory

A theory of information sharing was introduced by Constant et al.'s (1994), Information-sharing theory is a theory that proposes organizations own the information on their participants, and participants to share organizational information as a requisite. According to Constant et al. (1994), self-interest opinions of members can decrease support for sharing information in an organization.

From the organizational participant's view, organizational information embodied as “data” can be shared easily amongst personalities and is more frequently regarded as an asset owned by organizations. Simultaneously, organizational information for instance “expertise” is regarded as more challenging to share among individuals and is more generally regarded as individual property owned by organizational members most of the time. Constant et al. (1994) verified sections of the concept in a sequence of laboratory researches. The main discoveries were that attitudes about various categories of information sharing (data versus expertise information) are related with various backgrounds and that people's attitudes about sharing information are based on both rational self-interest and contextual factors. Constant et al. (1994) discovered that a relationship between attitudes of sharing information and self-interest is restricted due to the attitudes concerning social and organizational norms.

The possibility of participants sharing information is affected by the way employees believe in organizational ownership concerning expertise and information (Jarvenpaa & Staples, 2001). Constant et al. (1994) mentioned that adoption of belief in organizational ownership can help in enhancing attitudes of members towards sharing

information. In the same way, Kolekofski and Heminger (2003) proclaimed that external values are placed by stewardship before individuals claim the ownership.

The factors derived from this theory are “information ownership” and “information stewardship.” Akbulut et al., (2009) disputed that “information ownership” and “information stewardship” can be reflected as two important factors that play significant roles in the process of participation in electronic information sharing.

Information ownership denotes that a person is a definitive authority for information comprising all connected rights and responsibilities and information stewardship, that is, an individual must handle information on behalf of others. When organizational participants are motivated toward information ownership, then they consider information as a personal resource instead of an organizational resource and limit their sharing to information they see as profiting the whole organization rather than potential internal competitors (Kolekofski & Heminger, 2003). Some studies adopted this theory in information-sharing in public organizations (Yang & Maxwell, 2011). As the result of this study, several activities that can enhance organizations' probabilities for effective information sharing. At an operational level, the establishment of information systems that diminish alterations to internal procedures and information flow seems to be vital for a fruitful advancement of a culture of information stewardship in contrast as opposed to ownership. Thus, this study investigates this information stewardship to find their influence on the participation of electronic information sharing in the higher education sector in Yemen.

2.15 Conclusion

This chapter reviews the relative works of electronic information sharing in public organizations, identifying the research issues in Yemen public universities. It began with the description of information sharing in public sectors, then followed up with benefits and challenges facing the public sectors to share their information electronically with others. The review illustrated the limitations of these previous studies. One of the limitations is the technological issues of electronic information sharing. However, it also clarified the Higher education in Yemen, the structure of higher education, and the ICT in Yemen higher education.

The chapter continues to discuss cloud computing and social media and the differences between them. It also described the potential uses of cloud computing and social media in public sectors and higher education sectors (university level and Ministry level). Finally, the chapter presented the foundational model of this study, Layered Behaviour Model (LBM) model of (Curtis, 1988), Social Exchange Theory (Emerson, 1976), and Information sharing Theory (Constant, Kiesler & Sproull, 1994) . These theory and model in its technique to find the factors that influence EIS between Yemen public universities and YCIT-HE.

CHAPTER THREE

THEORETICAL MODEL

3.1 Introduction

This chapter describes the methodology applied in conducting the study in order to meet all the research objectives. It starts with a discussion on the theoretical model, with the focus on four layers: External Environment, Organizational, Technological and Individual layer. The aims is to identify the relevant factors (IV, DV) associated to the four levels. The chapter continues with presentation of the formulation of hypotheses. The independent variables are hypothesized to have some effects in increasing the participation, the dependent variable, within electronic information sharing between public universities and YCIT-HE. The chapter then proceed with a discussion on data collection and data analysis process.

3.2 Challenges EIS between Yemeni public universities and YCIT-HE

Earlier, this study has highlighted the present challenges of electronic information sharing evidenced from the previous studies. To identify relevant challenges in the context of this study and to attain the objectives of this research, EIS between Yemeni public universities and the center of YCIT-HE, a model was adopted to become a foundation of the study. Sekaran and Bougie (2010) defined it as a conceptual model to theorize or logically establish a relationship between many factors that have been recognized as essential to the problem of the study. From the theoretical model, the testability of hypotheses could be determined, and the validity of the formulated theory could be examined.

3.3 Analytical Model Based on Layered Behavior Model (LBM)

This study adopted Layered Behavior Model (LBM) as a foundation in examining and analyzing the relationship of independent and dependent variables. It was selected to support the intention of this study in examining the sharing of information at different layers between the public universities and YCIT-HE; from the individual to the external layer. According to Jing & Pengzhu (2009), the individual level refers to influences of participation behavior in electronic information sharing while technology layer refers to a technological context that influences the electronic information sharing project (Bigdeli, 2013). Technological issues are the most influenced aspects of the adoption of electronic information sharing between public organizations (Yang & Maxwell, 2011). This study focuses on the investigation of the electronic information sharing in higher education based on a technological point of view. This includes the discovery of the effect of cloud computing and social media on electronic information sharing.

Organization layer, on the other hand, is referred to as the agency context, the internal factors that cause an impact on government organizations, therefore inspiring the staff to share information with different organizations (Akbulut et al., 2009; Akbulut, 2011). In this study, the organization layer points to the effect of the university on the participation of electronic information sharing. Finally, there is an influence of participation from outside of the university which is called external environment layer (Bigdeli, Kamal, & de Cesare, 2012; Jing et al., 2014). Together, the individual, technological, organizational, and external environmental layer are proposed as

influencing factors on EIS in a university. Figure 3.1 illustrates the four layers that founded the operation of this study.



Figure 3.1. The Model of this study (The Foundation Model)

In determining the factors of electronic information sharing, the study is based on two theories; Social Exchange Theory and Information Sharing Theory. Thus, the proposed influential factors of electronic information sharing between Yemen public universities and YCIT-HE are (i) individual Layer (benefits, information stewardship), (ii) Technological Layer (information quality, information technology (IT) capability, IT compatibility, cloud computing and social media), (iii) Organizational Layer (interagency trust, top management support, Financial Capability), (iv) Environment Layer (laws and policies and upper-level leadership),. Chapter Two has also highlighted the importance of cloud computing and social media in supporting electronic information sharing. With a reason that cloud computing establishes a sharing platform, reduced implementation and maintenance costs, ensures the availability of information, eases the access to information and mobility, the study highlights cloud computing and social media platform as the potential factors that could increase electronic information sharing among organizations because cloud

computing can provide high-quality information with compatibility of software and hardware of information systems between YCIT-HE and public universities. Finally, it can enhance the security by reducing the interruption of information while sharing them. Social media, on the other hand, allows people to communicate and share their information across multiple platforms. It helps to improve public services and provides innovative mechanisms for service delivery in the public sector.

3.3.1 External Environment Layer:

This layer influence on the operations of organizations which are required to upkeep the development of information sharing (Akbulut, 2003). The empowering environment comprises economic, social, cultural and political factors cause an impact on power structures and national institutions in the private and public sectors. In this context of this study, the external environment layer represent the power of participation from outside of the university.

As cited by researches, various influential effects arising from the external environment exist and cannot be ignored by agencies (Jing & Pengzhu, 2007b, 2009; Bigdeil et al., 2012). Several environmental factors which have been examined in e-government, such as laws and policies, upper-level leadership and trust (Akbulut, 2003, Akbulut et al., 2009; Jing & Pengzhu, 2007b, 2009; Jing et al., 2014) are the most prominent factors in the external environment for each public organization. External environment layer in this study comprises the following factors: Upper-level leadership and Laws and policies.

Upper-level leadership can aid to uphold promote trust among participating agencies and elucidate roles and responsibilities during the project processes. Moreover, upper-level leadership may offer financial resources for development of project. Hedberg and Helenius (2007) stated that leaders are the main influencer on the worker in the organization. The other factors, laws, and policies, help in trust-building and reduce risk in information sharing projects between organizations. Laws and policies have a substantial effect on realizing information sharing; i.e., the extent to which government agencies share information through various electronic media tools (Bellamy, Raab, Warren & Heeney, 2007).

Based on observation Yemen public organizations environment need some laws and policies to support and encourage the staff regarding exchange of information electronically (OECD Joint Learning Study, 2010). Table 3.1 shows the definition factors based on context of this study. Moreover, the table shows influential factors of an external environmental layer based on previous studies. The table describes the findings of EIS studies in government organizations. Thus, the findings illustrate the importance of these factors in increasing the electronic information sharing among these organizations. This study investigates the External Environment Layer with laws and policies, and upper-level leadership factors as influential factors to increase electronic information sharing between public universities in Yemen and YCIT-HE.

Table 3.1

Influence factors of external environmental

Definition Factors	Akbulut, 2011	Bigdeli, 2012	Jing, Pengzhu & Yen, 2014
--------------------	---------------	---------------	---------------------------

<p>Upper-level leadership Has the authority to set guidelines, standards and provides advantages and disadvantages for EIS between YCIT-He and public Universities.</p>	<p>The scope of Study Information sharing between state and local enforcement law State agencies have been observed to exert various forms of power (encouragement, recommendations, incentives, penalties, etc.) on local agencies to increase EIS. Finding: power is supported factors in this study</p>	<p>Scope of Study EIS among many local government authorities in the UK Upper pressure refers to the influences of Central Government on the decision-making processes of local authorities. Finding: There is strong inter-organizational leadership in LGAs with positive attitudes and will towards inter-departmental</p>	<p>Scope of Study G2G information sharing among agencies in China Information sharing can be implemented effectively when government agencies share a common upper-level leadership Finding: upper-level leadership has significant influence in this study</p>
<p>Laws and policies Refers to legislation and policies to organize EIS and to build good relationships and trust among staff between YCIT-HE and public universities.</p>	<p>It refers to the rights of government agencies to collect and disseminate information, answering questions. Finding: Policy has no influence effect</p>	<p>The legal principles refer to the information sharing policies which can create an EIS environment in among departments to become effective and legitimate Finding: There is a set of legal information sharing, but with lack of clarity and integrity among them has negative influences on EIS.</p>	<p>Information sharing can be hard to achieve because of the uncertainties about the legislative authority of the government agencies to collect and disseminate information. Finding: Policy/laws have no effect on electronic information sharing.</p>

3.3.2 Organizational Layer

In this study, organizational layer refers to the internal factors which belong to a public university which have an effect on the participation of electronic information sharing between public university and YCIT-He. In the context of this study, three factors are focused on under Organizational Layer: Top management support, Financial capability, and interagency trust. These factors can support the staff in an organization to share information with others (Akbulut, 2003). Organizations can provide services to other organizations through information systems. It covers activities by and agreements between organizations. Previous studies have recognized the importance of these factors to provide more sources of electronic information sharing. The factors are such as top management support, financial capability and interagency (Yang & Maxwell, 2011; Bigdeil et al., 2012, 2013a; Jing et al., 2014). In this study, three factors are focused on under Organizational Layer, top management support, financial capability, and interagency trust factors affect increasing the electronic information sharing among public organizations. Table 3.2 shows the definition of these factors in this contexts of this study, influence factors of an organizational layer based on previous studies. It also explains the findings of related works of electronic information sharing in public organizations. The findings identified the influence of these factors in increasing the inter-organizations electronic information sharing. Thus, top management support, financial capability, and interagency trust will be investigated as the critical factors at the organization layer to increase electronic information sharing between Yemen public universities and YCIT-HE.

Table 3.2

Influence factors of the organizational layer

Definition Factors	Akbulut, 2011	Bigdeli, 2012	Jing, Pengzhu & Yen, 2014
Top management support Refers to universities manager provide a good environment to make EIS easy between public universities and YCIT-HE.	The scope of Study Information sharing between state and local enforcement law. Top management support can encourage staffs to share information electronically by providing a positive environment. Finding: Top management support has important effect on electronic information sharing.	Scope of Study EIS among many local government authorities in the UK Top management provides an optimal environment for effective inter-departmental EIS. Finding: Top management support has a significant and positive influence on EIS	Scope of Study G2G information sharing among agencies in China Top management within one agency appreciates the value of innovation and actively creates a favorable atmosphere for the IT system. Finding: Top management factor has important effect in this study.
Financial capability Financial power to develop, maintenance and integrate the information sharing system between YCIT-HE and public	Financial capability refers to the availability of financial Resources a local agency needs to share information electronically.	Public sector need financial capability is for procuring and developing hardware, software as well as for improving the IT skill among the employees.	

Table 3.2 continued

<p>universities in Yemen.</p>	<p>Lack of resources represents an important barrier to information sharing Finding: Financial capability has effect on electronic information sharing.</p>	<p>Finding: There is a set of legal information sharing, but with lack of clarity and integrity among them and has negative influences on EIS.</p>	
<p>Interagency trust Refer to a high level of mutual trust mean YCIT-HE should protect university information during sharing electronically and the information is correct.</p>	<p>Trust can define as a local agency's belief that the state agency will perform actions that will result in positive outcomes for the local agency. Finding: Trust is a supported factor in this study</p>	<p>Trust among the participating entities becomes an urgent matter. Finding: Trust factor has been the most critical factor influencing the final decisions of adopting EIS in LGAs.</p>	<p>Trust among inter-organizational is one of the fundamental conditions for establishing a partnership. Finding: trust has no influence effect</p>

In the context of this study, technology layer refers to a technological context that influences the electronic information sharing. Moreover, this layer refers to the technological capability which can be used to share information electronically (Bigdeli, 2012; Kamal, Singh & Ahmad, 2012). According to Yang and Maxwell (2011), technological challenges have been considered as the leading influence in adopting electronic information sharing in government sectors. Therefore, this study

emphasizes on the subsequent factors: IT Capability, Information Quality, IT Compatibility, Cloud Computing and Social Media.

This study investigates IT capability, information quality, compatibility, cloud computing and social media as influence factors to increase electronic information sharing amongst Yemen public universities and YCIT-HE. Additionally, this study tried to discover the effect of cloud computing and social media on electronic information sharing. Table 3.3 shows the definition of these factors in this contexts of this study, the influence factors of a technological layer based on previous studies. The table explains the IT capability, information quality, compatibility, cloud computing and social media barriers in electronic information sharing in public sectors. It also illustrates the findings of previous studies of electronic information sharing. The results examined in previous studies that these influence factors can increase the electronic information sharing between government organizations.

Table 3.3

Influence factors of Technology layer

Factors	Akbulut, 2011	Bigdeli, 2012	Jing, Pengzhu & Yen, 2014
IT capability refers to the availability of IT resources, IT expertise, and other IT skills in the public universities.	The scope of Study Information sharing between state and local enforcement law IT capability refers to the availability of IT resources within a local agency that enables EIS.	Scope of Study EIS among many local government authorities in the UK IT capability of the LGA departments was examined through three key variables; IT infrastructure, IT	Scope of Study G2G information sharing among agencies in China It refers to the level of IT resources, IT expertise, and other IT skills within a government agency. <i>Finding:</i> IT capability has no

Table 3.3 continued

	Finding: IT capability has essential effect on EIS in this study.	sophistication and IT knowledge. Finding: There is not enough knowledge about the IT compatibility in LGAs	influence on support because all the agencies have good IT support and IT skills.
Information quality (IQ) refers to timeliness, accuracy, authority and currency of information sharing.		refers to accuracy, credibility and currency. Finding: Information quality has a positive influence in EIS.	
IT Compatibility refers to equal levels of hardware, software and data standards in information sharing project.	IT Compatibility refers to the degree to which the technologies required for EIS are compatible with a local agency's existing information systems Finding: IT Compatibility has no influence on EIS in this study	Information sharing efforts via integrated systems in organizational and technological interoperability. Finding: There is not enough knowledge about the IT compatibility in LGAs.	Compatibility of G2G information sharing requires both technological and organizational information systems. Finding: Compatibility has influence support in this study.

3.3.3 Individual Layer

In the context of this study, the individual layer refers to influences of participation behavior in electronic information sharing between Yemen public universities and YCIT-HE. Individual layer focuses on the employees in an organization (Kamal et al., 2012). Employees in an organization are an important entity because the exchange of information between staffs is based on them. Individual leads an essential part to handle the organization with the help of technology and virtually reliant on

information in decision making and provide services to the citizen. Organizational members' prospects before the commencement of information sharing activities will affect the attitude and willingness of workers towards the sharing process (Jing et al., 2014). Majority of government leaders and workforce have recognized the profits of information sharing (Kamal et al.,2012; Jing et al., 2014). When the staff knows the benefits of information sharing, this can make them share more (Mendes Calo, Cenci, Fillottrani & Estevez, 2012). Individual layer in this study contains the following factors: Benefits and Information stewardship.

Benefits and Information stewardship are the most influential factors in the individual layer for each public organization. Table 3.4 shows the definition of these factors in this contexts of this study, demonstrates the influence factors of the individual layer based on previous studies. The table describes the findings of electronic information sharing studies in government organizations. Thus, the findings illustrated the importance of these factors to increase the electronic information sharing among organizations. This study investigated the benefits and information stewardship factors as significant factors to increase electronic information sharing between public universities and YCIT-HE in Yemen.

Table 3.4

Influence factors of Individual layer

Definition Factors	Akbulut, 2011	Bigdeli, 2012	Jing, Pengzhu & Yen, 2014	Yang & Maxwell 2011
Benefits refer to the	The scope of study	Scope of study	Scope of study	Scope of study

Table 3.4 continued

<p>significance of information sharing among staff in public organizations</p>	<p>Information sharing between state and local enforcement law Perceived benefits play an important role in motivating government agencies. Finding: Benefits have influence support in electronic information sharing between agencies</p>	<p>EIS among many local government authorities in the UK Benefits of innovation would positively influence the adoption process. Finding: The benefits has influence effect, is the most crucial factor in EIS throughout the participation phases.</p>	<p>G2G information sharing among agencies in China Improve information quality, streamline the business process, increase administrative efficiency, enhance the ability of decision and policy-making, and reduce cost. Finding: Benefits is supported factors in this study</p>	<p>Information-sharing in public organizations.</p>
<p><i>Information stewardship</i> Information stewardship means information belongs to an organization (YCIT_HE) and not just to a staff at public universities.</p>	<p>The individual should manage information on behalf of others because information should be freely shared among public organizations. The staffs in some organization feel</p>			

Table 3.4 continued

	<p>that information is their own</p> <p><i>Finding:</i></p> <p>Promotion of a culture of information stewardship as opposed to ownership</p>
--	--

This section will illustrate the four layers that will be investigated in this study. Therefore, these layers can be utilized as the barriers of electronic information sharing between public universities and YCIT-HE. Each layer has some factors that can influence electronic information sharing between them. These factors have been examined based on the theories to be used in this research and from the previous work of electronic information sharing. The next section will explain the electronic information sharing factors that are proposed to affect the involvement of EIS between public universities and YCIT-HE in Yemen.

3.4 Formulation of Hypotheses

The observed situation and problems raised in this study need to be explained systematically. Thus the hypotheses need to be formulated and tested. This section explains the formulation of the hypotheses as part of justifying the research questions and achieving its objectives.

3.4.1 External Environment Layer

In this study, external environmental Layer refers to the influence of participation from outside of the university. Several environmental factors which have been examined in the prior study, such as upper level leadership Jing et al. (2014), and Otjacques, Hitzelberger and Felndtz (2007) showed that upper-level leadership plays a vital role in the implementation of electronic information sharing. Upper-level leadership has the authority to set guidelines and standards for sharing information such as data definitions, data standards, and information clearinghouses (Jing et al., 2014). It can disguise as encouragement or pressure and can fluctuate from no encouragement or pressure to recommendations, requests, or offering rewards or imposing penalties (Akbulut, 2003).

The upper-level leadership could have an interactive effect on the public universities in Yemen because they can encourage others by applying high standard and aims and support them attain these ambitions. Furthermore, the leader's capacity of taking the risk, attempting novel techniques of undertaking things for organization and workers mean that the leader can encounter the procedure and leader's capability to empower employees, improve collaboration, and inspire cooperation (Kouzes & Posner, 2007; Al-sharafi & Rajiani, 2013). Finally, inspiring the worker to speak of the leadership role in knowing and gratifying the worker collaborations. (Al-sharafi & Rajiani, 2013).

Laws and policies include the rights of government agencies to collect and disseminate information. The government policies can decrease or increase the encouragement of using electronic information sharing among its agencies; thus, it has a substantial

influence on EIS across organizations, especially in the public sector (Dawes, 1996; Landsbergen & Wolken, 2001; Gil-Garcia & Pardo, 2005; Gil-Garcia et al., 2007). The lack of laws and policies which will help to ascertain the privacy and confidentiality of shared information can obstruct information sharing in the public sector (Atabakhsh et al., 2004; Landsbergen & Wolken, 2001; Zhang & Dawes, 2006; Yang & Maxwell, 2011). The policies and laws support agency employers because the policies and laws can increase authority and trust between the staff of agencies (Gil-Garcia & Pardo, 2005; Gil-Garcia et al., 2007; Estevez et al., 2010; Kamal et al., 2012).

The higher education in Yemen is governed by the laws and policies and instructions issued by the government regarding higher education (Alhamassy, 2012). Hence, in this study, a hypothesis presumes the External Environment Layer as below.

H1: External Environment Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.

3.4.2 Organizational Layer

Organizational layer refers to the internal factors which belong to a public university which have an effect on the participation of electronic information sharing between public university and YCIT-He. This layer have three factors such as: Top management support, financial capability and interagency trust.

Top management support is explained as the support of the top managers who can confirm the adequate amount of resources and perform as a change agent to produce a more encouraging atmosphere for staffs and buoy up them to share information with

different organizations (Kamal et al., 2012). Researchers have stressed that without the support of top management, the progress of information sharing slows down (Akbulut, 2003; Jing & Pengzhu, 2007, 2009; Estevez et al., 2010). Top management support provides guidance that can help organizations cross the barriers of information sharing (Akbulut et al., 2009; Liu, Lu & Pei, 2011). Top management is exercised through leadership, authority, and involvement, thus further encouraging the staff to electronically share information (Gil-Garcia et al., 2007). This kind of encouragement includes staff incentive, such as the organization provides training to utilize the system, application packages, and operation systems (Al-Mamary et al., 2014), or money and position (Yang & Maxwell, 2011)

In Yemen, the top management can provide support to staff by encouraging them to use new technology. In other words, the top manager can provide a suitable environment for any new information system (Al-Mamary et al., 2014).

Financial capability is referred as the financial capacity that a local agency requires for the sharing of information electronically (Akbulut, 2011). The cost of electronic information sharing is primarily correlated to the costs of obtaining the convenient technology for partaking comprising development cost, operating cost, setup costs, installation costs, integration costs, interfacing costs, communication cost, maintenance cost, and in addition to the cost of staff training (Landsbergen & Wolken, 2001; Akbulut, 2003; Jing & Pengzhu, 2007b, 2009). It is challenging for organizations to spare their inadequate assets to allow availability of information for the profit of different organizations, specifically when the costs are ambiguous, and

the benefits are not well-defined. Therefore, the organization with good financial capability can be able to share more information electronically with others.

According to Kapur and Crowley (2008) finance is one of the most substantial issues in Yemen, although the comparatively high percentage of public funding dedicated to higher education currently. The finance provided to universities to encounter their running costs is rigorously restricted and the current situation of HEIs in Yemen puts them at a significant disadvantage of having no joint bargaining power and incurring a lot of costs for connectivity to Internet, purchasing hardware and software to develop a real information system platform (Ministry of Higher Education and Scientific Research, 2006).

Interagency trust is considered to be one of the essential factors in EIS. Interagency trust can amend the proficiency and precision of EIS among agencies (Kamal et al., 2012). The primary outcome of trust between government agencies is the provision of a positive staff behavior (Akbulut, 2003; Gil-Garcia et al., 2009; Bigdeli et al., 2011, 2013). Information sharing causes difficulty in the interactions between participants because they may belong to different departments, hold different values, or operate in differing fields (Akbulut, 2003; Gil-Garcia et al., 2007a; Akbulut et al., 2009). Therefore, the leadership should distinguish and guard the privileges and benefits of all the participants who can increase information sharing behavior (Akbulut, 2003; Jing & Pengzhu, 2009; Akbulut et al., 2009). Researchers have pointed out that the lack of trust between staff in public sectors can create issues in sharing information electronically.

In this situation, the trust between the staff in YCIT-HE and the staff in public universities in Yemen should be improved since trust is an imperative and pivotal factor among them to accommodate better information sharing in producing better services. This study thus suggests that interagency trust factor could affect electronic information sharing between the Yemen public universities and YCIT-HE.

H2: Organizational Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.

3.4.3 Technological Layer

Technology layer refers to a technological context that influences the electronic information sharing. This study emphasizes on the subsequent factors: IT Capability, Information Quality, IT Compatibility, Cloud Computing and Social Media.

IT Capability is defined as the accessibility of IT resources, IT expertise and other IT skills in the organizations that help them to share information electronically (Jing & Pengzhu, 2009; Kamal et al., 2012). Akbulut et al., (2009) defined IT capability of an organization into three levels such as IT Infrastructure, IT sophistication and staffed IT knowledge. The sufficiency of IT tools in an organization is useful in adopting new technologies because a different level of IT capabilities in government agencies have different attitudes towards information sharing initiatives (Yang and Maxwell, 2011; Kamal et al., 2012; Jing et al., 2014).

The lack of IT capability is considered as a significant barrier in information sharing among government organizations (Lee & Rao, 2007; Jing & Pengzhu, 2007a; Bigdeli

et al., 2012, 2013). The barrier like the IT skill of an agency's employees is a factor that may constrain the implementation of new technologies. Staffs who have mastered the new technology can simplify the project development greatly (Barua, Ravindran, & Whinston, 2007).

The personal IT skill for government employees is a highly significant influence on adopting new technologies (Yang & Maxwell, 2011; Liu, Lu & Pie, 2011). If staff members of government agencies have adequate experience and training, this raises the affluence of information flow and gives more options to share information (Tung-Mou Yang, 2011; Zheng, 2009). Agencies at the low level of government hierarchy can use basic IT capabilities, such as phones, disks, and faxes, or use the separate department of IT support (Heeks, 2006; Jing & Pengzhu, 2007b, 2009).

The IT skills of staff and the availability of software and hardware have important influences on and within the Yemen public organization. The augmentation of IT capabilities in the Ministry of Higher Education and public universities in Yemen increases electronic information sharing (Alsurori & Salim, 2009). Moreover, the deficiency of infrastructure presented a vast gap in the IT skills between the Ministry of Higher Education and public universities (Alsurori & Salim, 2009; Alhamassy, 2012).

In this study, IT capability is viewed as the capacity of YCIT-HE department to effectually apply IT tools to attain the preferred consequence and to share information with different departments in public universities. Technical compatibility refers equivalent levels of software and hardware in every government agencies (Estevez et

al., 2010; Liu, Lu & Pei, 2011; Bigdeli et al., 2012). A different organization may utilize various hardware, software and data standards. Technical compatibility needs the integration of different information systems for taking part in information sharing project (Luna-Reyes, Gil-Garcia & Cruz, 2007). Many studies have specified that the incompatibility of telecommunication networks, software, and hardware as well as having unskilled and inexperienced employees negatively affect the EIS among agencies (Dawes, 1996; Landsbergen & Wolken 2001; Jing & Pengzhu, 2007a; Estevez et al., 2010; Yang & Maxwell, 2011; Bigdeli et al., 2011, 2013). Government agencies contributing in a project have various values, cultures, and also competing for interests (Pardo & Tayi, 2007). It is difficult to incorporate numerous different information systems and organizational goals into one information sharing project (Kim, 2006).

In this study, it is suggested to propose technical compatibility as the influencing factor to increase electronic information sharing between public universities and YCIT-HE.

Information Quality some researchers consider information quality as an essential factor in the success of Management information system (Al-Mamary et al., 2014). Effective sharing of information in inter-department cooperation intensely depends on the information quality (Klischewski and Scholl, 2006). The latter contains of several characteristics, such as timeliness, accuracy, credibility, currency, authority, and adequacy of information sharing (Xiao-rong & Sui-cheng, 2010; Bigdeli, 2012). Quality of information can mend the method the departments cooperate and enrich the quality of service conveyance towards the public and improves the efficiency of interactions and information sharing (Prybutok, Zhang & Ryan, 2008).

Gilbert, Balestrini, and Littleboy (2004) reveal that information quality is among the factors that cause the achievement or disappointment of e-government. Recently, governments have started to pay more attention to information quality because a government decision can provide poor quality results if it is based on low information quality (Estevez et al., 2010; Bigdeli et al., 2011). Moreover, information quality has a substantial influence on the information sharing among the government organizations because when employee share good quality information, then that will increase the trust and can enhance the collaboration between staff can affect in agencies (Yang & Maxwell, 2011). Yang and Maxwell (2011) likewise emphasize that information quality increases the trust of the public sector, which in turn, increases electronic information sharing.

The lack of electronic databases in Yemen public universities has resulted in the lack of electronic information sharing. This problem negatively affects the quality of decisions. Moreover, lack of quality of information has terrible effect on decision making and services delivery. Therefore, in the Yemeni universities the information quality is considered as the central issue of electronic information sharing between public universities and YCIT-HE (Alhamassy, 2012).

Social media carries a necessary role in the exchange of information (Cross & Parker, 2004; Hatala, 2006). Many government entities are making use of social media sites as a means to intermingle with the public (Abdelsalam, Reddick, Gamal, & Al-Shaar). Social media sites have become an essential method for the public sector and its components to conduct outreach and share information with stakeholders (Young-McLear, Mazzuchi, & Sarkani, 2015). In the public sector, the social media provides

employee an accessibility, which means staffs can make use social media sites for the determinations of performing official business, professional development, or any personal interests and share information, or to attain a common goal or interest, and it permits operators to inexpensively instantly issue information in near real time (Hrdinová, Helbig, and Peters, 2010; Bertot et al., 2010). In addition, the social media can be used for swapping thoughts, inciting discussion and sharing of information about social and political issues and provide profits of e-Governance by encouraging, strengthening, refining and observing its given services at decreased costs, boosting citizen utilization of e-Services and e-Participation, and pursuing public feedback, opinion, cooperation and collaborate across its geographically diverse citizens and thus increase trust on government.

Social media sites allow augmented information sharing at a quicker pace, constructing and improving relationships and assisting coworkers to stay joined. It serves as a stage to allow people and societies to display views on government and government organizations. For this study, social media is proposed as one of the factors that can augment EIS between Yemen public universities and YCIT-HE.

Cloud computing can drive and allow shared services by delivering services to several organizations in a shared domain (Chadha & Bajpai, 2012; Smith, 2011).

Some organizations in the public sector have deployed into cloud computing to support giving services to customers (Wyld, 2009; Craig et al., 2009; Malliga, 2012). One of the most important factors with cloud computing chances for the public sector is the capability to share information and ICT resources among several organizations

that support mobile employees and teleworkers (Hayes, 2008). Moreover, cloud computing offers stress-free and quick access to information in an efficient and effective way to those working in the public sector. These organizations that are willing to work in collaboration may arrange shared services in a cloud environment.

In education, cloud computing provides several profits to e-learning solutions by giving the infrastructure, platform, and educational services straight through cloud suppliers and using virtualization, centralized data storage and amenities for monitoring accessibility of data (Pocatilu et al., 2009). In this study, cloud computing is suggested to increase electronic information sharing between Yemen public universities and YCIT-HE. Hence, it is hypothesized that:

H3: Technological Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.

3.4.4 Individual Layer

The individual layer refers to influences of participation behavior in electronic information sharing between Yemen public universities and YCIT-HE. Under individual Layer have two factors benefits and information stewardship. Benefits refer to significant information sharing among staff in public organizations (Jing et al., 2014). The benefits of EIS have been observed to be the core motive to achieve public organization (Calo, Cenci, Fillottrani & Estevez, 2012). Studies indicated that the benefits of information sharing have an essential part in a government organization within the government system (Yan et al., 2009; Estevez et al., 2010). Electronic information sharing helps the staffs in the organization to get different kind of benefits,

such as improve information quality, increase administrative efficiency, reduce cost, reduce duplicate data collection, improve information accuracy and timeliness, enhanced streamlining and management of operations, complete information to solve the problem, support for the current information, advanced decision making and provide excellent services quantity and quality (Dawes 1996; Jing & Pengzhu, 2007a, 2009; Estevez et al., 2010; Yang & Maxwell, 2011). The dearth of knowledge on the benefits of sharing information has been displayed to be a significant reason in obtaining participation of staffs (Seddon, Calvert, & Yang, 2010). Organizational members, who were not wholly acquainted with the prospective benefits of EIS, were found to be unwilling to participate in it. Moreover, the awareness of the benefits of EIS improved the participation in higher education sector (Mohammed, Huda & Maslinda, 2014). Therefore, the awareness of the benefits of EIS is expected to boost the staffs among the public universities and YCIT-HE employees.

Information stewardship is referred to as information that belongs to all agencies and not only one individual (Tung-Mou Yang, 2011; Kamal et al., 2012). According to Dawes (1996) information stewardship, is critical to the victory of interagency information sharing. Based on information sharing theory, information stewardship means a person must cope with the information on behalf of others because information must be liberally shared among public organizations. Some agency's staff feels that information is power, so they are hesitating to share them so as not to lose that power or the social influence (Kolekofski & Heminger, 2003; Ardichvill et al., 2003). The stewardship principle: distinguishes information as a public good and is concerned about its accuracy, reliability, safeguarding, and security. The usefulness

principle identifies government information as an asset and potential benefits attained due to proper use. In upholding the principles, a government portrays the roles of regulator, collector, producer, provider and user (Guides, 1999).

According to Dawes (1996), information stewardship is vital to the achievement of EIS in public organization. When organizational participants are motivated towards information ownership, they consider information as a private resource rather than an organizational resource and limit their sharing of information they see as a profit of the entire organization instead of potential internal competitors (Kolekofski & Heminger, 2003). The previous studies showed the significant effect of this factor on electronic information sharing. Thus, this study implies that through applying it as an influential factor to increase electronic information sharing between Yemen public universities and YCIT-HE. Hence, it is hypothesized as below.

H4: Individual Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.

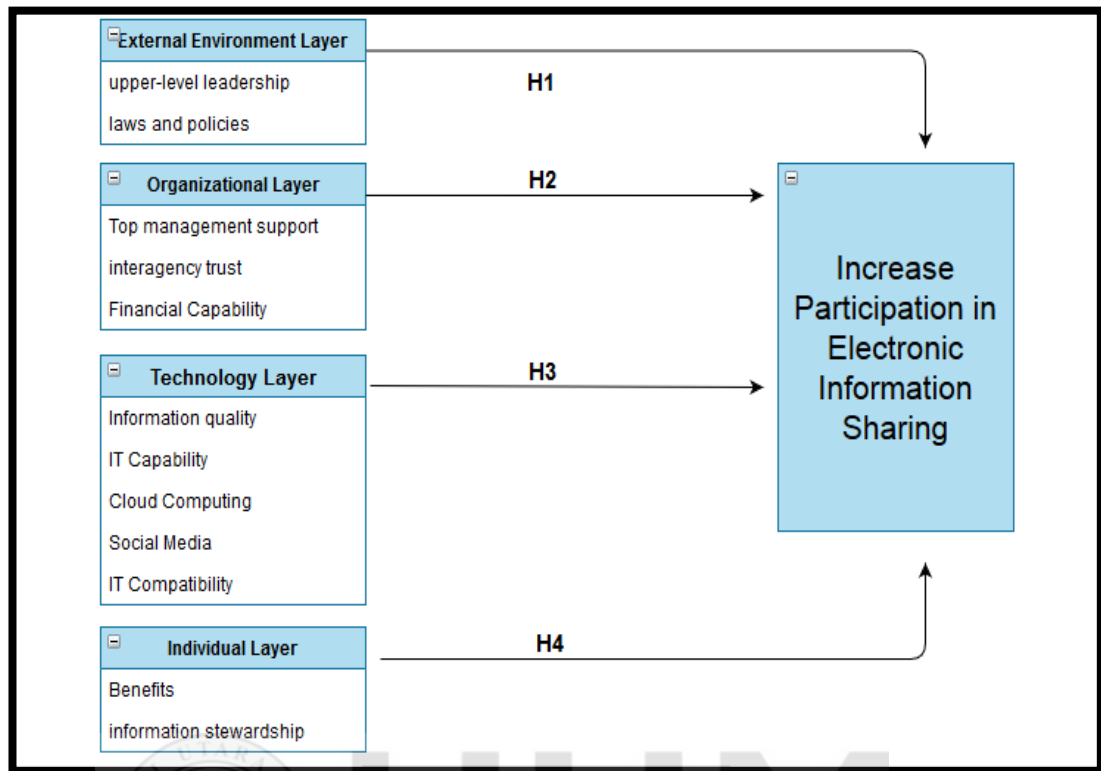


Figure 3.2. The dependent and independent variables

3.5 Conclusion

This chapter started with the discussion of a theoretical model of LBM, which consists of four layers (environmental layer, organizational layer, technological layer and individual layer). This theory has been selected to be the foundation of this study to examine different layer or level in the electronic information sharing between YCIT-HE and Yemeni public universities. In each layer, starting from Individual to External, the sharing of information is assumed to be influenced by different factors, determined from the related previous studies.

This chapter proceeds with the formulation of hypotheses of four electronic information sharing factors namely, External Environment Layer (Upper-level

leadership and Laws and policies), Organizational Layer (Top management support, Financial capability and Interagince trust), Technological Layer (IT compatibility, IT capability, Information quality, Social media, Cloud computing) Individual Layer (Benefits and Information Stewardship).

This chapter also explains the positive and negative influence of each factor to increase the electronic information sharing between Yemen public universities and Yemen Center Information Technology - Higher Education (YCIT-HE). The following chapter will describe the study design and methodology applied in conducting this study.



CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents the descriptions of the research design and approach, research process, survey, data collection, population, target population and sampling, it continues with a discussion on the development of questionnaires and follows with the concept of reliability and validity of the questionnaire.

As stated in Chapter one, the objectives are as follows:

- To identify the current issues of electronic information sharing between Yemen public universities and YCIT-HE.
- To determine the factors that will increase the electronic information sharing between Yemen public universities and YCIT-HE.
- To propose a theoretical model of electronic information sharing between of Electronic information sharing between Yemen public universities and YCIT-HE.
- To examine the relationships between the factors that may increase the participation of Electronic information sharing between Yemen public universities and YCIT-HE.

4.2 Research Design and Approach

Research design represents the plan by which the research flow will be organized, managed, and accomplished. Research is the procedure of looking for clarifications to

a problem after comprehensive research and scrutiny of the situational factors (Sekaran & Bougie, 2013). Moreover, research is the formal, systematized application of the scientific method to the study of problems (Gay et al., 2006). The scientific method comprises generating hypotheses based on observation, inferring the repercussions of the hypotheses, testing the repercussions, and accepting or rejecting the hypothesis. In particular, a hypothesis is a clarification of the happening of some actions, occurrences, or events (Gay et al. 2006). In this study, the inductive reasoning is used while generating hypotheses by previous researches. Moreover, there are two main research approaches; quantitative and qualitative. The qualitative type refers to discovering method used to describe the issue as real as possible (Saunders, Lewis, & Thornhill, 2009). Quantitative research that had been applied in this study, on the other hand, involve collecting and analyzing of statistical information to elucidate, predict, and to curb phenomena of interest (Gay et al., 2006). The factors or variables involved may be useful in developing a better model to increase electronic information sharing between Yemeni public universities and YCIT-HE. A survey used in this study for data collection, it is considered as the most general mode of data collection (Sekaran & Bougie, 2010) and has usefulness and power to identify the proper answers for research questions (Hair et al., 2007; Sekaran & Bougie, 2010). This study has examined the factors of electronic information sharing among Yemeni public universities and YCIT-HE.

The survey conducted lead to observing the association between the environment layer, agency layer, technological layer and individual layer factors to increase the electronic information sharing between Yemeni public universities and YCIT-HE. The

quantitative approach provides an empirical test in which hypotheses can be generated from this model and tested.

4.3 Research Process

The research process describes the steps involved in this study. Which consists of three phases to attain its objectives:

4.3.1 First Phase

The content of the first phase focuses on reviewing and analysis of the previous literature in the related topics of information sharing, and electronic information sharing. The reviews include information about, electronic information sharing in the higher education sector in Yemen. Identifying the current issues and the challenges by interview with the manager YCIT-HE guides the study in selecting the factors of EIS in the second phase. Moreover, the result of this phase helps in building the research problem, research questions, research objectives, importance and usefulness of the study, and the significance of the study. Additionally, this phase investigates the current issues of Yemen public universities to increase electronic information sharing with YCIT-HE.

4.3.2 Second Phase

The output from the first phase such as the current issues of electronic information sharing between the Yemeni public universities and YCIT-HE, and the previous studies and theoretical framework of electronic information sharing, become the input for the second phase. The second phase is to determine the factors that will increase

the electronic information sharing between Yemeni public universities and YCIT-HE. The outcome will be the proposed factors of electronic information sharing to be examined between the Yemen public universities and YCIT-HE.

4.3.3 Third Phase

The third phase propose a theoretical model and examined the relationships between the factors that may increase the participation of Electronic information sharing between the Yemen public universities and YCIT-HE, which have been proposed from the second phase. Moreover, it builds the hypothesis for each factor in this theoretical model. The outcomes in this phase include the proposed theoretical model for increasing participation in electronic information sharing between Yemeni public universities and YCIT-HE. The design questionnaires, validity and reliability and sampling of the research are also described in this phase. Finally, the outcome of this phase is the conceptual model to increase the electronic information sharing between Yemeni public universities and YCIT-HE. The three phases are presented in Table 4.1.

Table 4.1

Research Process

Phase	Objective	Input	Method	Output
Phase1	To identify the current issues of electronic information sharing between Yemen public	Literature on information sharing, Electronic information sharing, Electronic information sharing in the	Interview with the manager YCIT-HE. in order to discover the current state of	Current issues of electronic information sharing between Yemen public universities and YCIT-HE.

Table 4.1 continued

	universities and YCIT-HE.	higher education sector in Yemen and Electronic information sharing in Yemen for Previous information sharing related theories and models and initial interview with the manager YCIT-HE.	electronic information sharing in YCIT-HE in Yemen	Research problem, research questions, research objectives, the importance of study significant of study.
Phase2	To determine the factors that will increase the electronic information sharing between Yemen public universities and YCIT-HE.	The current state of electronic information sharing between Yemeni public universities and YCIT-HE., previous studies on electronic information sharing, and theoretical frameworks for electronic information sharing. Research problem, research questions, research objectives, the importance of study significant of study.	Analyze the literature reviews and select the potential factors of electronic information sharing. Review related models and theories Formulate hypothesis Design questionnaire	The proposed factors that can increase participation in the electronic information sharing between Yemeni public universities and YCIT-HE.
Phase3	To propose a theoretical model examine	The proposed factors that can increase the value	Collect data for the questionnaire	Theoretical model

Table 4.1 continued

<p>the relationships between the factors that may increase the participation of Electronic information sharing between Yemen public universities and YCIT-HE.</p>	<p>of electronic information sharing between Yemeni public universities and YCIT-HE.</p>	<p>s of the survey in public universities in Yemen. Analyse data to evaluate the conceptual model by testing the hypothesis of this conceptual model. Design the theoretical model to increase electronic information sharing between Yemeni public universities and YCIT-HE.</p>	<p>Results of the analysis. The final examines the relationships of electronic information sharing between Yemeni public universities and YCIT-HE.</p>
---	--	---	--



UUM
Universiti Utara Malaysia

4.4 Data Collection

Data collection in this study is carried out by distributing and administering the questionnaires.

A survey is used in the current study because it is considered as a suitable and famous data collection technique. According to Hair et al. (2007), the most commonly used survey procedures are in-person telephone interviews, questionnaires, and interviews.

Questionnaires are considered as an efficient mechanism for collecting data because they allow a researcher to exactly determine the requirements and measurements of variables (Sekaran & Bougie, 2010). Therefore, questionnaires are used in this study to achieve the second research objectives.

According to Sekaran and Bougie (2010), a survey is highly suitable if the data are collected from a large population. In this study, any employees at public universities can share information with another employees, in YCIT-HE, is considered an information-sharing user. Thus, any member of the academic and administrative staff in each university can be considered a part of the population. Another reason for selecting the survey is its capacity to obtain information from a large sample of the population (Kumar, 2011).

An official letter was sent to the public universities selected in Yemen, accompanied by the supervisor's letter and researcher's request to get the acceptance. Next, the manager of YCIT-HE gave the researcher a list of names, email and mobile phone of all staff who share information electronically with public universities for different purposes.

The researcher requested from the department to distribute the questionnaire to the employees who share information electronically with YCIT-HE. Besides, the YCIT-HE official letter have been attached with each questionnaire in order to encourage the employees to answer (APPENDIX D). The questionnaires have been collected around four weeks later by the researcher in each university.

4.5 Population and Sample

The primary focus of this section is to identify the population and then select target population and sampling to be used for this study; In addition, it aims at specifying the method and the respondents for the study. Sekaran and Bougie (2010) described population as some individuals, objects, or events of concern that a researcher wants to investigate. The population of this research comprises of six public universities in Yemen (Sana'a University, AL Hodaydah University, the University of Aden, Taiz University, and Dhamar University, Ibb University) that deal with YCIT-HE. Because of a large number of employees in the universities in Yemen, it is not possible to question every individual in the population because it is too expensive and time-consuming. This is the reason why the study should rely on a sampling technique Sekaran and Bougie (2010). The size of the sample will depend on the level of accuracy required. Not only that the number of variables in the study and the appropriate statistical tools to be used. Hair et al. (2007) described the sample as a small subset of the population that can raise the results on the population characteristics. Sampling is the method of choosing an adequate quantity of elements from the target population (Sekaran & Bougie, 2010).

The size of the sample will depend on the level of accuracy required. Not only that the number of variables in the study and the appropriate statistical tools to be used.

Currently, the sampling frame of this study consists of people who have some roles or tasks related to YCIT services and universities, or those who rely on certain information to make decision. These include the administrator staff of the chancellery

office of each university, Deans of the faculties, engineer responsible for the system, Director of the computer center, Vice-Chancellor of the University, the senior management of the universities, and Student Affairs of each university in these six universities. The sampling method used in the current study is non-probability sampling. The selection of elements for the sample is purposive; therefore, the sampling method is purposive sampling (convenience sampling). Sekaran and Bougie (2010) cited several reasons for selecting the sampling.

- It is almost painful to collect data on every element if the survey involved few hundreds of elements. Even if it is possible, it would be expensive and a waste of effort and time.
- The best reliable accuracy is when data is collected in a limited amount because it reduces fatigues, which creates less error.

A total of 260 questionnaires was distributed. The final number of respondent was 173.

4.6 Required Sample Size

To ensure its validity, a survey questionnaire needs to have a suitable sample size. According to Comrey and Lee (1992), a sample size of 1,000 and above is deemed as excellent, 500 as very good, 300 as good, 200 as fair, and 100 as poor. A multivariate study which entails multiple response data analyses would require a large sample size (Wimmer, 2006). Watson (2001) proposes three criteria in determining the sample size of a study namely: variability, precision level (sampling error), and confidence level. Caution must be taken when determining a sample size randomly or when fixing it

with a certain percentage because an exact percentage does not exist for any population (Watson, 2001). Sample size can be calculated using the equation below as proposed by Krejcie and Morgan (1970) and U. Sekaran (2005):

$$S = X^2NP(1 - P) \div d^2(N - 1) + X^2P(1 - P)$$

S = sample size

X^2 = chi square value for 1 degree of freedom at the desired confidence level

N = size of population

P = proportion of population (as known variability)

d^2 = degree of precision (as known sampling or margin error)

In this present study, a total of 262 respondents will be selected which represents the sample size required for this study. A larger sample size could lead to errors in the significant levels of weak correlations, which may adversely affect the overall research outcome.

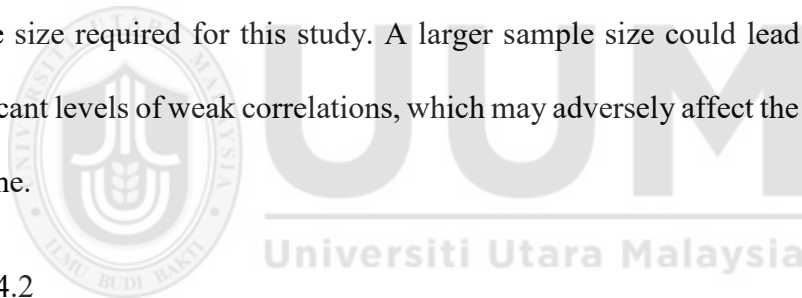


Table 4.2

Sample size based on the population size

Required Sample Size								
Population Size	Confidence = 95%				Confidence = 99%			
	Margin of error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	146	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1,067	427	636	827	1,119
1,500	306	515	759	1,297	460	712	959	1,376
2,000	322	563	869	1,655	498	808	1,141	1,785
2,500	333	597	952	1,984	524	879	1,288	2,173
3,500	346	641	1,068	2,565	558	977	1,510	2,890
5,000	357	678	1,176	3,288	586	1,066	1,734	3,842
7,500	365	710	1,278	4,211	610	1,147	1,960	5,165
10,000	370	727	1,332	4,899	622	1,193	2,098	6,239
25,000	378	760	1,448	6,939	646	1,285	2,399	9,972
50,000	381	772	1,491	8,056	655	1,318	2,520	12,455
75,000	382	776	1,506	8,514	658	1,330	2,563	13,593
100,000	383	778	1,513	8,762	659	1,336	2,585	14,227
250,000	384	782	1,527	9,248	662	1,347	2,626	15,555
500,000	384	783	1,532	9,423	663	1,350	2,640	16,055
1,000,000	384	783	1,534	9,512	663	1,352	2,647	16,317
2,500,000	384	783	1,536	9,867	663	1,353	2,651	16,478
10,000,000	384	784	1,536	9,594	663	1,354	2,653	16,560
100,000,000	384	784	1,537	9,603	663	1,354	2,654	16,584
300,000,000	384	784	1,537	9,603	663	1,354	2,654	16,586

4.7 Questionnaire Design

A questionnaire is considered to be the primary technique of data collection in this study because the questionnaire is an efficient mechanism for collecting data. According to Sekaran and Bougie (2010), the questionnaire design in the present study relies on three criteria, namely, the manner of writing the questions, planning for the classification of variables, and appearance of the questionnaires set in this study. A set of questionnaires have been designed to achieve the objectives. The questionnaires covered six sections in which it begins with demographic profiles of the respondents, followed by the questions about the readiness for electronic information sharing between YCIT-HE and public universities, questions about the environment, organization, technology, and about the individual. Questionnaires have been further tested for reliability and validity. The six sections are as follow:

1. Section 1- is about demographic profile including the respondents' job title, experience, education, gender, and age.
2. Section 2- contains questions about the readiness for electronic information sharing between YCIT-HE and public universities.
3. Section 3- consists of items on the environment.
4. Section 4- highlights questions about the organization.
5. Section 5- contains questions about technology.
6. Section 6 – is about the individual.

Table 4.3

Operationalization of the Factors and Items

Construct	Factor	Total number of items	References
External Environment layer	Upper-level leadership.	4	Social Exchange Theory Bigdeli (2012) Akbulut (2011) Jing et al. (2014)
	Laws and policies	3	Jing et al. (2014)
Organizational Layer	Top management support	4	Social Exchange Theory Bigdeli (2012) Akbulut (2011) Jing et al.,2014
	Financial capability	4	Akbulut (2011)
	Interagency trust	3	Social Exchange Theory Bigdeli (2012) Akbulut (2011) Jing et al. (2014)
Technology layer	IT Capability	4	Bigdeli (2012) Akbulut (2011) Jing et al,2014
	Information Quality	4	Bigdeli (2012)
	IT Compatibility	3	Bigdeli (2012) Akbulut (2011) Jing et al,2014
	Cloud Computing	4	(Kuan & Chau, 2001) (Hayes,2008)
	Social Media	3	Hearn, Foth, and Gray (2009) Bertot et al.,2010

Table 4.3 continued

Individual Layer	Benefits	6	Kaplan&Haenlein,2010 Bigdeli (2012) Akbulut (2011) Jing et al,2014
	Information stewardship	3	(Yangand Maxwell,2011)

4.8 Reliability of Questionnaire

The reliability of measures specifies the level to which it is not biased (error free) and henceforth confirms steady measurement across time and the various items in the tool.

The reliability of magnitude is a sign of the constancy and dependability with which the tool the concept and assists to evaluate the "goodness" of a measure (Sekaran & Bougie, 2010). The reliability of the research may be determined through two procedures, namely, internal and external consistency procedures (Kumar, 2011).

This study followed with the internal consistency procedures because it needs to measure the questions of the same phenomenon by changing the result of answers that are attached from the respondents together as a group (Kumar, 2011). The examination of the internal consistency measures conducted via two modes, namely, inter-item consistency reliability and split-half reliability (Sekaran & Bougie, 2010).

According to Sekaran and Bougie (2013), 'inter-item consistency reliability is a test of the dependability of participants' response to every item in a measure. To the degree that items are independent measures of the similar theory, they will be correlated with each other. The most common test of inter-item consistency reliability is Cronbach's coefficient alpha (Cronbach, 1946; Sekaran & Bougie, 2013). The Cronbach's alpha test has values ranging from 0 to 1; a higher level of range implies a higher value of

reliability. Values of 0.8 and above indicate that the reliability of the research instrument is good; values above 0.6 also signify acceptable reliability (Hair et al., 2007). Moreover, Zikmund, Babin, Carr, & Griffin, (2013) explained that values ranging from 0.5 to 0.6 are slightly acceptable for the reliability of research in the context of new applications or situations.

To increase the value of questionnaire reliability up to 0.74, Kumar (2011), suggested that the researcher should follow specific steps, such as increasing the number of items, standardizing the administration procedures, ensuring that the respondents wisely mark items in the questionnaire, and ensuring that the items in the questionnaire convey a clearer understanding, and that the questionnaires are well written, and suitable for the respondents. The inter-item consistency reliability was selected for this study to test the respondents' answers for all the items using Cronbach's alpha. Having read all these important research concepts relevant to the reliability the researcher hopes to test the questionnaire on a sample representing the target group. Administering the questionnaire will help items reading to be meaningful and understandable to the target group. Corrections will be made, and the questionnaire will be tested again, and when sure of the content validity, it will be used for the actual sample selected for this purpose. To ensure its consistency, the exercise will be repeated before the actual application of the questionnaires.

4.9 Validity of Questionnaire

According to Sekaran and Bougie (2013), validity is a test of how well a tool that is created to assess the specific theory it is proposed to measure. Validation has several

types, such as face and content validity, concurrent and predictive validity, and constructs validity (Kumar, 2011). Validity test is achieved through content validity and face validity. Content validity is a function of how well the magnitudes and components of theory have been demarcated (Sekaran & Bougie, 2013). It needs both item validity and sampling validity. Item validity is considered to check whether the test items are appropriate to measure the proposed content area, while sampling validity is apprehensive with how proper the test samples the total content area being tested. In this study, the researcher presented the questionnaire to a few reviewers to validate the questionnaire and translated the questionnaires into the Arabic Language. Face validity indicates that the item that is intended to measure a concept do, on the face of it, look like they measure the concept. (Sekaran & Bougi, 2013). As such the researcher hopes to be certain that the validity of the instrument is not compromised and meets its validity purposes.

4.10 Pilot Study

This section presents the pilot study conducted to test the validity of experimental procedures and measures (Kenneth, 2005) of the questionnaires. According to Zikmund (2003), a pilot study is used to test the study aimed to enhance the particular research items. Cronbach's alpha is a popular test in measuring the reliability of the pilot study questionnaire (Cronbach, 1946; Sekaran and Bougie, 2013). The Cronbach's alpha test has values ranging from 0 to 1; In general, reliabilities values less than 0.6 are considered to be poor, those in the 0.7 range, acceptable, those over 0.80 good and Values that are 0.9 and above are excellent. The data collected from the

pilot study were analyzed using SPSS 20 to know the values of each factor in Cronbach's alpha.

In this study, the pilot study was performed amongst Yemen employees who are working at Saudi universities and Yemen students who are doing doctorate studies in Malaysian universities. The participants from the group employees have administrative experiences in one of the Yemen public universities. From the 48 questionnaires collected, 40 were completed correctly. The result shows that five factors have values less than 0.7. These five factors are interagency trust, top management support, IT compatibility, cloud computing and social media, with a value of 0.616, 0.373, 0.611, 0.514 and 0.511, respectively.

A second pilot study was performed to test the enhancement of a particular research item. Some suggestions from the participants have been considered to improve the questionnaire items. Many changes in some of the items have been done to make the questionnaire clearer and easier to understand by rewriting them again. Moreover, the items of factors have been reduced (Benefits, IT Compatibility, Social Media, Cloud Computing and Top management support) because of the repetition and modifications of the questions. The questionnaires in the second pilot study have been distributed among members of the Administrative staff in two Yemen public universities (Al Hdiada University, and Hadromaot University) and two private universities (Al Jazira University, and Al Naseer University). The participants were chosen by their administrative experience in Yemen public universities and Yemen private universities. Moreover, more than a hundred emails were sent to members of the administrative staff in some Yemen public universities and Yemen private university.

A total of 70 questionnaires were collected, ten of which have not been answered correctly. Thus, the total number of correctly answered questionnaires is 60. The result from the second pilot study showed that all the factors now have values more than 0.7 which are acceptable. Table 4.3 shows the Cronbach's alpha and a number of items for each factor.

Table 4.4

Cronbach's alpha and number of items

Factor name	Cronbach's Alpha		No. of Items	
	Pilot study 1	Pilot study 2	Pilot study 1	Pilot study 2
Law and Policy	.780	.758	3	3
Upper-Level Leadership	.737	.704	4	4
Interagency trust	.616	.713	4	4
Top management support	.373	.794	4	4
Financial capability	.956	.933	4	4
IT Capability	.833	.764	4	4
Information Quality	.817	.744	4	4
Information Quality	.611	.823	4	4
IT Compatibility	.514	.712	5	4
Cloud Computing	.511	.709	4	4
Social Media	.857	0.793	4	3
Benefits	.855	.856	7	6
Information stewardship	.855	.856	3	3

4.11 Conclusion

This chapter started with the presentation of the research process to describe the steps involved in this study. Three phases are designed throughout the study. The study is a quantitative type with the intention to examine factors to be measured through questionnaires. A sampling method was applied in conducting data collection. The sampling units include six public universities (Sana'a University, AL Hudaydah University, the University of Aden, Taiz University, and Dhamar University, Ibb University) who communicate with the YCIT-HE. The communications are made by the Deans of the faculties, engineer responsible for the system, Director of the computer center, Vice-Chancellor of the University, the senior management of the universities, and Student Affairs. A set of questionnaires has been designed to achieve the objectives. The questionnaires has been designed based on six sections in which it begins with demographic profiles of the respondents, followed by the questions about the readiness for electronic information sharing between YCIT-HE and public universities, questions about the environment, organization, technology, and about the individual. Questionnaires have been further tested for reliability and validity by applying two pilot studies.

CHAPTER FIVE

DATA ANALYSIS AND RESULTS

5.1 Introduction

Comprehensive explanations about the data analysis implemented in this study is presented throughout this chapter along with the obtained results to evaluate the proposed model of the study. It begins with details on survey response, response rate, missing and screening data, and normality and outliers. Next, it explains respondents' profile, results of validity and reliability measures, regression analysis results. Later, descriptions about the correlation analysis based on the formulated research questions are made. Finally, discussion on the results of the hypothesis was introduced.

PLS version 23 was used to analyze the collected data via a questionnaire technique and the reason behind this practice is to ensure that the data collection process is successful enough. To achieve the study objectives and reveal a comprehensive representation of the hypothesized relations among the conceptual model constructs, this chapter provides a summary of the hypothesis testing findings in accordance with the developed conceptual model.

5.2 Data Analysis

Data analysis is the process of storing and analyzing the collected data as the main step in the data collection process (Creswell et al., 2003). Data analysis process can be used in both quantitative and qualitative studies. For instance, it used in qualitative researches to build methods of storing and processing data that will help future endeavours and thereby it will help to identify the relationships and recognize patterns

in qualitative research methodically (Sapsford and Jupp, 1996). In contrast, the analysis of quantitative data needs to be handled systematically and this makes the analysis of quantitative data needs to be achieved in an appropriate manner.

Scholars such as Sandelowski (2000) and Tisdall, et al. (2008) acknowledge that quantitative data being analyzed is carried out through conceptualization to distinguish between data and ideas (Sandelowski, 2000, Tisdall et al., 2008). It requires reasoning and the need to distinguish between data and ideas to maintain that through quantitative analysis needs the usage of ideas, the ideas need to be guided through the data which is being analyzed. The analysis should reflect the content of the collected data.

This study utilized two statistical applications to analyze the collected data and for answering the research questions. The first software program is SPSS which was used as a statistical analysis software package for the social sciences and information systems (Sekaran, 2005). SPSS was chosen because it is a universally recognized computer program for analyzing data, furthermore this application was designed to automate the complex formulas and calculations used in various statistics allowing researchers to focus on the research analysis without having to master the arduous intricacies of the statistical functions (Green & Salkind, 2010). Prior research will be conducted using the SPSS program to calculate correlation coefficients to determine the relationships, if any, between independent and dependent variables (Green & Salkind, 2010; Ness, 2005).

The second software program Smart PLS was used for Structural equation modeling (SEM) which was adopted also for data analysis to support and validate the result that

found using SPSS; it is user friendly in terms of creating the structural models and defining the required statistics (Ame, 2005); it allows a more complete modeling of theoretical relationships compared to traditional analyses of merely associating among measures (Bagozzi & Yi, 1989); it also provides a straightforward method of dealing with multiple relationships simultaneously while providing statistical efficiency; moreover, it has the ability to test the structural model (i.e. the relationship between an independent variable and the dependent variable) and the psychometric properties of the constructs (i.e. the relationship between a latent variable and its indicators).

5.3 Survey Instrument Response Rate and Data Collection Process

Public universities were taken into consideration for the present study in Yemen whereby, six public universities were set as the focus of the study. Therein, the survey forms were mailed on November, the 25th, 2016 to these universities for their top management, employees in student affairs centers, and people in authority in the area of engineering and information technology at the universities in the computer center and other employees in some department. Following the recommendations of Sekaran (2010), phone calls and messages were made to the concerned individuals to ensure healthy response rate and avoid any delays to the maximum (Sekaran, 2010). In parallel, reminders were also given through a phone call during the month of January, February, and March. In total 260, questionnaires were mailed to the six public universities. Two hundred questionnaires were returned, where out of 200 questionnaires, 27 questionnaires were found inappropriate and were discarded. Consequently, 173 questionnaires were found appropriate for the final analysis. Categorically, 114 questionnaires were received from universities with a healthy

presence of YCIT-HE responses and the remaining 59 from the ones with poor YCIT-HE prospects. The results concluded with the response rate of 66.53% which is acceptable as suggested by Sekaran (2006). Table 5.1 present further details in this regard.

Table 5.1

Sample Study Response Rate

Questionnaire response	Frequency	Rate (%)
Number of questionnaires distributed	260	100
Returned questionnaires	200	76.92
Usable questionnaire	173	66.53

5.4 Demographic Profile of Respondents (Questionnaire Part 1)

Generally, demographic information of respondents was mainly used to verify the validity of the obtained data. Table 5.2 presents respondents background details. It is worth mentioning that all the respondents are from academia. It means all the basic demographic questions were remained the same and disseminated to all the targeted respondents. In this case, they were asked to answer questions related their university affiliation, gender, age, educational credentials and the nature of the job that their job role. Other data included are experience, job title, position, and office or the department that they worked in.

The analysis results found that majority of the respondents were male (75.1%) and most of them (60.1%) were having age ranged between 31 to 40 years old.

Furthermore, some respondents were in 30 years old (21.4%), 41 to 50 years old (16.2%), and above 50 (2.3%) years old.

As per the results, majority of the respondents were male (75.1%), where most of them (60.1%) belonged to 31 and 40 years age category. The remaining found to be from 30 years old (21.4%), 41 to 50 years old (16.2%), and above 50 (2.3%) age category.

Regarding the education level, 21.4 reported having bachelor's qualification, 56.1% with masters and lastly, 18.5 % having Ph.D. and 4.0% others. So all the respondents were qualified enough in order to response the survey questionnaires.

Talking about experience, 25.4% mentioned to have 1-5 years of working experience, 41.0% with 6 to 10 years, 23.1% have 11- 15 years and 10.4% with 15+ years of work experience. Where 59.0% indicated to be working in administration and 41.0% outlined to be holding a mix of academic and administrative positions. With 26.0% were serving as general employees, 23.1% as IT engineers, 11.6% as divisional authorities (Responsible), 30.1% as managers and lastly, 9.2% as top management officials in the sampled universities.

Table 5.2

Demographic Profile of Respondents

Demographic Factor	Category	Frequen cy	Percent
Gender	Male	130	75.1
	Female	43	24.9
Age	Under 30	37	21.4
	31 – 40	104	60.1
	41 – 50	28	16.2

	51 or older	4	2.3
Education	Bachelor	37	21.4
	Master	97	56.1
	PhD	32	18.5
	Others	7	4
Experience	1-5 year	44	25.4
	6-10 years	71	41.0
	11-15 years	40	23.1
	Over 15 years	18	10.4
Table 5.2 continued			
Working Type	Administrative	102	59
	Academic	71	41
Position	Top manager	16	9.2
	Manager	52	30.1
	Responsible	20	11.6
	Employee	40	23.1
	Others	45	26.0
Name of Office	President office	26	15.1%
	Research and development	10	5.8%
	Student Affairs	73	42.5%
	Studies, planning, and follow-up	3	1.7%
	Continuing Education	3	1.7%
	Computer center	42	24.4%
	Engineering Affairs	6	3.5%
	Quality	3	1.7 %
	General Secretariat of the library	2	1.5%
	Studies	4	2.3%

5.5 State of Electronic Information Sharing Practices (Questionnaire Part 2)

Herein, findings about the Electronic information sharing amongst the public-sector universities are discussed in detail. Moreover, the section sheds light on the application and usage of different e-sources by these universities across Yemen in exchanging information electronically with YCIT-HE.

5.5.1 Use of Electronic Devices

Participants were requested to answer in accordance to their use of electronic devices and available apps such as line or mobile, email, website, webcam, Facebook, Twitter, WhatsApp and access to the YCIT-HE database in which participants use to share information. This section presents the respondents' favor on the use of electronic devices.

- Phone Line / Mobile Usage:

For the line and mobile usage, (figure 5.1), this study found that 11.0% of the respondents indicated to have never used mobile or landline. About 4.0% mentioned having used only once in a year, while 10.4% underlined to have used at least once in a month. The majority used it a few times, which can be categorized into a few times in 30 days (34.1%) and used it frequently every week (39.9%). However, only 6% mentioned that they used this device a few times a day.

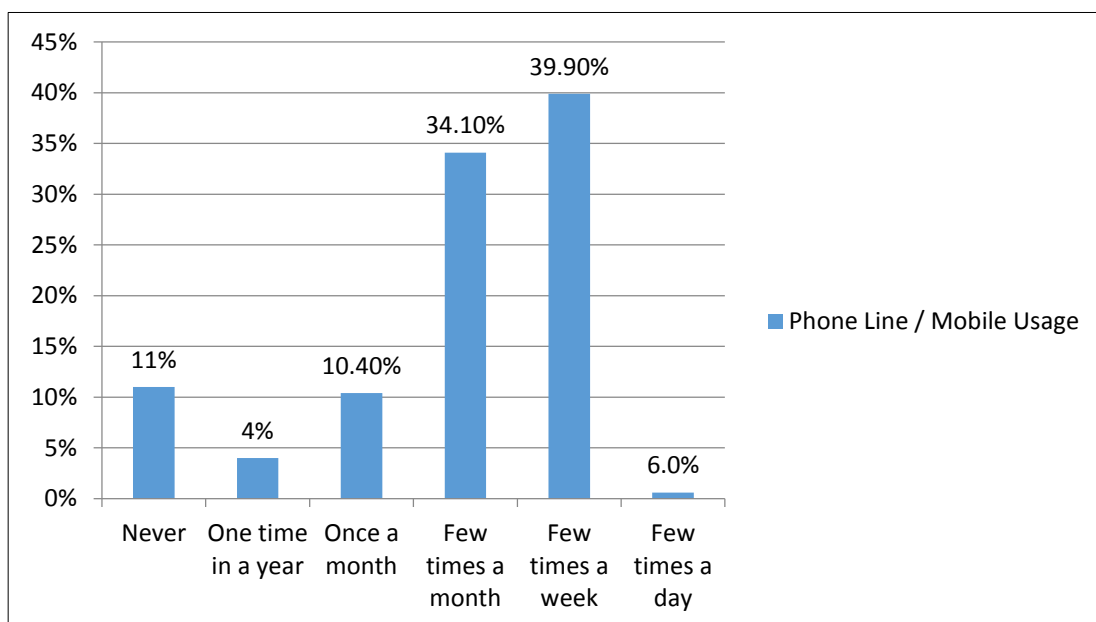
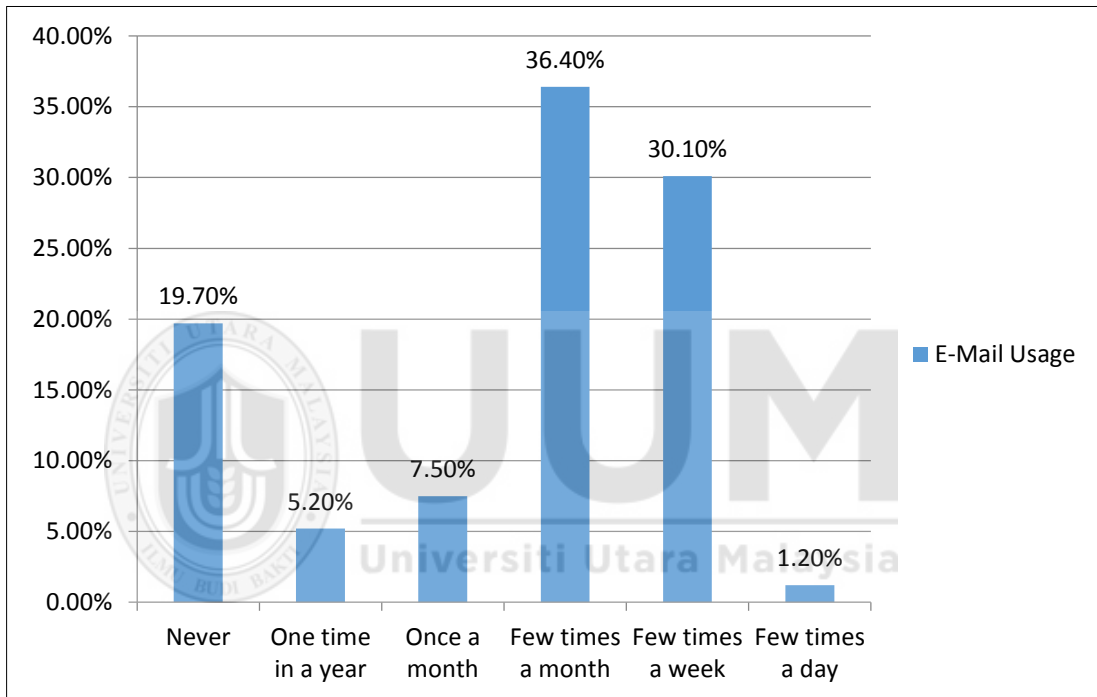


Figure 5.1. Phone Line / Mobile Usage

- E-Mail Usage:

Figure 5.2, shows a total of 36.4% reported using email a few times in a month to share information, followed with 30.1% use few times a week, and only 1.2% used a few time a day. About 7.5% of the respondents using emails once in a month and 5.2%



using emails once a year for this purpose. Lastly, 19.7% mentioned having never used emails for information sharing in their life.

Figure 5.2. E-Mail Usage

- Website Usage

Concerning to usage and access to the website, 50.9% never used web portals wherein, 8.7% indicated accessing them a maximum of once in a year. Notably, 5.2% mentioned accessing websites once a month and 17.3% indicated accessing websites

a few times in a month. Accordingly, 15.6% highlighted the frequent use of websites on a weekly basis and 2.3% used websites a few times a day.

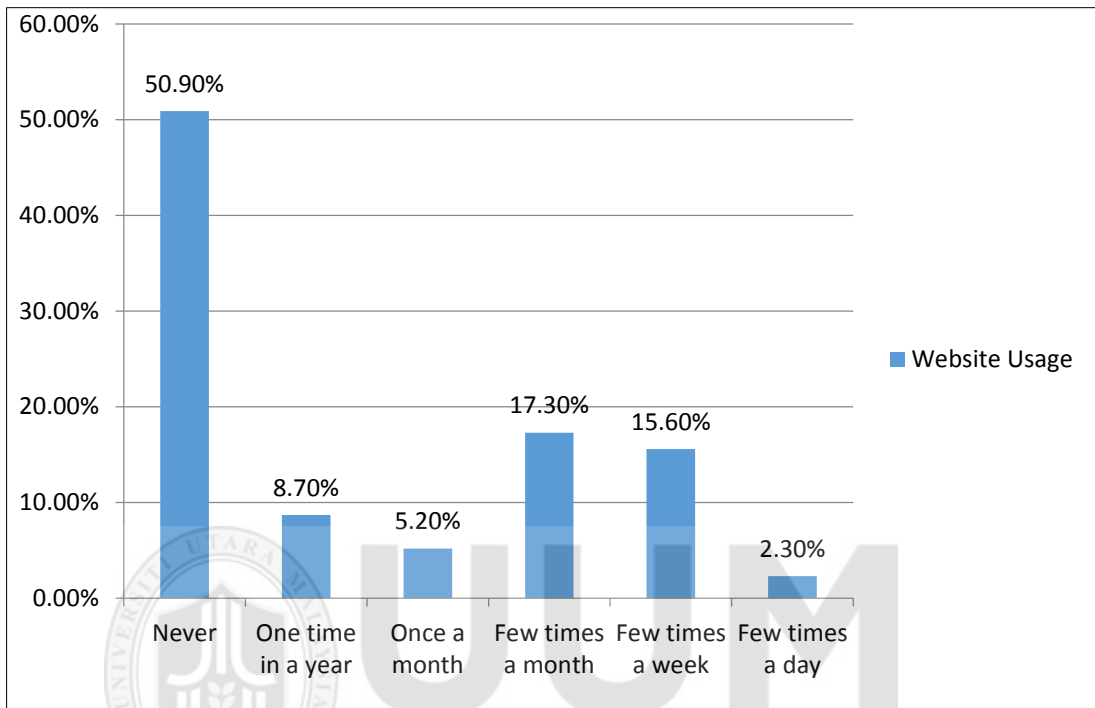


Figure 5.3. Website Usage

- Facebook Usage

When reviewing the social media, the results of the survey shows that 59% of the respondents have no experience of using Facebook, 12.7% of them reported to have accessed Facebook only once in the year and 15% once in the month. Similarly, 9.2% indicated using Facebook a few times on a monthly basis whereas, 3.5% mentioned Facebook usage and access a few times on a weekly basis. Finally, 0.6% Used Facebook a few times a day.

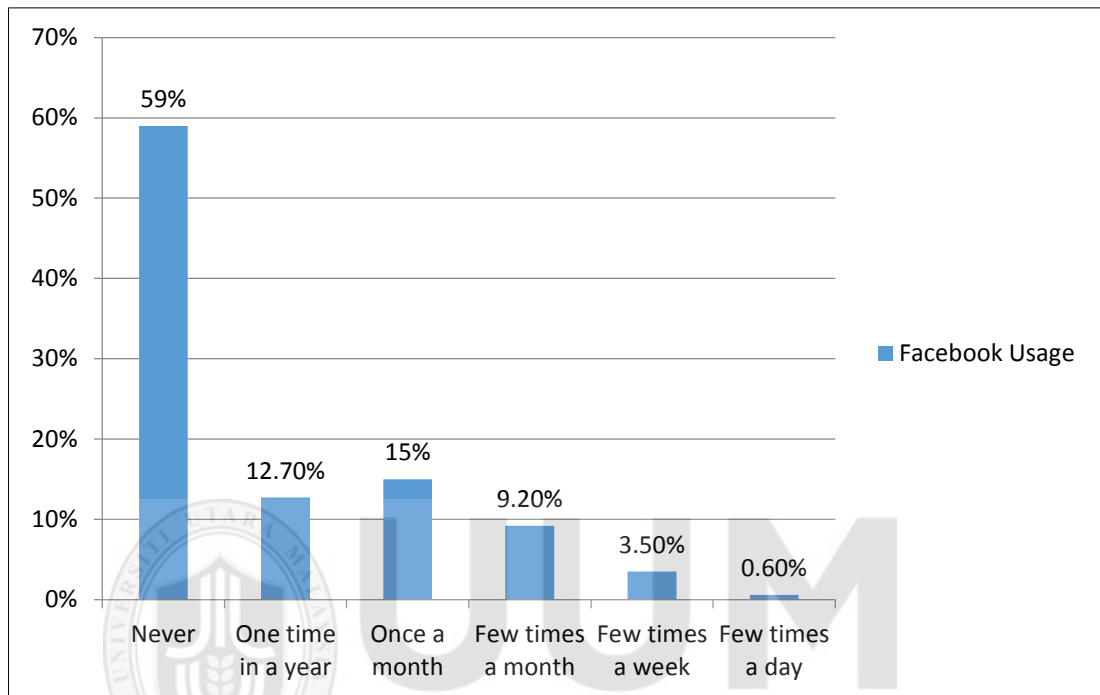


Figure 5.4. Facebook Usage

- WhatsApp Usage:

In connection with the usage of WhatsApp, for WhatsApp usage, (Figure 5.5), 13.9% indicated no experience of using WhatsApp for information sharing with YCIT-HE. However, 2.3% indicated using it once a year. Notably, 2.9% mentioned using WhatsApp rarely as once in a month and 9.2% as a few times a month. More importantly, 41.6% mentioned using it a few times on a weekly basis, and 30.1% used WhatsApp a few times a day.

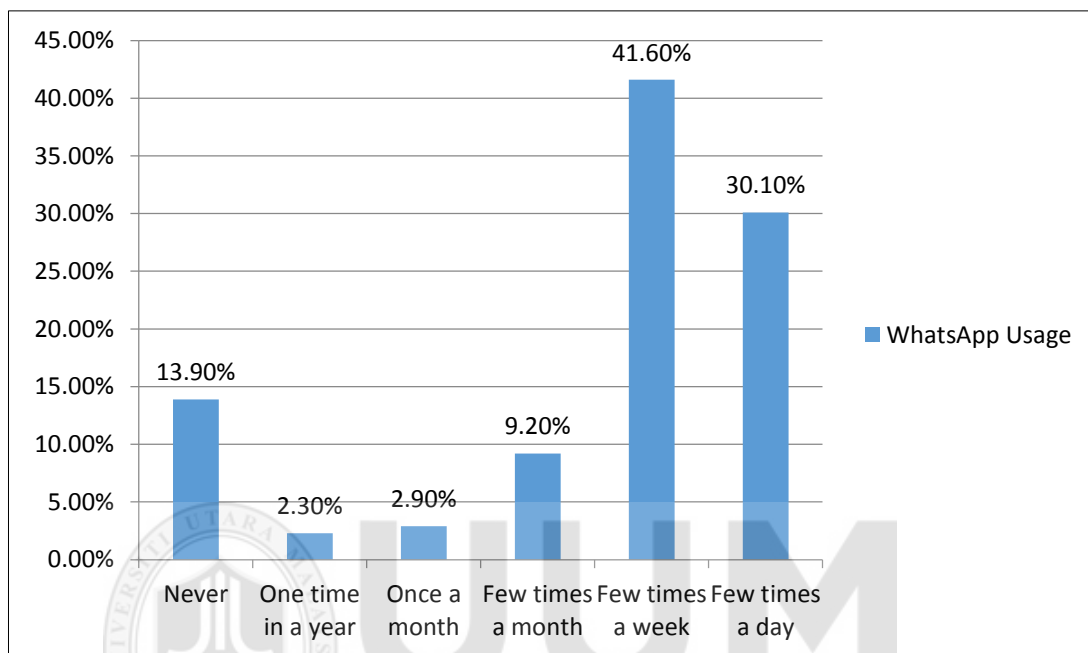


Figure 5.5. WhatsApp Usage

As conclusion refers to figure 5.6, all the participants indicated for usage of Electronic Devices that they hardly access to YCIT-HE database for information. Figure 5.6 provides further details in this regard. The critical analysis of the results has indicated that landline phone/mobile and email were the most common mediums used by the respondents to share information by the universities' employees with YCIT-HE. The respondents of universities also indicated use of the website and Facebook pages of YCIT-HE to retrieve information. Moreover, the results underlined that the universities also utilized WhatsApp facilities frequently to exchange information with the YCIT-HE staff. Likewise, the universities' employees never accessed the YCIT-HE database to obtain YCIT-HE information through other sources.

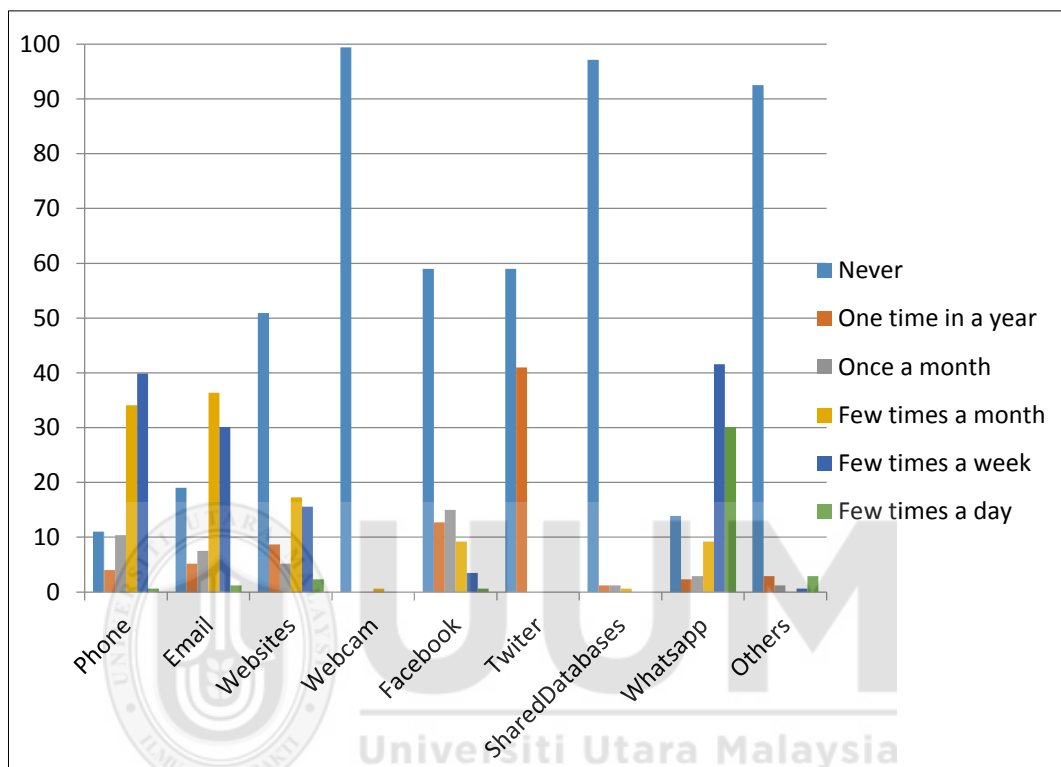


Figure 5.6. The Use of Electronic Devices to Share Information between Universities and YCIT-HE.

5.5.2 Percent of Information Shared Electronically between University and YCIT-HE

This study has provided empirical evidence concerning the electronic information sharing amongst Yemen public universities and YCIT-HE. From the survey response, 9.9% of participants agreed to share information electronically range between 1% to 20%, while 37.8% of the participants share information electronically range between 21% to 40%. In parallel, 36% of the participants share information electronically range

between 41% to 60%. On the other hand, 16.3% share information electronically ranges between 61% to 80%. Figure 5.7 provides further details of this in the percentage of total information being shared electronically with YCIT-HE. Conclusion, none of the university from sample shares information electronically more than 80 to 100 percent with the YCIT-HE.

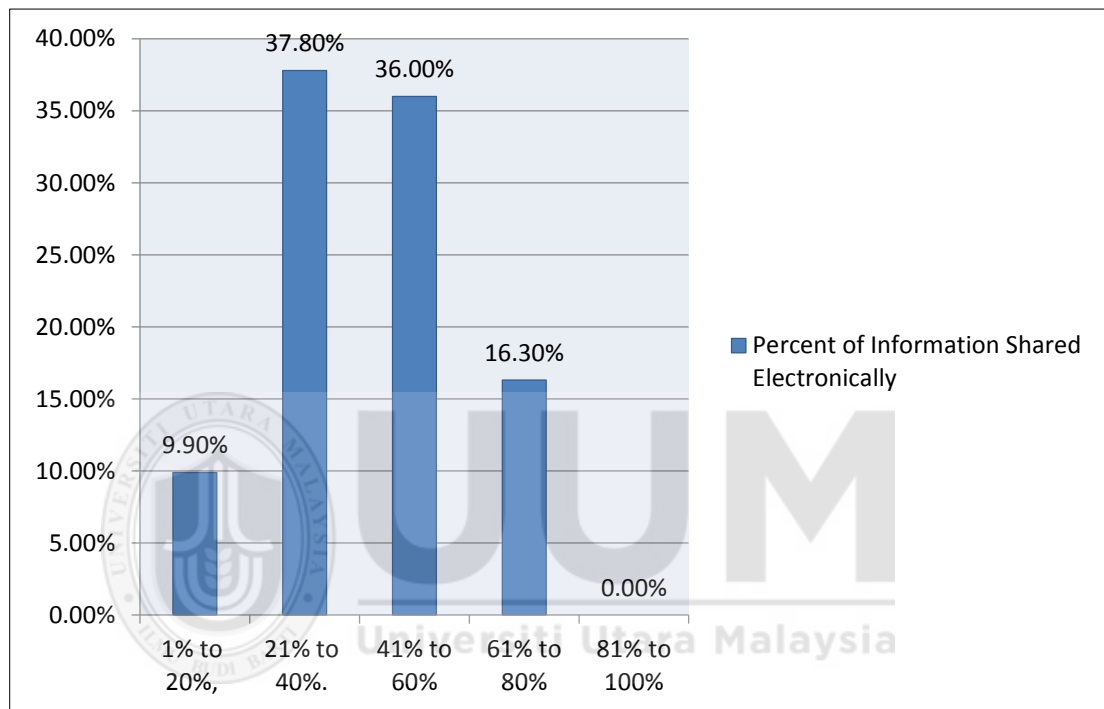


Figure 5.7. Percent of Information Shared Electronically between University and YCIT-HE

5.5.3 Years of Information Shares Electronically between University and YCIT-HE

Moreover, the study has identified that about 26.2% of the participants claimed to have shared information electronically within the past 12 months whereas, 51.7% of the participants reported to have used electronic mediums once in 1 to 3 years. Accordingly, 19.2% respondents mentioned having used these sources for 4 to 6 years and 2.9% reported to have used from 7 to 10 years. No universities in the study share

information electronically for more than ten years even though some universities are founded more than ten years. Figure 5.8 illustrates further concerning the number of years of sharing information electronically with YCIT-HE. Conclusively, the amount and frequency of using electronic sources for information sharing across the public universities and YCIT-HE in Yemen are not very encouraging. The respondents have indicated minimal usage of these prospects. Hence, these sources and their access is still in the initial stages.

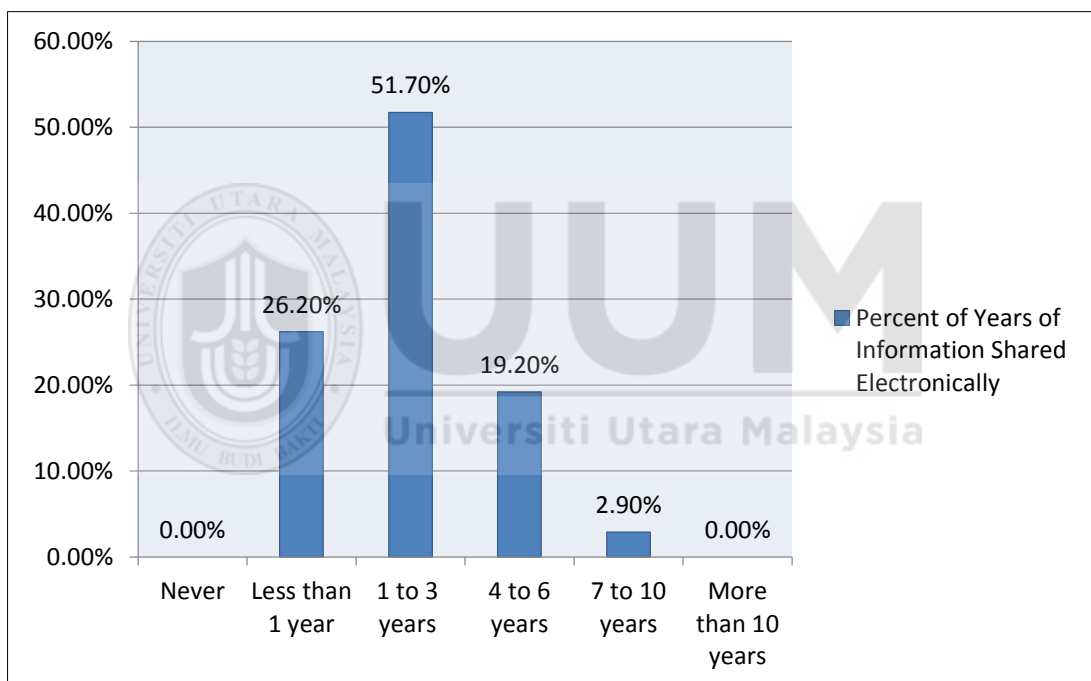


Figure 5.8. Years of Information Shared Electronically between University and YCIT-HE

5.5.4 Type of Information that Public Universities Shared

This study also attempted to classify specific information electronically shared between the public universities and the YCIT-HE. The results included information on students, staff reports, academic information, requests and suggestions for any

further details on academic matters, scholarship updates, and a new addition to rules and policies and general guidelines information. Table 5.3 shows the type and percentage of information that has been shared electronically with YCIT-HE. The table indicated that Administrative staff information and Student information are shared between the public universities and the YCIT-HE compared with other categories. While Scholarships and studies information receives a lower percentage for information shared between the public universities and the YCIT-HE among all categories.

Table 5.3

Type of Information that Public Universities Shared

	0%	1-20%	21-40%	41-60%	61-80%	81-100%
Student information	9.2%	12.7%	17.3%	13.3%	20.8%	26.6%
Administrative staff information	9.2%	30.1%	11.6%	23.1%	26.0%	0%
Academic staff information	79.8%	14.5%	4.6%	1.2%	0%	0%
suggestions	40.5%	11.6%	18.5%	14.5%	8.1%	6.9%
Dispatches	81.5%	5.2%	8.7%	2.9%	.6%	1.2%
Scholarships and studies	87.9%	1.7%	2.9%	5.8%	1.7%	0%
Policies and rules	59.0%	13.9%	5.8%	4.0%	11.6%	5.8%
Guidelines	33.5%	12.1%	13.9%	9.2%	19.7%	11.6%

Others	59.0%	41.0%	0.0%	0.0%	0.0%	0.0%
--------	-------	-------	------	------	------	------

5.6 Descriptive Statistics Analysis (Questionnaire Part 3)

Sekaran and Bougie (2013) has mentioned that the assessment of mean, variance, and standard deviation values can give a substantial evidence to researchers about respondents and their response. This values principally resides under the ambarella of descriptive statistics. To this end, a descriptive analysis method carried out in this study to explicate and describe the main characteristics of the primary data set and outline respondents about every studied variable.

Table 5.4 presents the final analysis test results for all the examined factors. The mean values mentioned in Table 5.4 were ranged between 1.8685 and 4.6503. Accordingly, the descriptive analysis indicated standard deviation ranging between .45026 and 1.06314. Notably, the table also outlines the two of the variables including financial capability, and information stewardship concluded with lower mean values i-e 1.8685 and 2.4393 respectively. For this, it also provides detailed information about the variables that have highest mean value. Based on this, the descriptive analysis results indicate a satisfactory level of acceptance for all the examined variables.

Table 5.4

Descriptive Statistics of the Constructs

Variables	Mean	Std. Deviation
UL	4.1252	.60177
LP	4.1272	.56879
TS	3.2731	1.06314

Table 5.4 continued

FC	1.8685	.77786
TR	4.3078	.56892
ITC	3.3714	.89840
IT	4.0231	.76129
IQ	4.1835	.76719
SM	4.3324	.64424
CC	4.1927	.79085
BE	4.6503	.45026
IS	3.5607	.81868

From the above Table IS = Information stewardship (Mean = 3.5607 Standard Deviation = 0.81868), BE = Benefits (Mean = 4.6503, Standard Deviation = 0.45026), SM = Social media (Mean = 4.3324, Standard Deviation = 0.64424), CC = Cloud computing (Mean = 4.1927, Standard Deviation = 0.79085), IT = IT Compatibility (Mean = 4.0231, Standard Deviation = 0.76129), IQ = Information quality (Mean = 4.1835, Standard Deviation = 0.76719), ITC = IT capability (Mean = 3.3714, Standard Deviation = 0.89840), FC = Financial capability (Mean = 1.8685, Standard Deviation = 0.77786), TR = Trust (Mean = 4.3078, Standard Deviation = 0.56892), TS = Top Management Support (Mean = 3.2731, Standard Deviation = 1.06314), UL = Upper level leadership (Mean = 4.1252, Standard Deviation = 0.60177), LP = Law and Policy (Mean = 4.1272, Standard Deviation = 0.56879)

5.7 Normality and Outliers

The analysis results from normality test shows the data was normally distributed on each variable (Tabachnick and Fidell, 2007) prior to run a hierarchical regression analysis test. Hierarchical regression analysis test is a method of multiple regression analysis (Hair et al., 2010). Of importance to mention that two types of normality test were implemented; namely, Histogram test, and A P-P plot test. These types help to ensure that the data is rational and can be genuinely used for analysis purposes.

5.7.1 Histogram

When a smooth probability density function is generated by the graphical line that generalizes the distribution of the data set appears like a "bell" curve (Hair et al., 2013a). The curves of factors are standard to shows, the underlying frequency distribution to identify the peaks of most common values.

The curves of factors are standard to shows, the underlying frequency distribution to identify the peaks of most common values. In this study, results obtained from histogram have shown that data is usually distributed with a bell-shaped featured curve.

A histogram is a plot that permits to find and display the fundamental frequency distribution (shape) of a set of continuous data. This allows the review of the data for its underlying distribution (e.g., normal distribution); enabling classification of the peaks, which are the tallest clusters of bars. The peaks illustrate the most common

values. Hence, the spread of sample is assessed to understand how much the data varies.

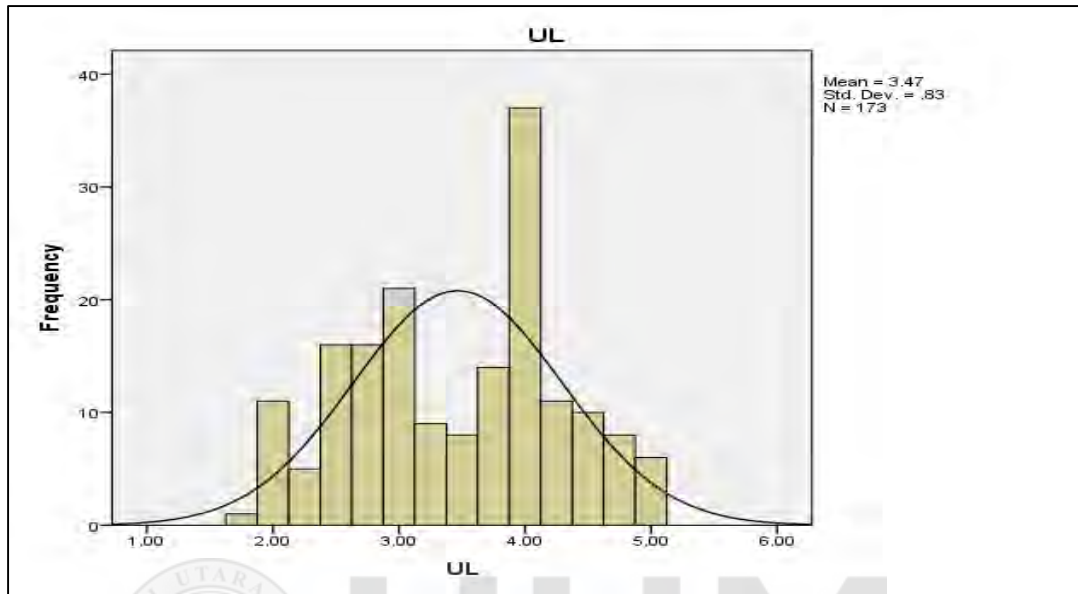


Figure 5.9. Histogram of Upper-level leadership

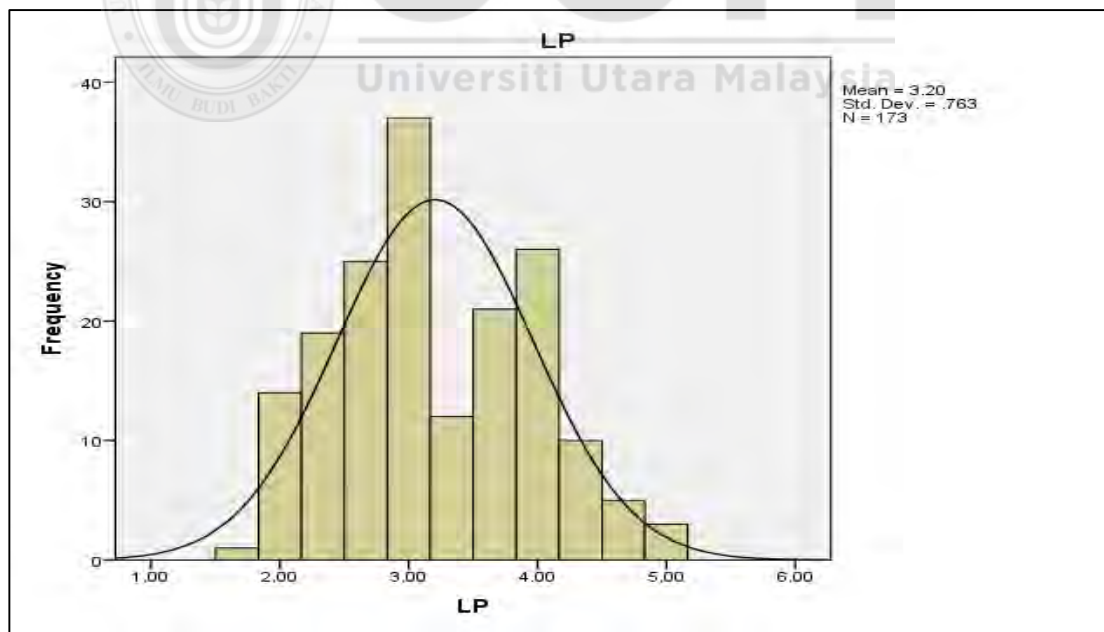


Figure 5.10. Histogram of Law and Policy

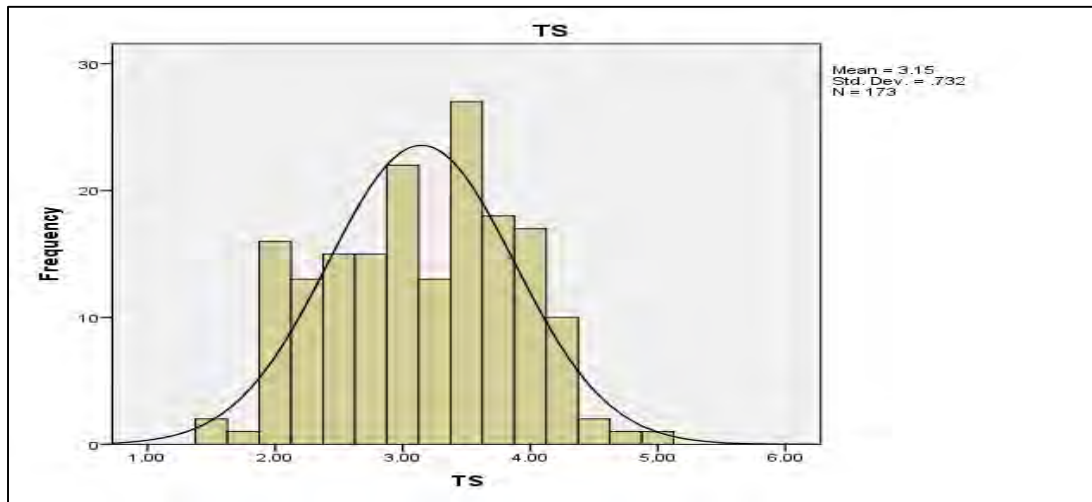


Figure 5.11. Histogram of Top Management Support

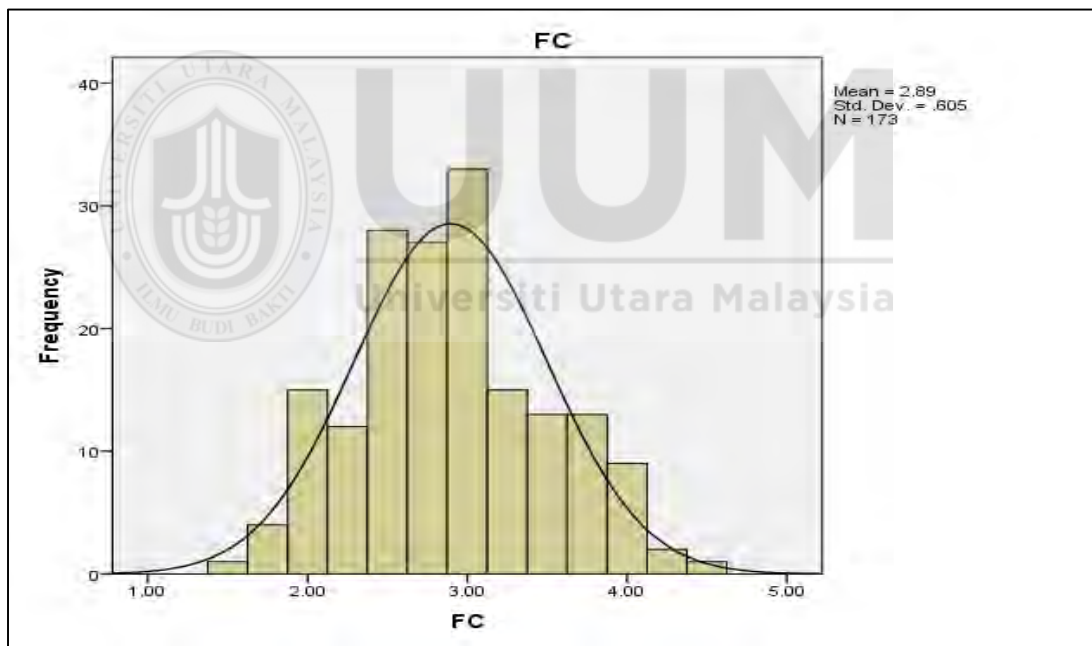


Figure 5.12. Histogram of Financial capability

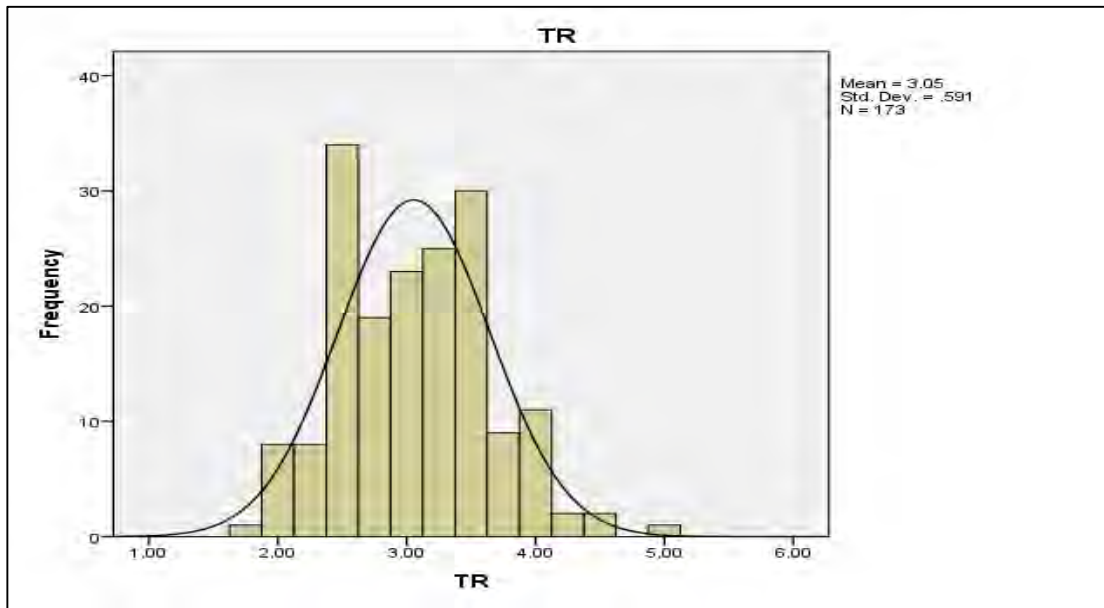


Figure 5.13. Histogram of Trust

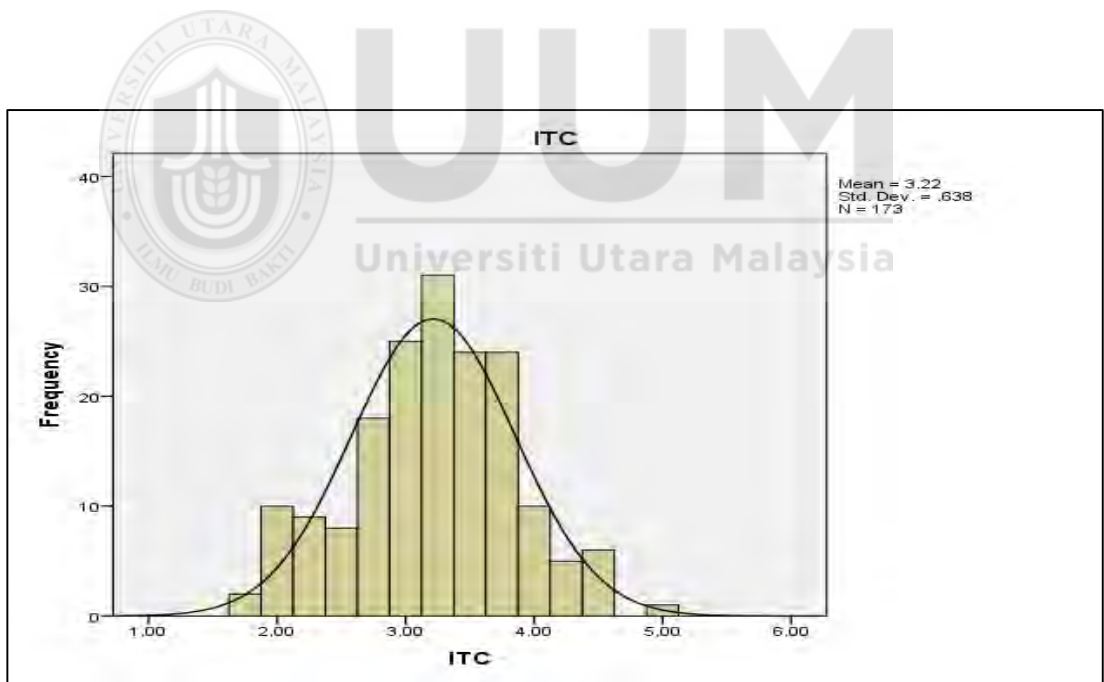


Figure 5.14. Histogram of IT capability

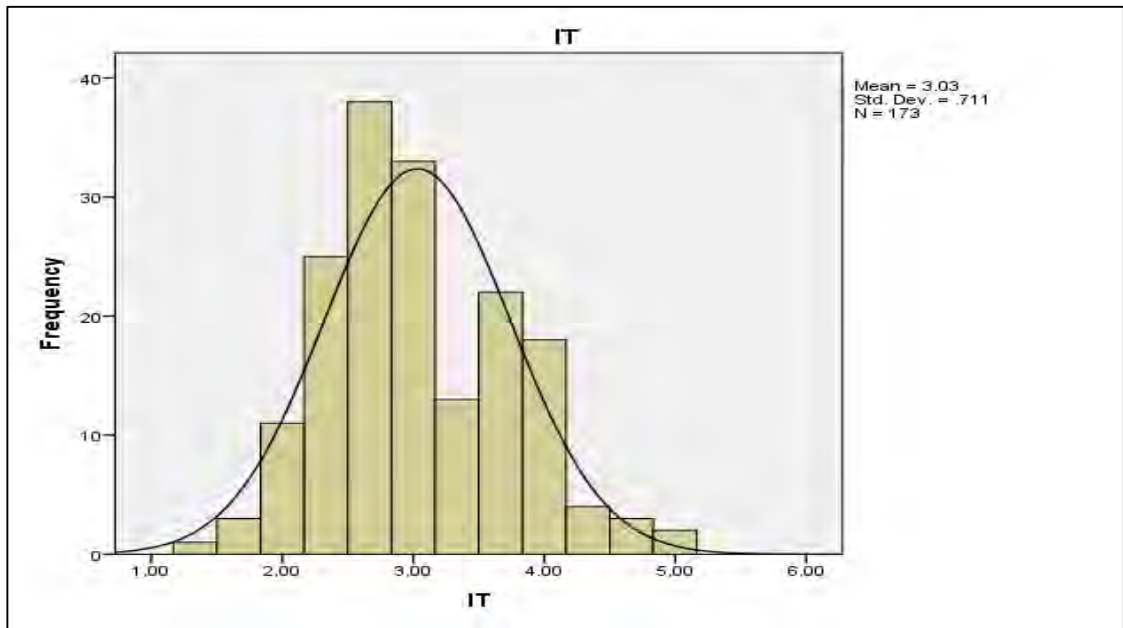


Figure 5.15. Histogram of IT Compatibility

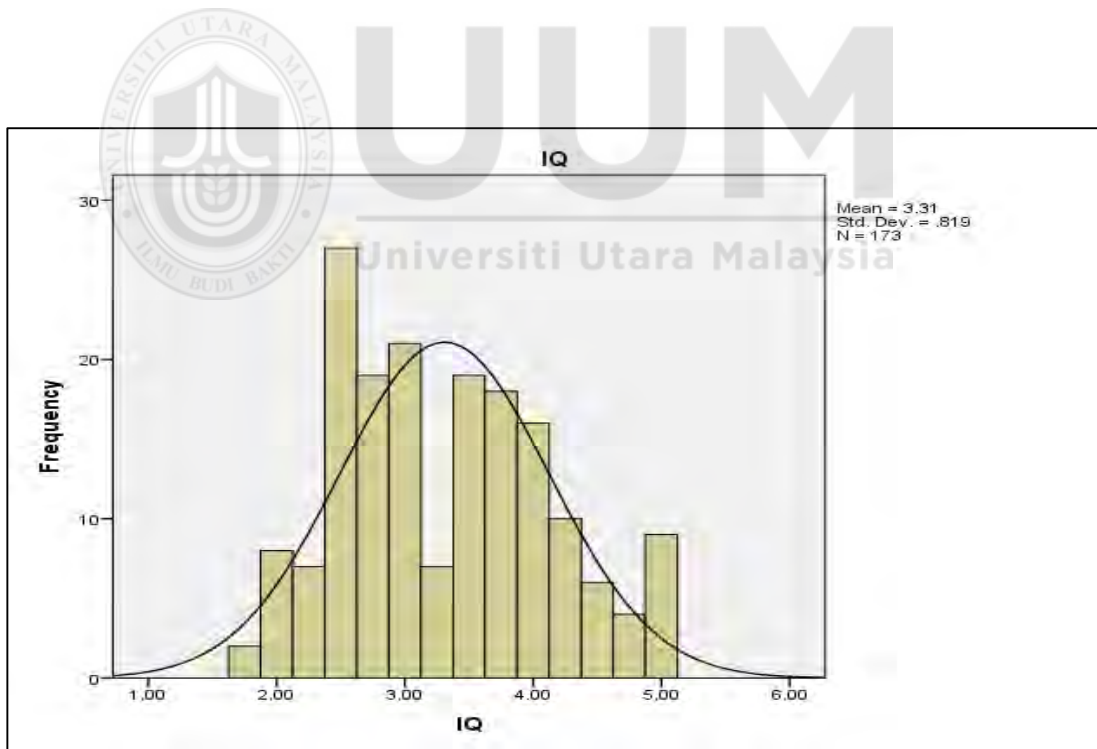


Figure 5.16. Histogram of Information quality

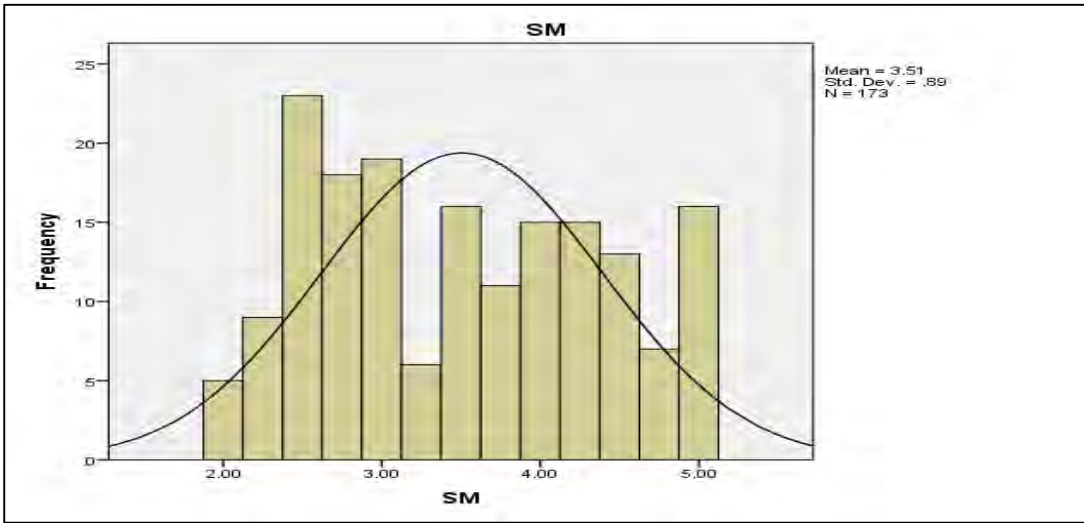


Figure 5.17. Histogram of Social media

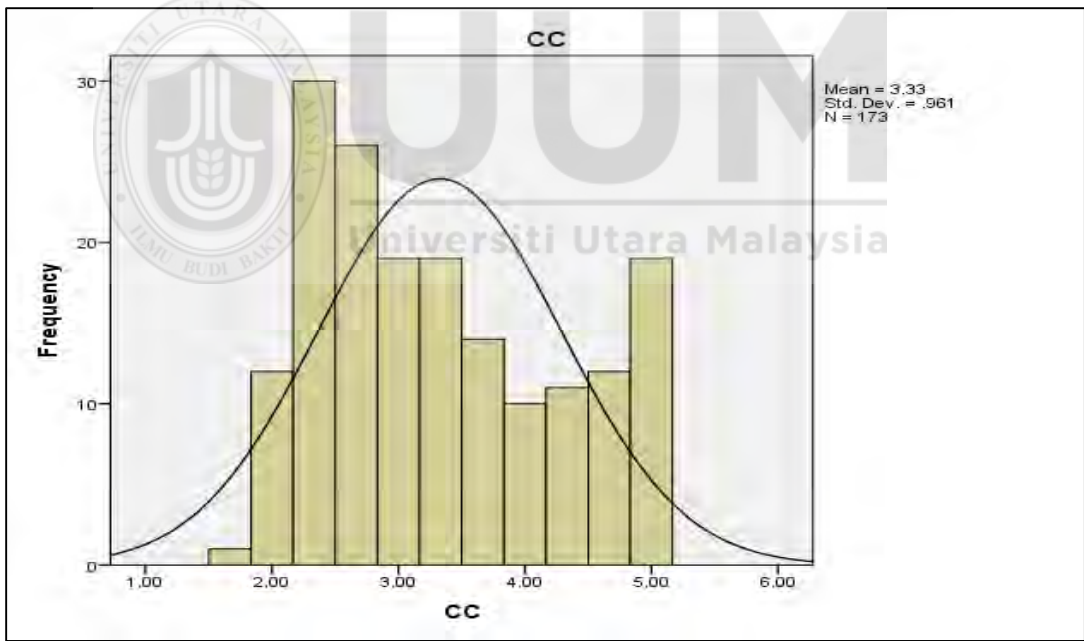


Figure 5.18. Histogram of Cloud computing

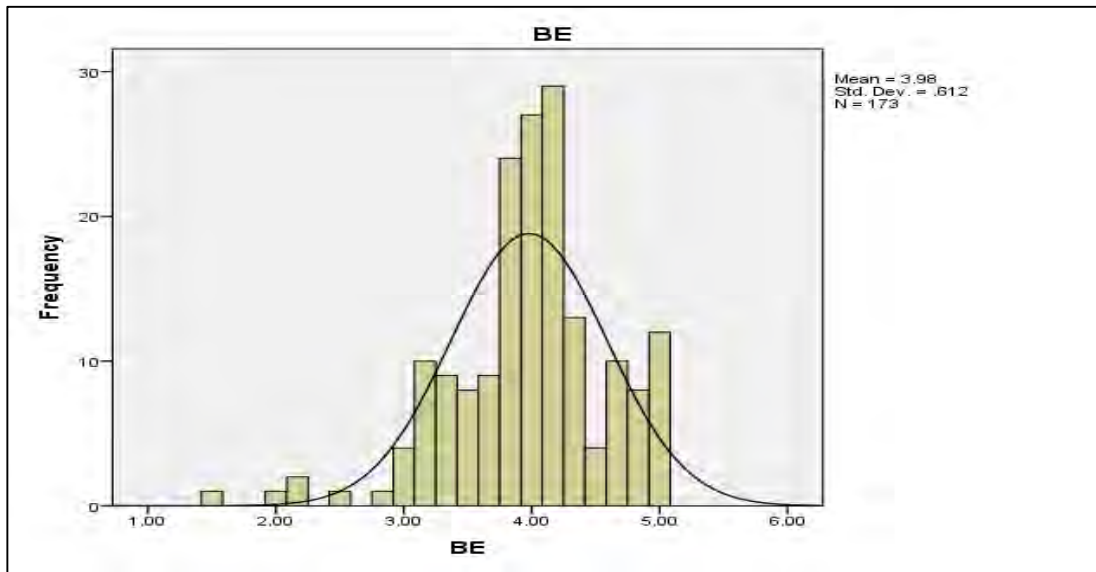


Figure 5.19. Histogram of Benefits

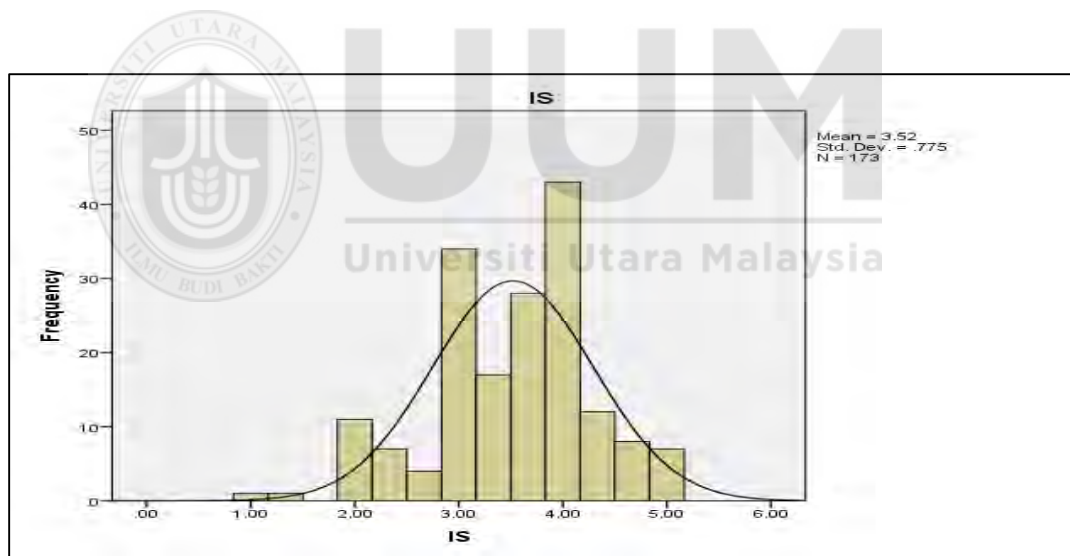


Figure 5.20. Histogram of Information stewardship

5.7.2 P-P plot

Furthermore, the P-P plot test was deployed in this study to determine the normality.

A P-P plot is a graph that can also aid to decide whether your data are Normal or not.

A probability plot for assessing show the circles follow to close the line, how the two

cumulative distribution functions agree or against each other (Gibbons and Chakraborti, 2011). Figures (5.21, 5.22, 5.23, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32), shows that the circles follow to close the line, which proved this data is normally distributed. Here observed that graph below shows probability plot.

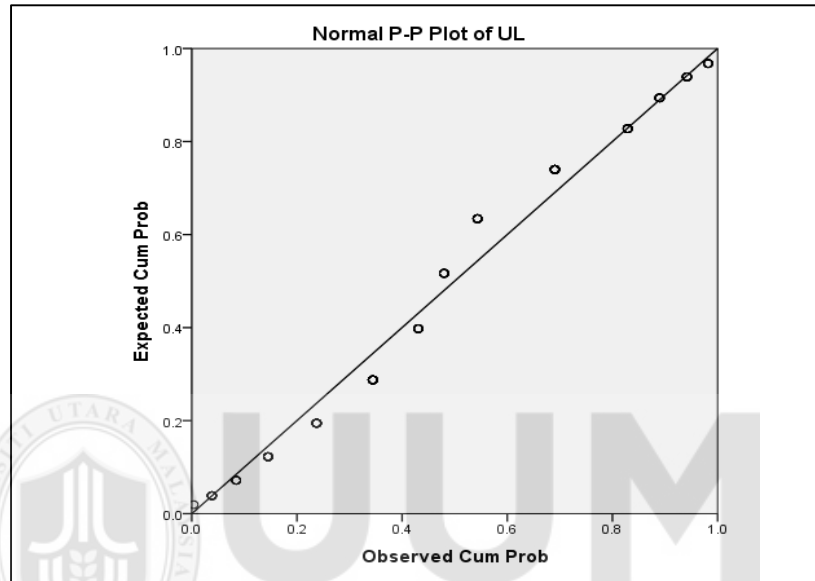


Figure 5.21. P-P plot of Upper-level leadership

Figure 5.21 shows the P-P Plot for Upper-level leadership is a skewed left distribution. It has a massive left tail and a light right tail. This explains that the distribution is more expected to generate outliers on the left side only. It could simultaneously point out that also indicate a distribution where most of the data piles near an upper boundary. Thus, Upper-level leadership collated data fulfill the requirements as normal.

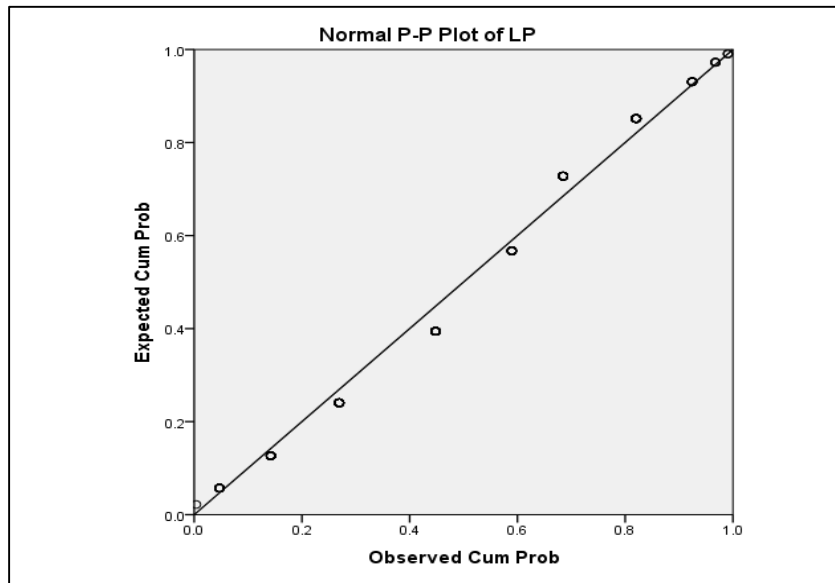


Figure 5.22. P-P plot of Law and Policy

Figure 5.22 shows the P-P Plot for Law and Policy. The figure shows that it has equal right and left tail. Thus, Law and Policy collated data fulfill the requirements as usual.

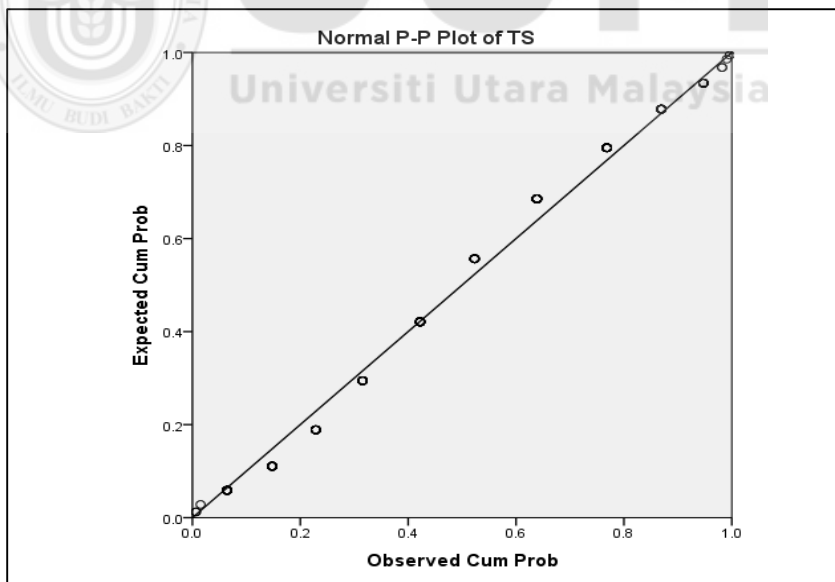


Figure 5.23. P-P plot of Top Management Support

Figure 5.23 shows the P-P Plot for Top Management Support that is a skewed right distribution and a light left. It also indicates that distribution piles near an upper

boundary. Thus, Top Management Support collated data fulfill the requirements as normal.

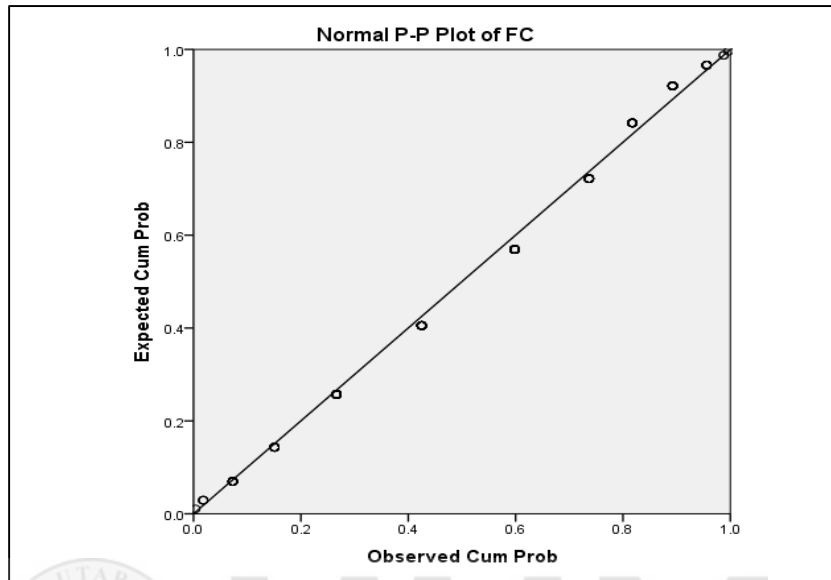


Figure 5.24. P-P plot of Financial Capability

Figure 5.24 shows the P-P Plot for a Financial capability that is a skewed right distribution. It has a massive right tail, and a light left tail. This result indicates that the distribution is more probable to create outliers on the right side only. It could also imply that a distribution where most of the data piles near a lower boundary. Thus, Financial capability collated data fulfill the requirements as usual.

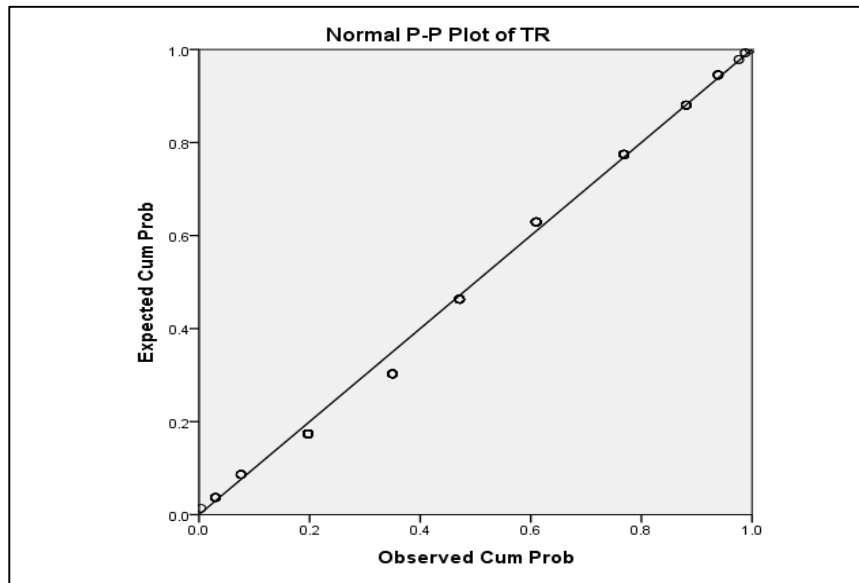


Figure 5.25. P-P plot of Trust

Figure 5.25 shows the P-P Plot for Trust. This means that the distribution is likely to produce outliers on the left side only. Thus, Trust collated data fulfill the requirements as the normal.

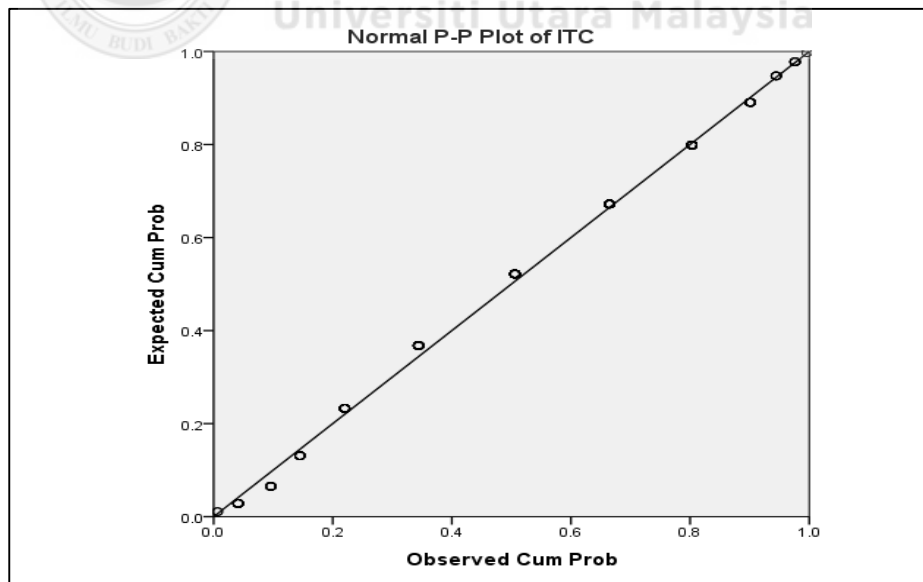


Figure 5.26. P-P plot of IT capability

Figure 5.26 shows the P-P Plot for IT capability that is a skewed left distribution. It has a massive left tail and a light right tail. This means that the distribution is likely to produce outliers on the left side only. It might also indicate a distribution where most of the data piles near an upper boundary. Thus, IT capability collated data fulfill the requirements as normal.

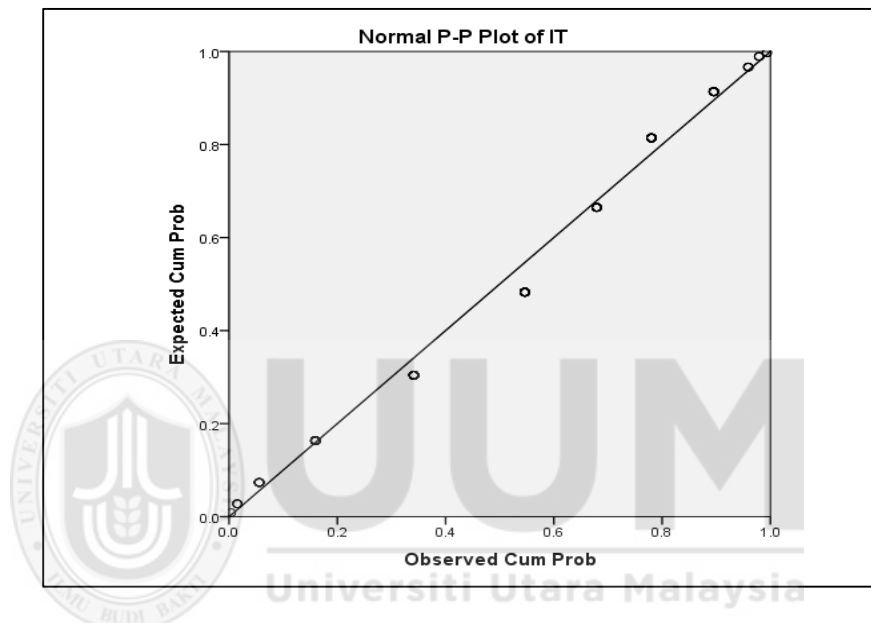


Figure 5.27. P-P plot of IT Compatibly

Figure 5.27 shows the P-P Plot for IT Compatibly. The figure shows that it has left a tail. Thus, IT compatibly collated data fulfill the requirements as normal results.

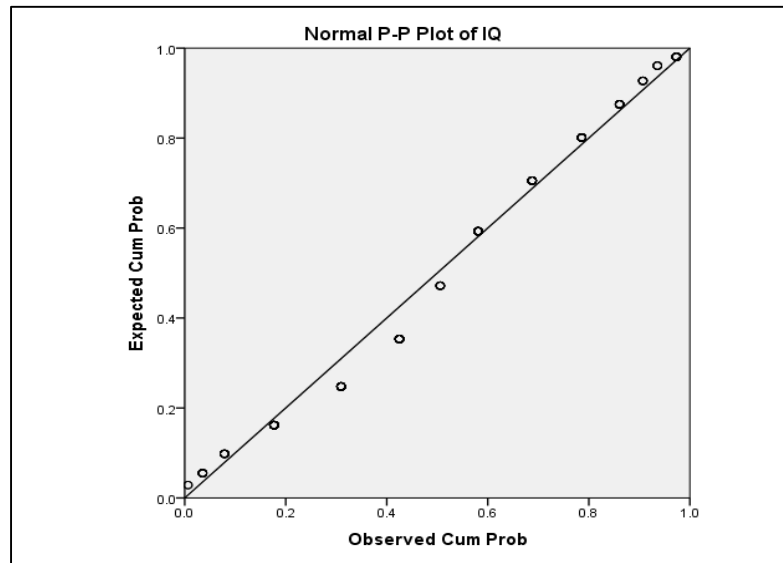


Figure 5.28. P-P plot of Information quality

Figure 5.28 shows the P-P Plot Information quality that is a skewed left distribution (heavy left tail and a light right tail) for information quality. The data loads near an upper boundary and distribution are producing outliers on the left side of the data piles near an upper boundary. Thus, Information quality collated data fulfill the requirements as normal.

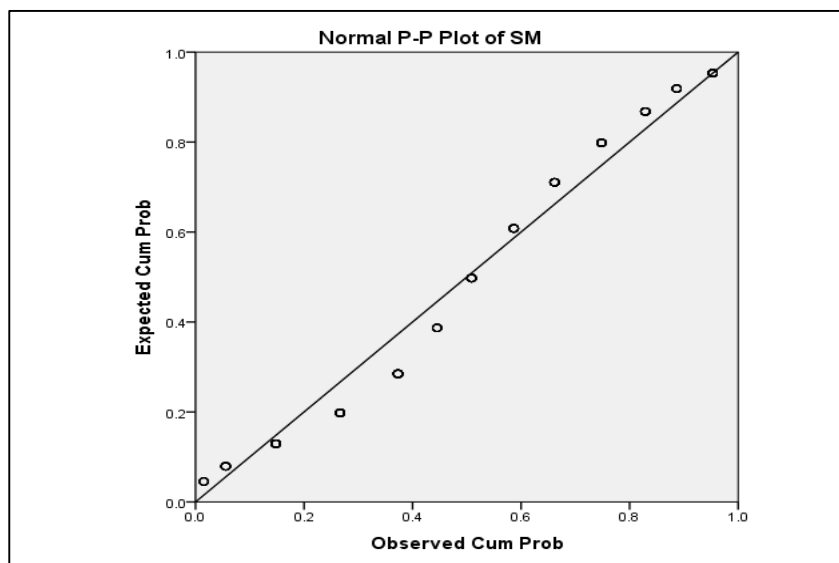


Figure 5.29. P-P plot of Social media

Figure 5.29 shows the P-P Plot for Social media. This means that the distribution is equally produce outliers on the right and left side. Thus, Social media collated data fulfill the requirements as normal.

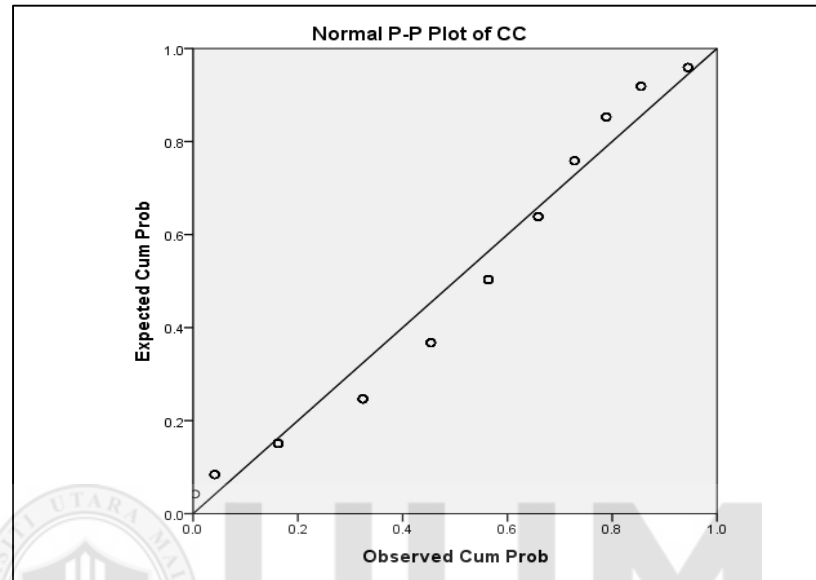


Figure 5.30. P-P plot of Cloud computing

Figure 5.30 shows the P-P Plot for Cloud computing that is that the distribution is equally produced outliers on the right and left side. It also indicates that distribution piles near an upper boundary. Thus, Cloud computing collated data fulfill the requirements as normal.

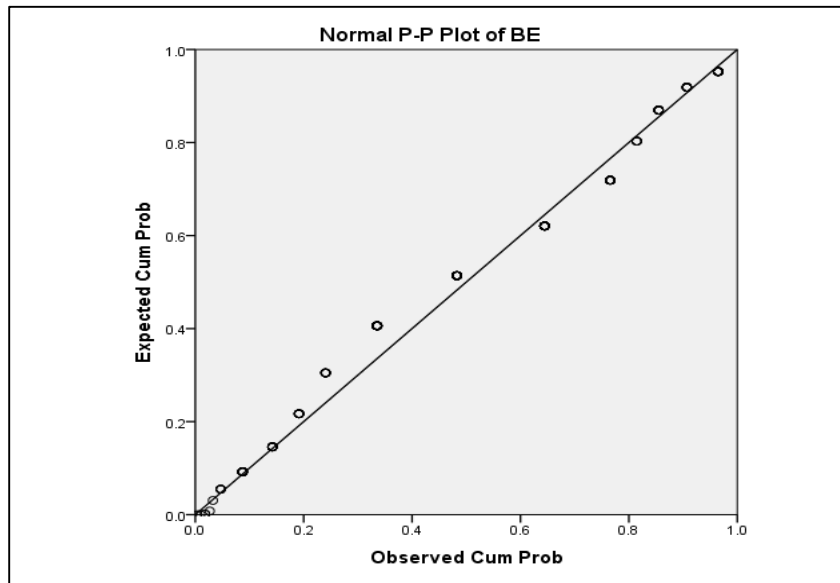


Figure 5.31. P-P plot of Benefits

Figure 5.31 shows the P-P Plot for Benefits. The figure shows that it has a right tail.

Thus, Benefits collated data fulfill the requirements as normal.

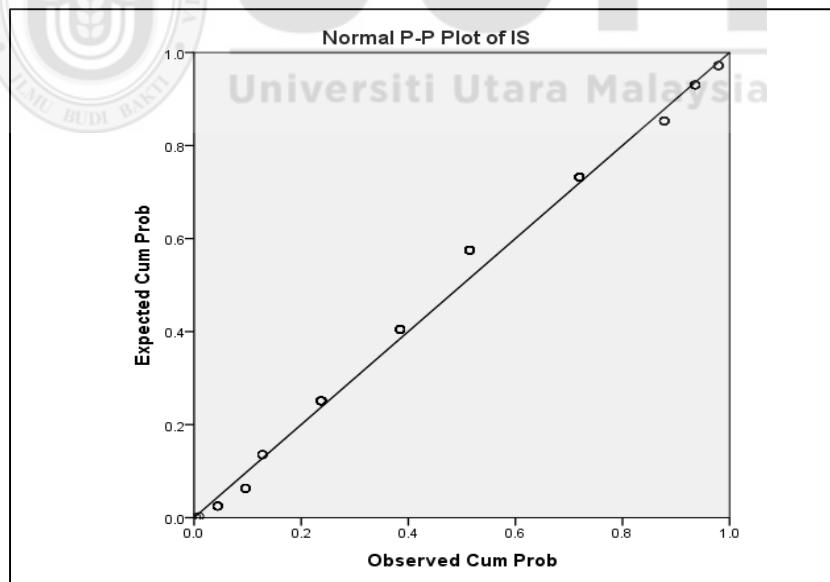


Figure 5.32. P-P plot of Information stewardship

Figure 5.32 shows the P-P Plot for Information Stewardship. This means that the distribution is equally produce outliers on the right and left side. Thus, Information stewardship collated data fulfill the requirements as normal.

5.7.3 Outliers

This study is also verified for the Outliers. Based on Zikmund (2003), the outlier is explained as data that has value progressing beyond the normal boundries of the dataset. In addition to that, Cookes and Steed (2003), identified the Outliers as “extreme cases which have a huge effect on the regression solution.”

The data that has value out (Cooke & Steed, 2003) the normal range (Z-score value more than +3 or less than -3) in each variable (Zikmund, 2003) of the dataset before run a hierarchical regression analysis (Cooke & Steed, 2003). However, this study found no outlier of the data.

5.8 Reflective Measures Reliability

In the present thesis, the measurement model evaluation is based on the reflective model, the outer model is analyzed to check the reliability and validity of the variable used in this study. Figure 5.33 presents the measurement model with first-order constructs, second-order constructs, and the number of items.

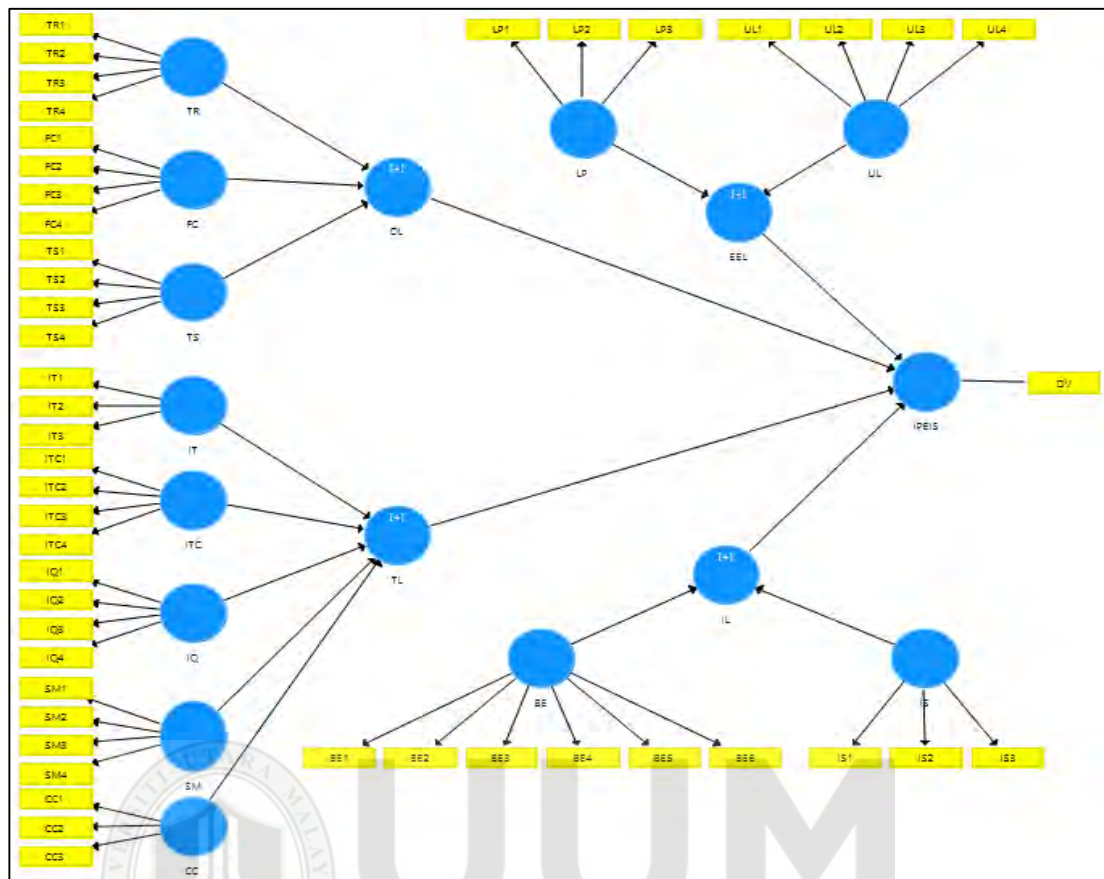


Figure 5.33. Measurement Model with Constructs and Indicators

UL = Upper Level Leadership, LP = Law and Policies, TS = Top Management Support, FC = Financial Capability, ITC = IT Capability, TR = Trust, IQ = Information Quality, IT = IT Compatibility, CC = Cloud Computing, SM = Social Media, IS = Information Stewardship, BE = Benefits

Chin (1998b) argued that loadings of the indicator should be higher than 0.70 and the level of significance should be at the level of 0.05. At the value of 0.70 loadings, a latent variable can explain the variance of its indicator at least 50%. A re-sampling technique such as jack-knifing or bootstrapping helps to analyze the loading significance. Hensler et al. (2009) argued that during the process of indicator elimination researchers should follow the characteristics of PLS, and the indicator should be eliminated when its value of reliability is less than 0.70 and its elimination

enhances the value of CR. In this study, all the loading values are higher than the benchmark value of 0.70. Therefore, no indicator is deleted from the measure. Figure 5.34 presents the measurement model with the construct's outer loadings.

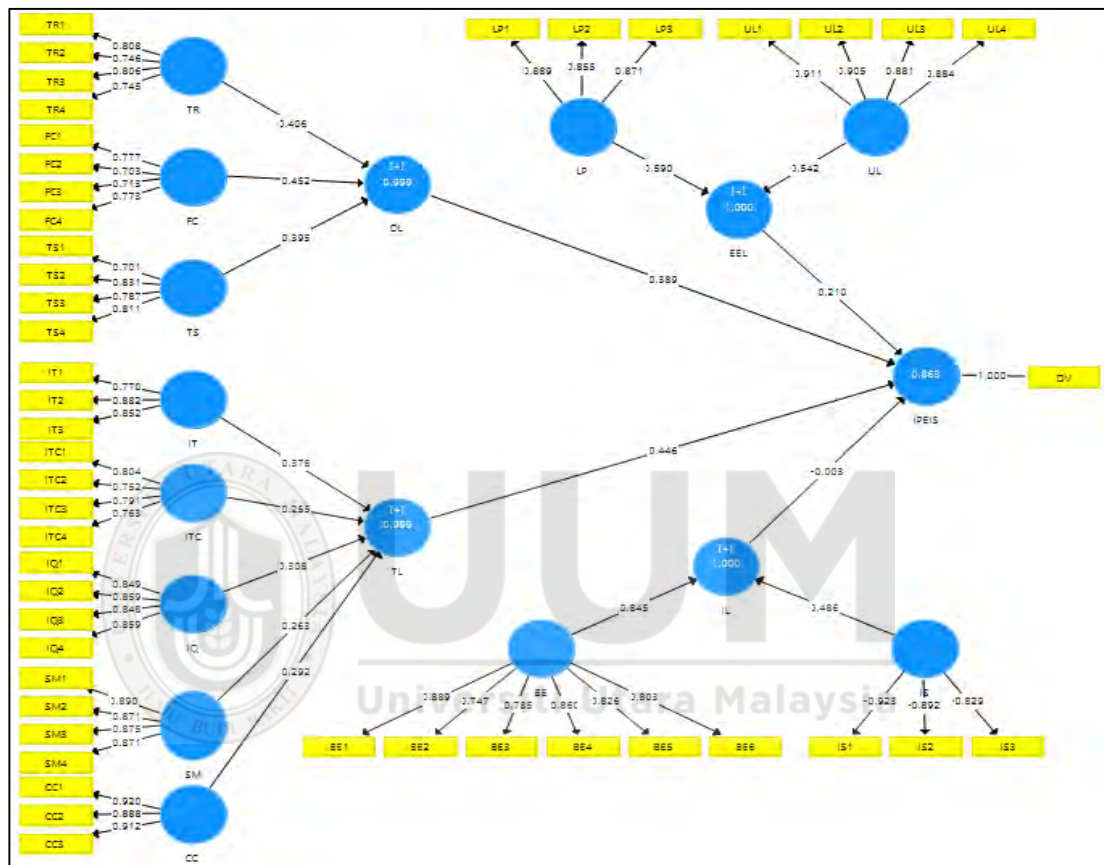


Figure 5.34. Measurement Model with Factor Loading

UL = Upper Level Leadership, LP = Law and Policies, TS = Top Management Support, FC = Financial Capability, ITC = IT Capability, TR = Trust, IQ = Information Quality, IT = IT Compatibility, CC = Cloud Computing, SM = Social Media, IS = Information Stewardship, BE = Benefits

In the next step, the reliability of reflective measures was examined. The reliability of reflective measures was assessed through composite reliability. According to Shook et al. (2004), composite reliability is a better choice, as this method considers the

standardized loadings and measurement error for each item over the coefficient alpha. The Cronbach alpha (α) has limitations; for instance, it assumes that all items have an equal distribution to reliability; in this research, both criteria are used for determining the extent of reliability. Results present that the Cronbach value of all constructs is higher than 0.70 and the composite reliability value of all measures is also higher than the benchmark value 0.70. Therefore, the results show the internal consistency of measures. Table 5.5 presents the outer loading of all indications.

Table 5.5

Reflective Constructs Reliability

Scale Name	Cronbach's Alpha	CR	AVE
BE	0.901	0.924	0.671
CC	0.892	0.933	0.822
FC	0.728	0.830	0.551
IQ	0.876	0.915	0.729
IS	0.857	0.913	0.779
IT	0.783	0.874	0.699
ITC	0.783	0.860	0.605
LP	0.842	0.905	0.760
SM	0.900	0.930	0.769
TR	0.781	0.859	0.604
TS	0.789	0.864	0.615
UL	0.917	0.942	0.802

UL = Upper Level Leadership, LP = Law and Policies, TS = Top Management Support, FC = Financial Capability, ITC = IT Capability, RT = Trust, IQ = Information

Quality, IT = IT Compatibility, CC = Cloud Computing, SM = Social Media, IS = Information Stewardship, BE = Benefits

5.9 Reflective Measure Validity

According to Phillips & Bagozzi, (1986), discriminant validity and convergent validity helps to measure the validity of reflective measures. The consistency within the multiple-operationalization's assessed through convergent validity. In the current thesis, the t-statistics values show the significance of the entire factor loading at $p < 0.000$. Table 5.6 presents the results and highlight that all the measures are fulfilling the criteria of convergent validity (Gefen et al., 2000). The Average Variance Extracted (AVE) is a standard measure of convergent validity, and all AVE values in this table have been recommended a minimum of 0.50 (Hair et al., 2013b). Furthermore, it is indicating that at least 50% of the measurement variance was captured by the latent construct (Chin, 1998). All constructs were assessed for their reliability and validity.

Table 5.6:

Outer Loading and AVE for Constructs

Items	Loadings	CR	AVE	p-value
UL 1	0.911	0.942	0.802	0.000
UL 2	0.905			
UL 3	0.881			
UL 4	0.884			
LP 1	0.889	0.905	0.760	0.000
LP 2	0.855			
LP 3	0.871			
TS 1	0.703	0.864	0.615	0.000
TS 2	0.830			
TS 3	0.788			
TS 4	0.808			

FC 1	0.772	0.830	0.551	0.000
FC 2	0.707			
FC 3	0.703			
FC 4	0.783			
ITC 1	0.793	0.860	0.605	0.000
ITC 2	0.761			
ITC 3	0.790			
ITC 4	0.766			
TR 1	0.810	0.859	0.604	0.000
TR 2	0.749			
TR 3	0.802			
TR 4	0.744			
IQ 1	0.846	0.915	0.729	0.000
IQ 2	0.859			
IQ 3	0.848			
IQ 4	0.861			
IT 1	0.774	0.874	0.699	0.000
IT 2	0.881			
IT 3	0.849			
CC 1	0.922	0.933	0.822	0.000
CC 2	0.887			
CC 3	0.911			
SM 1	0.889	0.930	0.769	0.000
SM 2	0.873			
SM 3	0.874			
SM 4	0.871			
BE 1	0.889	0.924	0.671	0.000
BE 2	0.747			
BE 3	0.785			
BE 4	0.860			
BE 5	0.826			
BE 6	0.803			
IS 1	0.923	0.913	0.779	0.000
IS 2	0.892			
IS 3	0.829			

The validity of constructs is assessed through discriminant validity. Discriminant validity refers to the extent to which different constructs diverge from one another (Hair et al., 2006). Discriminant validity can be assessed in different ways: (I) Fornell-Larcker criterion, (II) cross-loadings, and (III) Heterotrait-Monotrait (HTMT) Analysis. In a first way, discriminant validity can be analyzed by evaluating the square root of AVE for each factor with its correlations with another factor (Fornell &

Larcker, 1981). Table 5.7 presents that the square root of AVE for each factor are higher than correlations among factors. This highlights that the variance explained by the relevant factor is higher than the measurement error variance, thus proving the factors discriminant validity. In this research, the correlations between variables were generally low to moderate.

Furthermore, discriminant validity can also be assessed by analyzing the cross-loadings, where the loading of each indicator should be higher than all of its cross-loadings. The results of all cross-loading are presented (Appendix excel file) are matching the criteria of achieving discriminant validity. The highlighted part comprises of loadings for all indicators in each construct. It further involves that each indicator component score in its own set is better than other sets or indicators.

In the PLS path model to ensure that a reflective construct has the strongest relationships with its own indicators in comparison with any other construct is the goal of discriminant validity assessment (Hair Jr et al., 2016). According to Henseler et al. (2014), these approaches do consistently identify the lack of discriminant validity in common research situations as shown by means of a simulation study. Therefore, the Hetrotrait-Monotrait ratio of correlation (HTMT) is an alternative method to analyze the discriminant validity. In the variance based-SEM a detail explanation was provided to describe the HTMT by Petter, Straub, and Rai (2007). The value of HTMT should be less than 0.85 (Kline, 2011) or 0.90 (gold et al., 2001). The negative correlation results of the HTMT criterion has no issue. Table 5.8 presents the results of the Hetrotrait-Monotrait ratio of correlation.

Table 5.7:

Constructs Correlation Matrix

	BE	CC	FC	IPEIS	IQ	IS	IT	ITC	LP	SM	TR	TS	UL
BE	0.818												
CC	0.242	0.907											
FC	0.226	0.439	0.742										
IPEIS	0.221	0.522	0.770	1.000									
IQ	0.189	0.403	0.454	0.561	0.854								
IS	-0.052	-0.066	0.092	0.114	-0.062	0.880							
IT	0.141	0.329	0.628	0.728	0.401	0.117	0.836						
ITC	-0.001	0.241	0.286	0.469	0.123	0.051	0.400	0.776					
LP	0.195	0.325	0.517	0.690	0.495	0.056	0.496	0.250	0.872				
SM	0.135	0.204	0.282	0.499	0.207	0.023	0.359	0.244	0.216	0.877			
TR	0.090	0.224	0.482	0.642	0.331	0.096	0.467	0.349	0.456	0.431	0.776		
TS	0.051	0.368	0.442	0.631	0.368	0.044	0.464	0.367	0.510	0.256	0.443	0.782	
UL	0.145	0.355	0.494	0.576	0.362	0.155	0.414	0.254	0.555	0.010	0.311	0.483	0.895

UL = Upper Level Leadership, LP = Law and Policies, TS = Top Management Support, FC = Financial Capability, ITC = IT Capability, TR = Trust, IQ = Information Quality, IT = IT Compatibility, CC = Cloud Computing, SM = Social Media, IS = Information Stewardship, BE = Benefits, IPEIS = Increase Participation in Electronic Information Sharing.

Table 5.8:

Hetrotrait-Monotrait Ratio of Correlation (HTMT)

	BE	CC	FC	IPEIS	IQ	IS	IT	ITC	LP	SM	TR	TS	UL
BE													
CC	0.270												
FC	0.274	0.544											
IPEIS	0.227	0.550	0.900										
IQ	0.212	0.455	0.567	0.599									
IS	0.087	0.089	0.124	0.115	0.083								
IT	0.166	0.390	0.825	0.822	0.486	0.138							
ITC	0.071	0.296	0.358	0.514	0.145	0.098	0.502						
LP	0.224	0.369	0.658	0.750	0.575	0.086	0.612	0.302					
SM	0.149	0.225	0.347	0.524	0.231	0.100	0.424	0.263	0.245				
TR	0.137	0.256	0.630	0.718	0.393	0.108	0.594	0.430	0.548	0.513			
TS	0.077	0.424	0.571	0.701	0.441	0.067	0.589	0.475	0.618	0.290	0.554		
UL	0.157	0.389	0.602	0.599	0.403	0.158	0.489	0.309	0.632	0.050	0.361	0.559	

UL = Upper Level Leadership, LP = Law and Policies, TS = Top Management Support, FC = Financial Capability, ITC = IT Capability, TR =

Trust, IQ = Information Quality, IT = IT Compatibility, CC = Cloud Computing, SM = Social Media, IS = Information Stewardship, BE = Benefits,

IPEIS = Electronic information sharing between Yemen public universities and YCIT-HE.

5.10 Formative Measure Validity

The validity of formative measures analyzes in a different way as examined for reflective measures (Ringle and Sarstedt, 2016). According to Hair et al. (2014), the validity of the formative measure can be analyzed in three different ways. The current research employed the multicollinearity to analyze the formative measure validity.

Multicollinearity: The weight and level of significance of indicators are influenced by the presence of collinearity between formative indicators (Hair et al., 2014). The value of the variance inflation factor (VIF) helps to examine the level of collinearity. The benchmark value of VIF is five, if there is high value then it shows the collinearity issues. The results show that all values of VIF are less than benchmark value 5.00, therefore multicollinearity issues are not with second order constructs. The results of multicollinearity show that all the values are less than the benchmark values 5.00. The results of the second-order formative construct (ACAP, CE) multi-collinearity are presented in table 5.9.

Table 5.9:

Formative Constructs Multi-Collinearity

Formative Constructs	Dimensions	Tolerance	VIF
EEL	UL	0.514	1.145
	LP	0.573	1.445
OL	TS	0.407	1.433
	FC	0.426	1.418
	TR	0.493	1.452
TL	ITC		1.217
	IQ		1.326
	IT		1.347

	CC	1.245
	SM	1.155
IL	BE	1.003
	IS	1.028

EEL = External Environment layer, OL = Organizational layer, TL = Technology layer, IL = Individual layer

UL = Upper Level Leadership, LP = Law and Policies, TS = Top Management Support, FC = Financial Capability, ITC = IT Capability, TR = Trust, IQ = Information Quality, IT = IT Compatibility, CC = Cloud Computing, SM = Social Media, IS = Information Stewardship, BE = Benefits

5.11 Second-Order Model Assessment

In this study, External Environment layer (EEL) with two dimensions, Organizational layer (OL) with three dimensions, Technology layer (TL) with five dimensions and Individual layer (IL) with two dimensions are hypothesized as second-order formative constructs. Such measurement models are appropriate for multidimensional composite constructs because each dimension emphasizes various aspects in terms of outcomes. Four individual second-order measurement models for External Environment layer (EEL), Organizational layer (OL), Technology layer (TL) and Individual layer (IL) are developed to analyze the significance of their relative fit. These models are proposed on the basis of their dimensions as; EEL has two dimensions: Upper Level Leadership (UL) and Law and Policies (LP); OL has three dimensions: Top Management Support (TS), Financial Capability (FC) and Trust (TR); TL also has five dimensions: Information Quality (IQ), IT Compatibility (IT), IT Capability (ITC), Cloud Computing (CC), and Social Media (SM); while IL has two dimensions

Benefits (BE) and Information Stewardship (IS). These models are presented in figure 5.35 to 5.37.

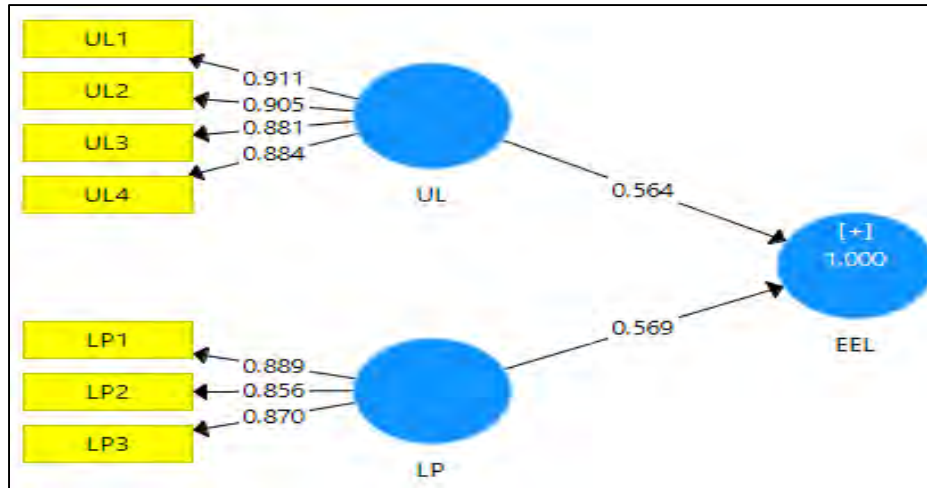


Figure 5.35: Measurement Model A-1: Direct relationship between First-order and Second-order External Environment layer

Figure 5.35 shows the second-order measurement model for External Environment layer (EEL) with two dimensions: Upper Level Leadership (UL) and Law and Policies (LP).

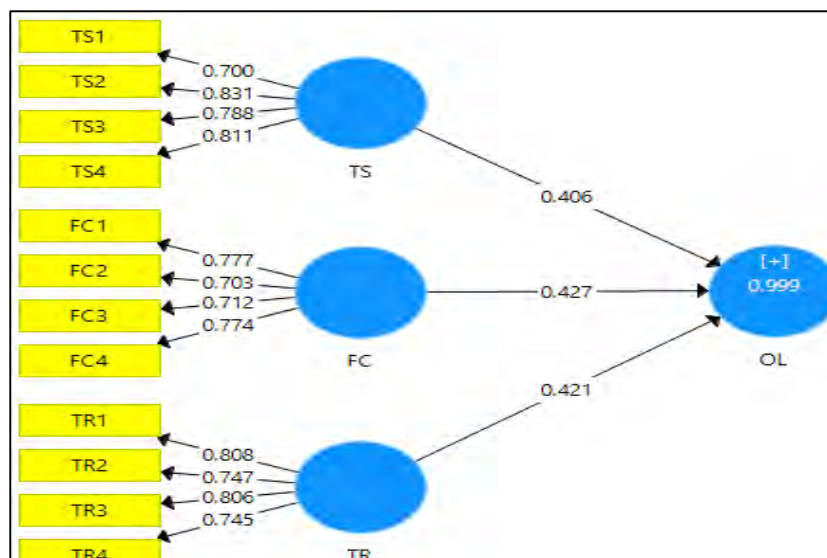


Figure 5.36: Measurement Model A-2: Direct relationship between First-order and Second-order Organizational layer

Figure 5.36 shows the second-order measurement model for Organizational layer (OL) with three dimensions: Top Management Support (TS), Financial Capability (FC), and Trust (TR).

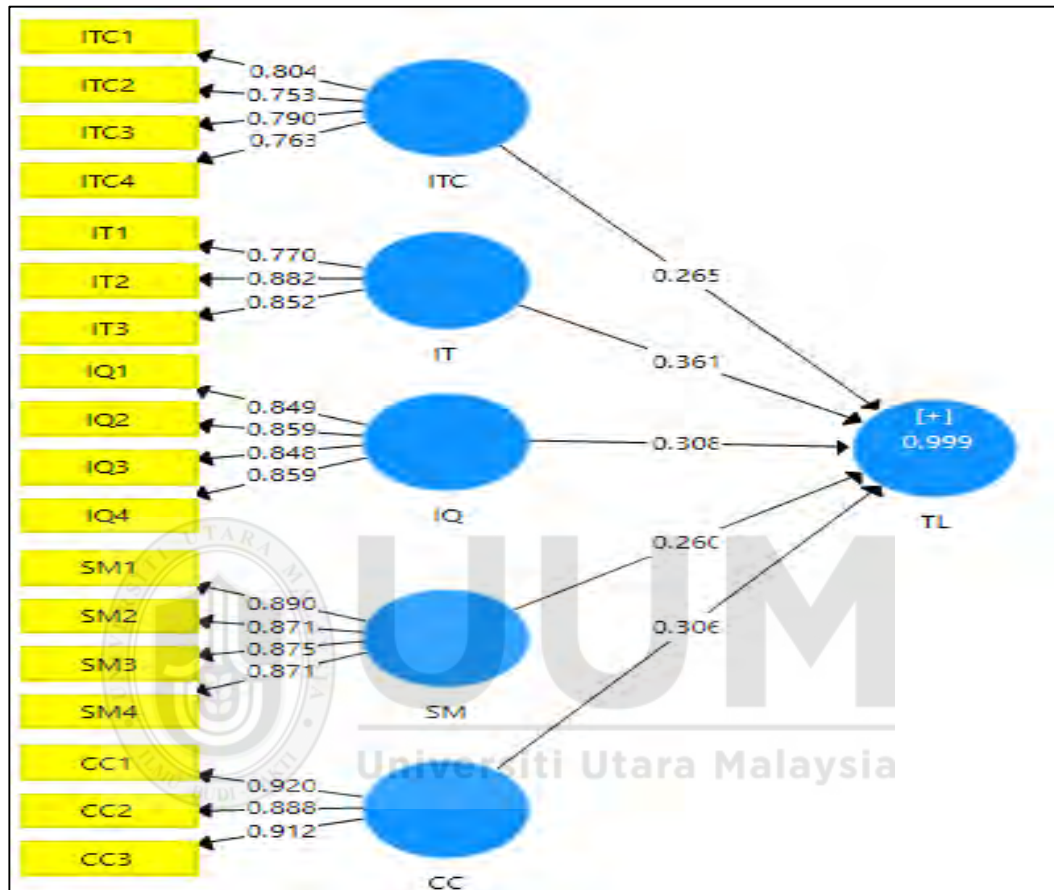


Figure 5.37: Measurement Model A-3: Direct relationship between First-order and Second-order Technology layer

Figure 5.37 shows the second-order measurement model for Technology layer (TL) also with five dimensions: Information Quality (IQ), IT Compatibility (IT), Cloud Computing (CC), IT Capability (ITC), and Social Media (SM).

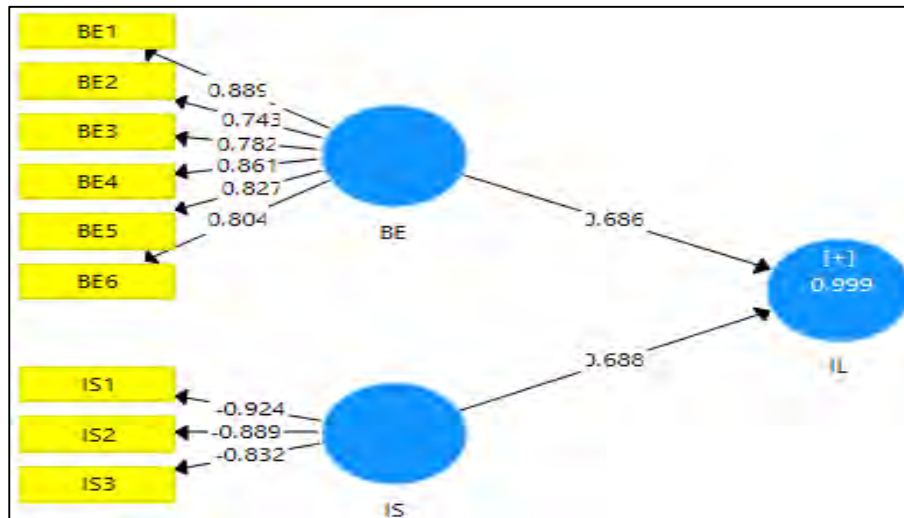


Figure 5.38: Measurement Model A-4: Direct relationship between First-order and Second-order Individual layer

Table 5.10 presents the relationship between first-order constructs and second-order constructs. All dimensions have a significant effect on the second-order constructs.

Table 5.10:

Relationship between First-Order and Second-Order Constructs

Model	Formative Second-Order (DV)	Reflective First-Order (IV)	No. of Items	Path Coefficient	P-Value
ModeA-1	EEL	UL	4	0.564	.000
		LP	3	0.569	
ModeA-2	OL	TS	4	0.406	.000
		FC	4	0.427	
		TR	4	0.421	
ModeA-3	TL	IQ	4	0.308	.000
		ITC	3	0.265	
		IT	3	0.361	
		CC	3	0.306	
		SM	4	0.260	

ModeA-	IL	BE	6	0.686	.000
4		IS	3	0.688	

EEL = External Environment layer, OL = Organizational layer, TL = Technology layer, IL = Individual layer

UP = Upper Level Leadership, LP = Law and Policies, TS = Top Management Support, FC = Financial Capability, ITC = IT Capability, TR = Trust, IQ = Information Quality, IT = IT Compatibility, CC = Cloud Computing, SM = Social Media, IS = Information Stewardship, BE = Benefits.

5.12 Hypothesis Testing

To answer the research questions by testing the proposed research hypotheses is the main objective of the structural model. Once the variables have achieved sufficient reliability and validity then the inner model or structural model can be analyzed. The examination of the inner model shows how empirical data sports the underlying theories used in the present thesis. Furthermore, it also permits to study the model's predictive abilities and relationships between hypothesized variables. The main purpose of PLS is to minimize error or maximize the variance explained in all dependent variables, thus the degree to which the PLS model achieves its objectives can be determined by analyzing the coefficient of determination (R²) values for the dependent variables. Therefore, the validity of the structural model is assessed using the coefficient of determination (R²) and path coefficients. In addition, this study also assesses the mediation relationships that are being proposed in the research model. Table 5.11 presents the four direct relation research hypotheses that analyzed in the structural model. Based on the research hypotheses, a hypothesized model is presented in table 5.11. There are total four direct relation research hypotheses.

H1: External Envirnoment Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.


H2: Organizational Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.

H3: Technological Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.

H4: Individual Layer will have a positive effect on electronic information sharing between Yemen public universities and YCIT-HE.

Table 5.11:

List of Hypotheses



Hypotheses	Relationship
H1	EEL → IPEIS
H2	OL → IPEIS
H3	TL → IPEIS
H4	IL → IPEIS

EEL = External Environment layer, OL = Organizational layer, TL = Technology layer, IL = Individual layer, IPEIS = Electronic information sharing between Yemen public universities and YCIT-HE.

Coefficient of Determination (R²): The value of R² shows the total variance by the independent variable (IV) in the dependent variable (DV). Therefore, a higher value

of R^2 enhances the structural model's predictive ability. In the present study, the value of R^2 is attained by employing the Smart-PLS algorithm function, while to produce the value of the t-statistics Smart-PLS bootstrapping function is utilized. For the present study, the bootstrapping produced 2000 samples from 173 cases. While, External Environment layer, Organizational layer, Technology layer, Individual layer are explaining 60.3% variance in Electronic information sharing between Yemen public universities and YCIT-HE.

Path Coefficients: The connection of two latent variables (LV) in a structural model represents a hypothesis. The relationship between the LV in the structural model is called path coefficients. Path coefficients are considered as the summary of all results. In the structured model that is labeled as “p” is also initially unknown and estimated as part of solving the PLS-SEM algorithm. Subsequently, the algorithm calculated the constructs scores that are used to evaluate the regression model. Also, the p-value (probability value) should be less than 0.05 which shows that the results are positive. It is also known as the significance level. On the other hand, the t-value should be higher than 1.96 that also presents the level of significance.

Relevance and Significance of Path Coefficient: The evaluation of the magnitude and significance level of path coefficients is permitted by the structural model. However, the execution of bootstrapping is required for the evaluation of the structural model in PLS-SEM. Using the PLS, the developed hypotheses were tested by examining the path coefficient, path significance, and variance explained. To ensure that the model obtains adequate validity and reliability test of convergent validity, discriminant validity, and reliability are done prior to test hypotheses. After running

the bootstrapping procedure, the structural model with results is shown in figure 5.39 and figure 5.40. The results of the path coefficient, significance level, and t-statistics are presented in table 5.12.

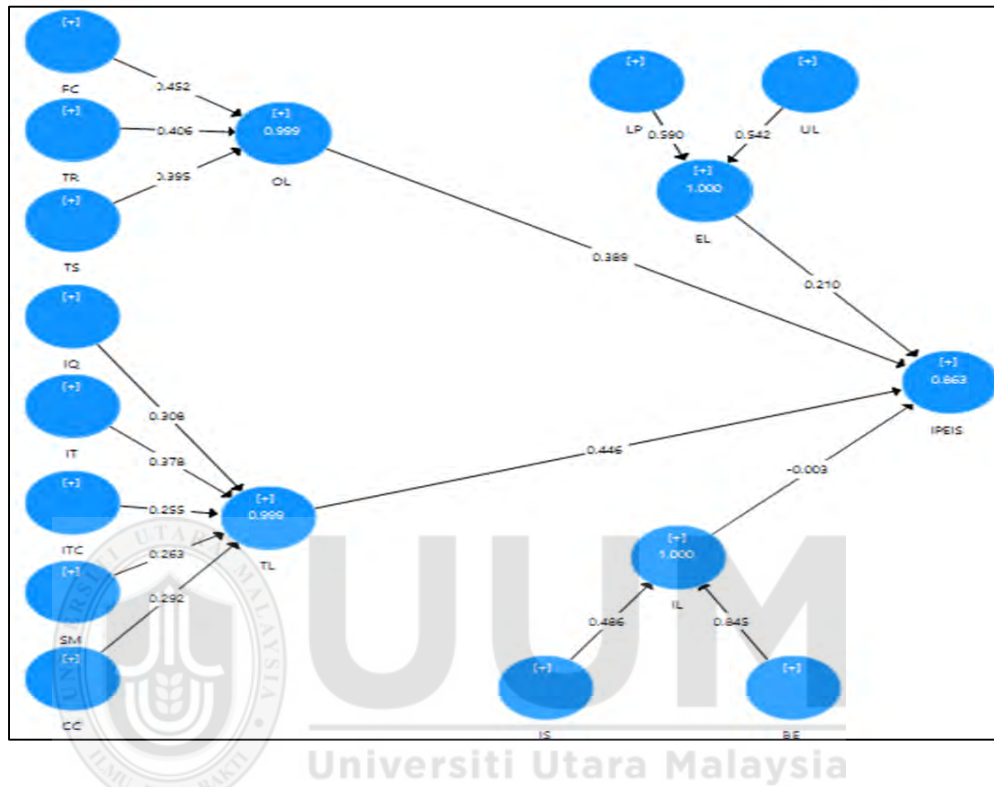


Figure 5.39: Structural Model with Path Coefficient

Table 5.12:

Path Coefficients

Hypotheses	Relationship	Path Coefficient	T-Statistics	P-Value	Significance Level	Direction
H1	EEL → IPEIS	0.210	4.073	0.000	***	Supported
H2	OL → IPEIS	0.389	6.536	0.000	***	Supported
H3	TL → IPEIS	0.446	8.497	0.000	***	Supported
H4	IL → IPEIS	-0.003	0.091	0.928	NS	Not-Supported

EEL = External Environment layer, OL = Organizational layer, TL = Technology layer, IL = Individual layer, IPEIS = Electronic information sharing between Yemen public universities and YCIT-HE

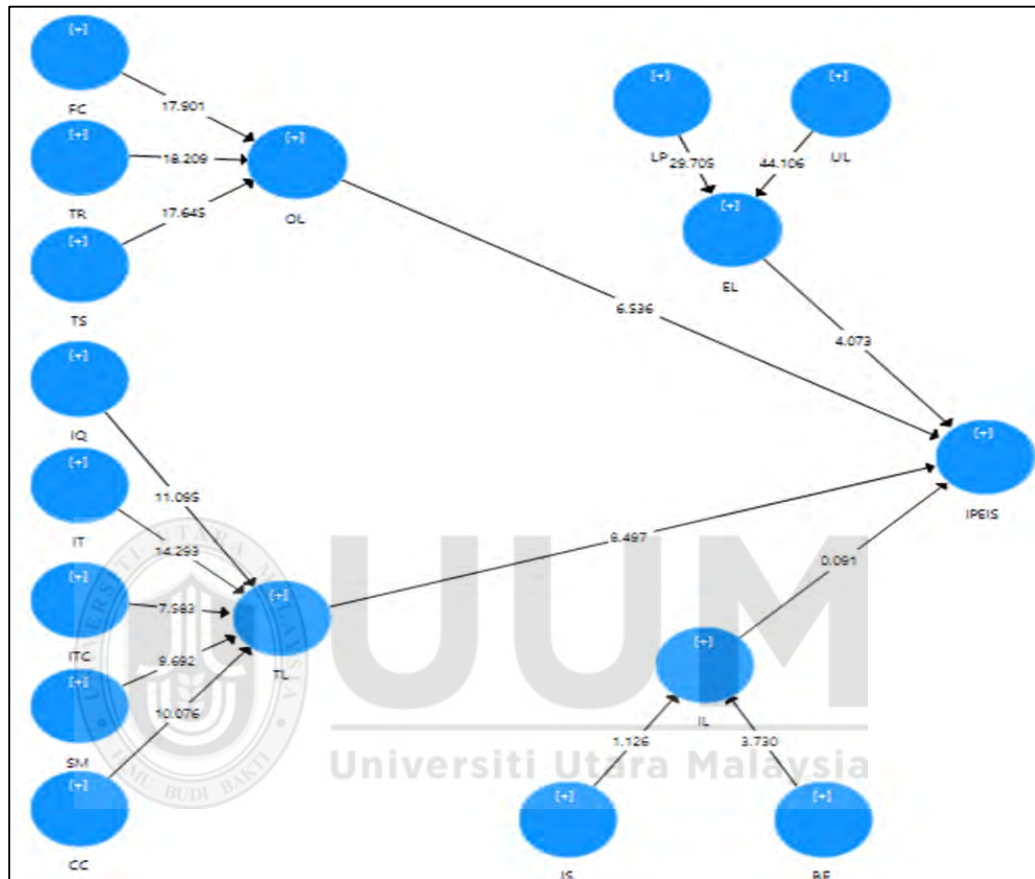


Figure 5.40: Structural Model with T-Values

There are four direct relationship hypothesized and the result of the structural model presents that all hypotheses in this study are supported except the relationship between Individual layer and Electronic information sharing between Yemen public universities and YCIT-HE.

Hypothesis 1 (H1) tests for a direct relationship between External Environment layer and Electronic information sharing between Yemen public universities and YCIT-HE.

The results show significant positive relationship ($\beta=0.210$, $p < 0.000$, $t=4.073$) and supporting the H1. The relationship is observed to be statistically significant with significance level ($P<0.001$). Therefore, the research hypothesis is accepted.

Hypothesis 2 (H2) tests for a direct relationship between Organizational Layer and Electronic information sharing between Yemen public universities and YCIT-HE. The results show significant positive relationship ($\beta=0.389$, $p < 0.000$, $t=6.536$) and supporting the H2. The relationship is observed to be statistically significant with significance level ($P<0.001$). Therefore, the research hypothesis is accepted.

Hypothesis 3 (H3) tests for a direct relationship between Technology layer with Electronic information sharing between Yemen public universities and YCIT-HE. The results show significant positive relationship ($\beta=0.446$, $p < 0.000$, $t=8.497$) and supporting the H3. The relationship is observed to be statistically significant with significance level ($P<0.001$). Therefore, the research hypothesis is accepted.

Hypothesis 4 (H4) tests for a direct relationship between Individual Layer and Electronic information sharing between Yemen public universities and YCIT-HE. The results show non-significant relationship ($\beta= -0.003$, $p < 0.878$, $t=0.091$) and not supporting the H4. The relationship is observed to be statistically not significant with significance level ($P =0.928$). Therefore, the research hypothesis is rejected.

5.13 Conclusion

This chapter provides a discussion on the data analysis methods adopted for the study and it also deliberates on the data obtained to evaluate the research model. In here, response rate, missing data, validity, reliability analysis of the instrument and nonresponse biased were explained and examined.

Two main phases of data analysis were carried out in this research using SPSS and Smart PLS. The first phase emphasized the goodness of data. Before proceeding with the various types of analysis, the data must be checked to determine if it was fit for further analysis or not. The reliability analysis had justified the goodness of measure. The following analysis was used to identify the normality of the data gathered. For the purpose of normality analysis, the Histogram and P-P plot test were considered accordingly. For the second phase, factor analysis was considered in identifying the quality of variables in determining if they were fit for analysis.

The correlation and regression tests suggested that the three variables as supported while one variable is not supported. Furthermore, research models and hypotheses are discussed along with the result obtained from the data analysis.

CHAPTER SIX

DISCUSSIONS AND CONCLUSION

6.1 Introduction

This chapter presents the discussion on the outcomes and the achievements of this study. It starts with a discussion on the findings, contributions, limitations of the study and the theoretical and practical contributions, and followed by a discussion of the future research. Additionally, conclusions of each chapter are drawn concerning the research effort.

The study was carried out with three main objectives as follow:

- To identify the current issues of electronic information sharing between Yemen public universities and YCIT-HE.
- To determine the factors that will increase the electronic information sharing between Yemen public universities and YCIT-HE.
- To propose a theoretical model of electronic information sharing between Yemen public universities and YCIT-HE.

In the next section, the achievements of the study are presented according to questions concerned and the objectives fulfilled.

6.2 The Study Achievements

This section caters to the overall recap of the study findings based on formulated research objectives.

6.2.1 Current Issues of EIS

Research Question 1: What is the current issues of electronic information sharing between Yemen public universities and YCIT-HE?

Research Objective 1: To identify the current issues of electronic information sharing between Yemen public universities and YCIT-HE.

This study has effectively clarified the first research objective through in-depth interview data with YCIT-HE workers (manager). Information pertaining to barriers and constraints faced by the workforce of YCIT-HE regarding electronic information sharing was uncovered. Therein, the interviewed manager provided two important documents that contained details regarding these barriers.

As per the provided report, currently there are four notable barriers that hindered electronic information exchange between YCIT-HE and public universities in Yemen. All the four barriers actually are the layers involved in electronic information sharing in this case. The first barrier referred to the environmental Layer which was noted to be the most deleteriously influencing factor amongst the four. It includes policy constraints, legal limitations and leadership barriers. Accordingly, the second barrier referred to technology Layer which underlined lack of advanced technology; technological awareness, lack of ICT. Likewise, the third layer was related to the organization in which, top management support limitations and financial constraints were indicated as the barriers towards sharing the information electronically between YCIT-HE and public universities in Yemen. The fourth factor reconsiders individual employees, expressing lack of understanding benefits using electronic information sharing between YCIT-HE and public universities in Yemen.

Conclusively, the reports outlined these four barriers as the main barriers, restricting the electronic information exchange between YCIT-HE and public universities in Yemen.

Research Question 2: What are the factors which could be used to influence the participation of Electronic information sharing with in Yemen public universities and YCIT-HE?

Research Objective 2: To determine the factors that will increase the electronic information sharing between Yemen public universities and YCET-HE.

Consequently, this objective figures out the most important factors **under the four levels (External Environment, Oraganizational, Technological and individual)** that have influences in increasing the electronic information sharing between public universities and YCIT-HE in Yemen. The objective was effectively achieved through examining four notable levels that contain a few factors which can positively infuse electronic information sharing between YCIT-HE and public universities in Yemen. The results show that only factors under three levels **External Environment, Oraganizational, Technological** were found to have a positive influence, and the remaining one (individual) have a negative effect in this regard.

These factors were considered in the present study based on the previous studies of electronic information sharing and based on the layers highlighted in the LBM, which are: individual, technological, organizational and environmental. The factors were tested as elements in the related layers, to see how they influence the enhancement of electronically information sharing between public universities and YCIT-HE in

Yemen.

The factors; Top management support, Inter-agency Trust from Organizational layer and upper-level leadership under External environmental layer are based on the theoretical explanation of Social Exchange Theory. Accordingly, as per the assertions of Information Sharing Theory, information stewardship under individual layer was examined.

These factors; Law and Policy proposed under External environmental layer, and IT capability, IT compatibility and Information quality proposed under Technological layer, Financial Capability proposed under Organizational layer and Benefits proposed under individual layer have also been investigated previously from the other studies in electronic information sharing.

Following this, the study also found cloud computing and social media factors under technological layer give contribution in this research. Cloud computing and social media were examined to overview how it can enhance the participation of electronic information sharing between public universities and YCIT-HE in Yemen. These factors have a positive effect to increase sharing information electronically between YCIT-HE and Yemen public universities. As mentioned earlier, three layers with their proposed factors have evidenced to be statistically significant in this regard. Figure 6-1 shows the three layers and factors that were proven to increase the EIS between public universities and YCIT_HE.

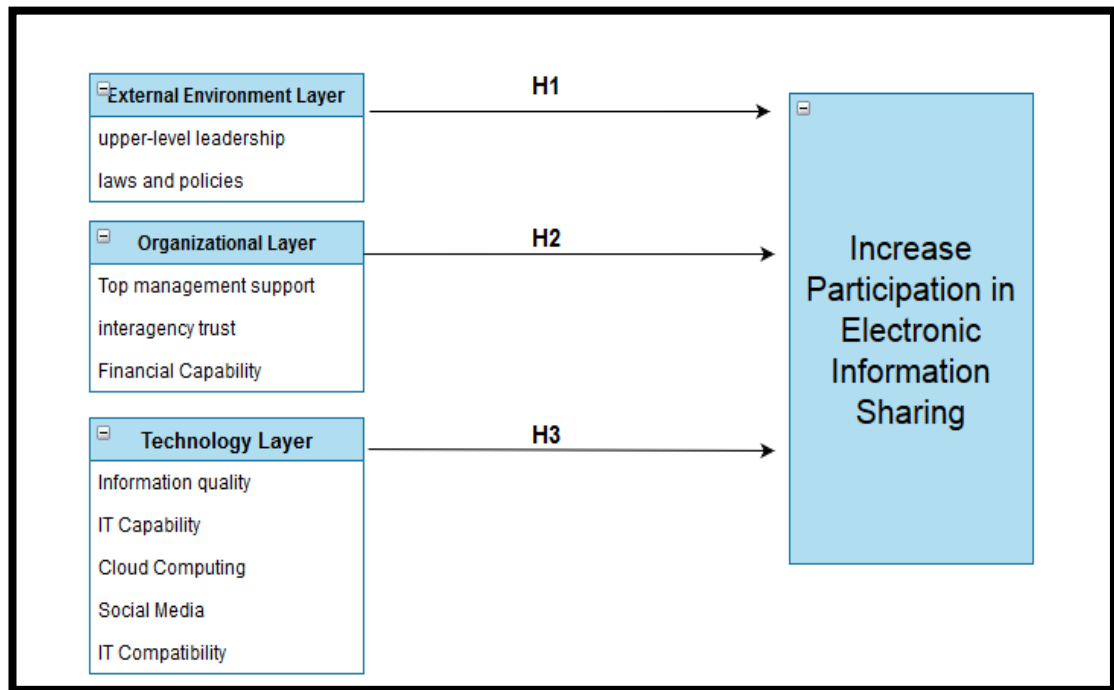


Figure 6.1. The suggested factors of electronic information sharing.

Research Question 3: What is the potential electronic information sharing model between Yemen public universities and YCIT-HE?

Research Objective 3: To propose a theoretical model of electronic information sharing between of Electronic information sharing between Yemen public universities and YCIT-HE. And to examine the relationships between the factors that may increase the participation of Electronic information sharing between Yemen public universities and YCIT-HE.

Pertaining to the third objective, this study examined the association between factors that could potentially enhance the participation of electronic information sharing between public universities and YCIT-HE. The study earlier has proposed a theoretical model. This model was proposed based on four electronic information sharing

constraints and three significant layer with factors that could help eliminating these barriers in a way to increase electronic information sharing between public universities and YCIT-HE.

Figure 6.2 presents the final model of the study. Three layers External Environment Layer, Organizational Layer and Technology Layer with 10 factors are significantly contributed in increasing electronic information sharing between YCIT. and Yemen public universities. The forthcoming subsections discusses about these findings followed by recommendations for theoretical and practical implications for the participating universities.

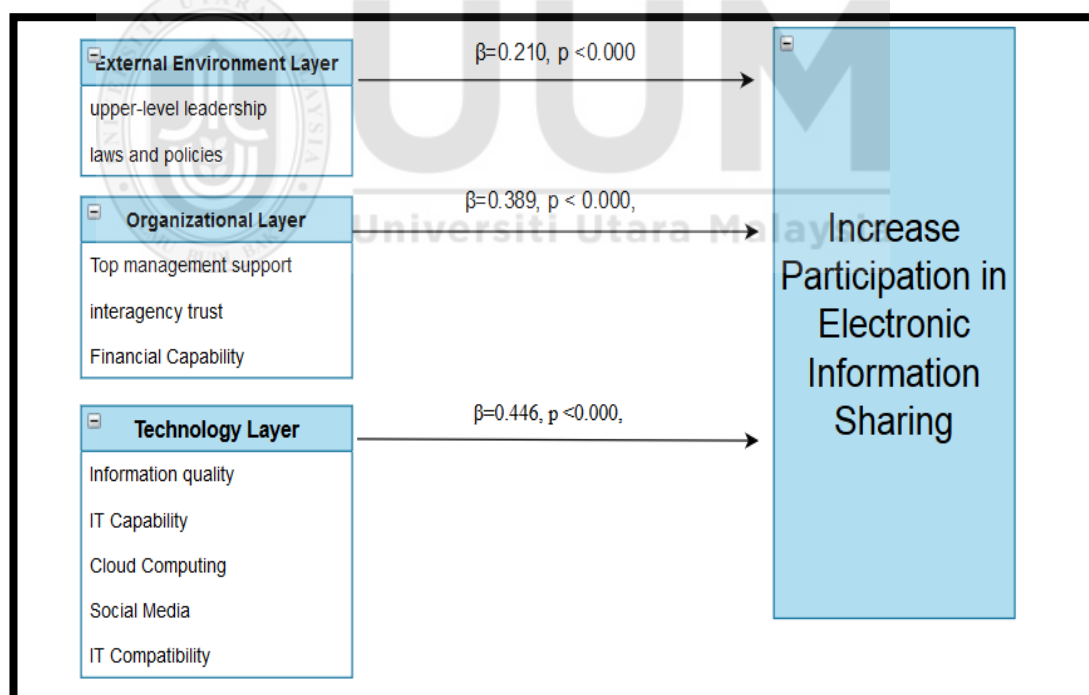


Figure 6.2. A summary of the survey

6.2.2 External Environment Layer:

The statistical analysis resulted a significant role of external environment layer ($\beta=0.210$, $p < 0.000$), hence supporting the hypothesis. The findings suggest that upper-level leadership can considerably help when providing information to public universities regarding the advantage and disadvantage of electronic information sharing. It can set rules and standards for sharing information such as data standards and how it can help to foster the process between YCIT-HE and public universities. The results have concluded that upper-level leadership can increase participation in the electronic information sharing among YCIT-HE and public universities. In order to increase electronic information sharing between them, it might be wise for YCIT-HE to make recommendations and requests to public universities about sharing their information electronically with them.

Accordingly, the findings suggest that YCIT-HE can responsively facilitate the electronic information sharing by instructing public universities to cooperate and encourage employees to sharing information with the YCIT-HE. Instructing universities through guiding and mentoring such as upper-level leadership should know and understand the staff in the universities. If they do not allow sharing information between them, this may cause problems for the decision-making bodies in the public universities and not provide services from YCIT-HE in the best time. This is guiding would be a better idea for YCIT-HE to facilitate this exchange. (Prove reading)

In connection with Law and Policy, the findings suggest that by introducing good encouraging laws, public universities can considerably help advancing the electronic

information sharing amongst with the YCIT-HE. Thus, the public universities need good laws and policies such as the YCIT_HE must answering questions such as: “How will information be shared by public universities?”, “Which departments in YCIT-HE are permitted to access for information?”, “Which department in YCIT-HE have the right to collect and own information?”, “Which of it can be shared?”, in order to organize their electronic information sharing with public universities. Additionally, it is also important to note that, law and policies may also help in trust building, risk reduction and can make the staff more comfortable in sharing the information electronically. Therefore, policy- making and laws related to the use of electronic information sharing process can be carefully planned and executed through a consultation between universities and YCIT-HE to increase electronic information sharing.

6.2.3 Organizational Layer

The results show that Organizational layer has significant influence on Electronic information sharing between Yemen public universities and YCIT-HE ($\beta=0.389$, $p < 0.000$). The influence of top management, interagency trust and financial capability across the public universities towards enhancing information sharing was also concluded to be significant. As per the results, top management needs to consider working on encouraging information sharing through electronic means. Therein, top management authorities can facilitate and guide employees for effective and responsive electronic information sharing with YCIT-HE. For example top management support is necessary to provide that the necessary resources and equipment such as hardware, software, and training staff to motivate employees to

exchange information with YCIT-He electronically.

Therein, rewards and recognition prospects may also be used to motivate employees for this. Overall, the finding also suggests that the management authorities are positive about exchanging information with YCIT-HE..

The result of financial capability factor in electronic information sharing of this study was aligned with the previous studies important influence of financial capability on electronic information sharing among government agencies (Akbulut et al., 2009; Akbulut, 2011). However, the YCIT-HE and Ministry of Higher Education have not increased its expenses for its universities in the last few years in order to enhance the education system (Kalad, 2014), because of the political situation in Yemen and the organizations of Holland that stopped supporting the center fund.

Therefore, electronic information sharing in universities was found to be less able to obtain grants from MOHESR sources to support their electronic information sharing. Also, MOHESR is not in capacity to pay all the cost of building any new EIS related project for any university. Therefore, there is a financial issue for the universities to engage in new projects. However, these findings can still conclude that, financial capability might affect the increasing of electronic information sharing between the YCIT-HE with Yemen public universities. Therefore, in order to increase universities participation, one approach is to design electronic information sharing projects with less cost-effective among public universities and YCIT-HE.

Moreover, this layer also recaps that substantial impact could be considered in terms of interagency trust aspect. Public universities staff do believe that a high level of trust with YCIT-HE can increase the electronic information sharing. This is aligned with a

study conducted by **Mohammed**, Huda, and Maslinda, (2017), that stated that Ministry of Higher Education and Scientific Research (MOHESR) and public universities in Iriqe bodies are impacted by the trust factor when it concerns sharing information electronically. Among the staff, there were many who stated that their university did have a good relationship founded on trust with YCIT-HE. The public universities staff said YCIT-HE as part of the Ministry, hence, a strong bond build on mutual trust exists between the public universities and YCIT-HE.

6.2.4 Technological Layer

The results show that Technology layer has significant influence on Increase Participation in Electronic Information Sharing (IPIES) ($\beta=0.446$, $p < 0.000$, $t=8.497$) and supporting. Information quality, IT Capability, Cloud Computing, Social Media and IT Compatibility are factors that significantly could increase the electronic information sharing between these universities and the YCIT-HE. The result suggests that information quality is an essential component for public universities to increase their electronic exchange of information with YCIT-HE. The findings suggested that universities with a good quality of information will be more positive in sharing information with YCIT-HE. Moreover, information quality also can help to improve the trust among them, and help them to maintain a good contact with the YCIT-HE. The study finding can be also taken to understand its importance in making right decisions for the operational excellence of the universities. The results confirmed that information quality for employees working in public sector universities in Yemen is important because it helps to reduce processing time, to have better time usability and effective resource pooling, to support improvement in the university processes and the

enrichment of work practices for quality service. For this, the universities are recommended to exchange well-needed information with meaningful feedback with YCIT-HE. Similarly, it is also important to note that sharing information should be two ways hence, YCIT-HE may also take this into consideration pertaining to how it can help enhance and responsively participate.

In parallel, the findings of this study concluded that IT capability can considerably influence information exchange amongst public universities and YCIT-HE in Yemen. It suggest that the Universities must focus on necessary IT resources, to increase information sharing between YCIT-HE and public universities. Therein, these universities already have IT infrastructure, but advanced IT infrastructure with latest electronic information exchange resources is potentially required such as cloud computing for store all information on one database. Parallel to these resources and equipment, IT capability also asserts the need for IT skills in the employees. Training and knowledge sharing for example top manager must provide the university more advice and make extra time for staff to attend the workshop at YCIT-HE center to trining, this can be of great value and prominence in this aspect. The findings suggest that IT capability can help to increase the electronic information sharing process. By using new technological like cloud computing with fair knowledge and understanding; the university employees will be more in a much better position to share information with the higher authorities at YCIT-HE. Employees will also be motivated to develop projects online and share & retrieve the needed information electronically. Smart apps can be of good use in this regard for which universities would probably be required to provide training or mentoring for its employees. Hands-on expertise with smart apps

can considerably help increase electronic information exchange. For this, the ministry can also help support and facilitate the process through appropriate funding to obtain competitive technologies.

Connected to cloud computing the findings suggested that public universities in Yemen ought to effectively plan and provide cloud computing for information storage access, and distribution purposes in collaboration with the YCIT-HE. This would help both parties to facilitate information sharing. In general, with cloud computing, a better storage platform will give more strategic ways to easily access and provide more information. Storing public universities' and YCIT-HE information on a cloud computing system can increase the indirect electronic information sharing between public universities' and YCIT-HE.

Accordingly, the public universities and YCIT-HE should also focus on making available a common information exchange process such as cloud computing, as this will motivate employees to facilitate both sides information sharing. However, there should be some restrictions placed on employee access.

On the grounds of the current findings, the study has outlined that availability of cloud computing can significantly enhance the electronic exchange of information between public universities and YCIT-HE. In parallel, there are necessary tools that require being made available for the public universities to effectively engage in information exchange.

Related to social media factor has an effect in order to increase the sharing of

information electronically. In the public universities, social media provides the employees with access to information, which means employees at work can utilize social media sites for the purposes of performing official business, professional development, and share information. They could also attain a common goal or interest, and it permits operators to share information, inexpensively instantly information in near real-time (Hrdinová, Helbig, and Peters, 2010; Bertot et al., 2010). Social media allow augmented information sharing at a quicker pace, constructing and improving relationships between Public universities' employees and YCIT-HE and assisting coworkers to stay joined. It serves as a stage to allow employees to display views on exchange ideas and suggestions. For this study, social media was proposed as one of the factors that can strengthen electronic information sharing between Yemen public universities and YCIT-HE. It serves as a stage to allow employees to display views on the idea, recommendations, suggestions of YCIT-HE and public universities.

Since the study shows employees are focusing only on WhatsApp and Facebook, thus it is also recommended that public universities' employees and YCIT-HE engage on other social media such as Twitter, to have more platforms in sharing information. A group mode can be established to create a better and easy two ways interaction.

In connection with IT compatibility, the findings suggest public universities to invest on a robust and compatible infrastructure to facilitate information sharing process. Universities may focus on implementing a great deal of hardware and software applications and non-IT resources to increase the electronic information sharing between the YCIT-HE and public universities. In addition, the technologies that enable electronic information sharing may differ across YCIT-HE and public

universities, therefore, YCIT-HE and public universities must make effort in designing information sharing systems and focus on IT skills. Also, knowledge should be enhanced so that the employees are capable of translating the technological resources for more technological compatibilities proactive information exchange purposes between them. This can occur through a thoughtful assessment and redesign of the current IT Strategic Plan, with the focus of enhancing data and information sharing. The best way to achieve this is by working on a team with the sole goal of building completely integrated systems. An example of this is the cloud computing system, which can be used as an integrated platform for YCIT-HE and its public universities. Another plus of the YCIT-HE is that it aids public universities when searching for workable solutions, guides them on technology purchases and assist them on various technological matters.

6.2.5 Individual layer

The results show that Individual layer has insignificant effect on Electronic information sharing between Yemen public universities and YCIT-HE ($\beta = -0.003$, $p < 0.878$, $t = 0.091$) and not support. The current study found that the element of benefits is in an insignificant relationship with staff in public universities. Previous scholars have highlighted that benefits in public organizations that are still unclear and hidden (Bigdeli, 2012). While Akbulut (2003) agreed that benefits generally have no impact on electronic information sharing in the government institutions. The author further suggests that regardless of the lack of positive impact of benefits, this does not negate the influence of electronic information exchange in the public sector. Despite this, Jing and Pengzhu (2009) have suggested that a majority of staff institutions have realized

the importance and benefits of electronic information sharing for the operational excellence of their organizations. Accordingly, Bigdeli (2012) suggested that there is variation in terms of the significance and importance of benefits factor in electronic information exchange process amongst the government departments.

One possible explanation in this regard is that the insignificant results which came about in the present study may be due to the fact that employees in the public universities were probably not aware of the features and benefits of electronic information sharing. This may also be because of a difference in the assumptions and expectations of the employees regarding electronic information sharing between the universities and YCIT-HE. Henceforth, universities should encourage employees' involvement in the electronic information sharing. More information about its benefits and features should be made known to employees to increase their awareness and understanding of the benefits of electronic information sharing. Universities are recommended to focus on helping their employees to participate in the information sharing projects that could help them to focus on obtaining agency needs for responsive usage and exchange of information electronically.

Parallel to benefits, information stewardship was also found to be in an insignificant relationship with staff in public universities. But this does not necessarily mean the information stewardship of electronic information sharing did not affect an increase in the electronic information sharing. In the views of Dawes (1996) information stewardship is critical to the success of interagency information sharing. One possible explanation in this regard is that the insignificant results came in the present study may be due to the fact that employees in the public universities probably felt that

information is power so they reluctant to share them so as not to lose that power or the social influence. Although the YCIT-HE center's staff cares about the security of the accuracy and reliability of the information, the university's employees still feel worried. Based on these findings, it can be argued that information stewardship might not influence the increase of the electronic information sharing between public universities and YCIT-HE.

Therefore, in order to increase participation of universities in electronic information sharing, there must be awareness among the staff that Information in the public Universities that belongs to YCIT-HE not only ownership for staff member in the public universities. This means that a person must deal with the information on behalf of others because information must be liberally shared among public universities and YCIT-HE. Moreover, for the purpose of enhancing the information exchange, the universities and YCIT-HE are recommended to work together and create common goals and values through which, they could help increasing information stewardship. Mutually agreed security systems and control measures could be applied in this regard to provide the security of the accuracy and reliability of the information and a hassle-free information exchange environment, electronically.

6.3 Theoretical and Practical Contributions

Prominent contributions of the present study are discussed in the forthcoming sections, divided into theoretical and practical aspects.

6.3.1 Theoretical Contribution

In general, the reviews of previous studies on electronic information sharing in public sectors are not very comprehensive which open rooms for more studies. On this basis, this study intended to extend the knowledge studies of electronic information sharing to reveal more informative findings in the government sector. In particular, to the best of the researcher's knowledge, there is very few academic researches being conducted in addressing issues and factors that increase electronic information sharing participation between Yemeni public universities and a specific center under MOHESR that is YCIT-HE. Not much have being scientifically researched in terms of potential aspects or factors reside in or outside of these higher institution of education towards improving information sharing. Therefore, this study has put a big effort in opening up this research gap by focusing on the significant factors and further developing a theoretical model of electronic information sharing participation higher education sectors in Yemen; that is the sharing between the YCIT-HE and public universities in Yemen. The following highlights the theoretical contribution of this research:

- **Layered Behavior Model (LBM)**

Layered Behavior Model (LBM) has been used before in a study of electronic information sharing among government agencies Jing, Pengzhu, & Yen(2014). The model highlights four layers External Environmental layer, Organizational layer, technological layer and individual layer.

This previous study gives research opportunities to further expands the use of the LBM from another perspective. with the scope of this study to understand more about how

electronic information sharing behaves or could behave between in an agency and education institutions, thus it decided to adopt LBM, with an expectation to investigate twelve factors according to each layer In addition two new factors; i) cloud computing ii) social media are added to Technological layers. In this study, the two factors have empirically supported the rise of electronic information sharing between public universities and YCIT-HE in Yemen. This finding acknowledges an expansion of knowledge and a theoretical contribution in relation to LBM.

In summary, this study makes a theoretical contribution by introducing Layered Behavioral Model in studying potential factors that can increase electronic information sharing between an agency and a higher education institution in Yemen. The importance of the LBM in this study is the factors being determined under each layer could provide guidance to universities and agency to design a better practise and system in sharing information electronically.

- **Social Exchange Theory**

In the area of social exchange, this study was based on two significant parts (power and trust). From the aspect of power, it is referred to two power levels such as YCIT-HE power and Universities power. Thus, upper-level leadership refers to the influential power of YCIT-HE, which was found as the factor to increase the electronic information sharing in higher education sector. Moreover, Top management support refers to the influential power of a university, which also supports the increment of electronic information sharing. Additionally, interagency trust factor refers to trust which has also influenced the increase of sharing information electronically among

public universities and YCIT-HE. These factors can also contribute to improving the interaction, communication, relationship and sharing between the public universities and YCIT-HE.

In summary, the higher education division greatly supported this electronic sharing sharing. Moreover, this research provides detailed insights into the application of the Social Exchange Theory to public higher education a thorough exploration of the factors concerning electronic information sharing among the public universities and YCIT-HE. This is also an example of the versatility of this Social Exchange Theory as it can be applied in various circumstances and environments concerning electronic information sharing for higher education. Environments includes centers, government sectors and its surroundings as Fundamentals for the examination which has been explained in this study.

6.3.2 Practical Contribution

The findings of this study are important and relevant in an academic environment such as to Yemen Center Information Technology higher education, staff in public universities, president, deans, IT managers' and the staff who share information electronically in these universities. Therefore, this section illustrates their contribution:

- **Contribution for YCIT-HE**

Sharing Information electronically with YCIT-HE will increase information resources, increase program effectiveness, decrease cost, reduce time, diminish paperwork, augment the accuracy of information and completed information for

decisions making. Additionally, successful electronic information sharing can increase productivity shared , integrate public services delivery provide better services for public universities. Electronic information sharing between public universities and YCIT-HE has the ability to provide more efficiency in university operations and enhanced the services to the students. Additionally, it also facilitate higher education sector (for example YCIT) to provide better services to the public universities within a suitable time. Such as, information quality provides high-quality information which encourages more information sharing between the university's employees, managers, top managers, and decision-makers in the universities. Thus, they will be more able to make their efficiency policies and effective decisions based on the university's situations.

- **Contribution for public universities**

In this study, all the technological factors (IT capability, information quality, IT compatibility, social media and cloud computing), have been found as bringing significant influence on the electronic information sharing in the YCIT-HE. For instance, software, hardware and IT training to employees are critically needed in public universities. Therefore, public universities should increase their investment in software and hardware to enhance the communication channel with YCIT-HE. Also, they must give IT training to the staff in order to improve their IT skills for new information sharing project . This training can make the staff more familiar with sharing the information in electronic ways. Moreover, software, hardware, and IT skills between public universities and YCIT-HE should be compatible. Thus, they should work together in order to make work out for the information sharing. Additionally, the electronic information sharing has to be easy and friendly to use in

order to encourage the employees to use it and continue to do. This can happen by creating management system platform to sharing information between them and consider the easy and friend usage conditions. Public universities have to be sure that their ways of sharing the information electronically with YCIT-HE are easy.

Another element that is worth considering is cloud computing as it has potential to widen the information sharing among public universities and YCIT-HE in Yemen. Cloud computing is known for the high- quality huge amount of information and integrated information it can offer public universities usually enjoy a great deal of advantages due to cloud computing. According to EDUCAUSE (2010a) a simple switch in information technology and services such as data storage, application, and processing, which are stored to the cloud based can provide public universities with the knowledge of greater performance, flexibility and reliability with reduces expenses. A simple understanding and comprehension of ICT in education is basic in being well-educated of quickly changing innovations. This is a basic of higher educations to get a strong understanding of how cloud computing is being developed and changed.

6.4 Future Work

This study delivers more explanation and understanding of the influence factors which can increase in electronic information sharing between YCIT-HE and public universities in Yemen. In the future, more extended studies can be conducted as suggested below:

6.4.1 Geographical Extension for Research

The theoretical model is constructed by investigating the factors based on the previous studies and the model analyzed based on only six public universities in Yemen namely, Sana'a University, Aden University, AlHodeidah University, Ibb University, Taz University and Dahmer University. Therefore, it would be interesting to apply the same theoretical model to other public universities in order to see the similarity and difference between the results and to see if the relationship among the factors will change or not. The model produced from this study could also be enhanced in future depending on new situations or environments tested under that particular study.

Moreover, electronic information sharing between a private university and YCIT-HE could also be explored in the future. Private university could have more freedom or authority in decision making, or could have more or less financial support to invest in technology resources. might have more thus, it is a significant area of research for future studies.

Therefore, in the future also possible can be replicated into various contexts using complementary samples to make a clear the boundary conditions of the theoretical framework.

- **Extension Study in Methodological Approach**

Utilizing the data collection method, the questionnaires in this study were distributed to the samples by the universities themselves, through the President office, student affairs, Research and development, and information technology at the universities in computer center, Department of Scholarships, Public Relations and Studies, planning,

and follow-up. The amount of data that could be gathered depended on the cooperation of these units. In the future studies, researches can collect data using a different approach of data collection such as surveys by issuing these questionnaires themselves in order to receive a more detailed response and even better results. Moreover, researchers can also use the internet to get their questionnaires or survey answered online. This questionnaire did not include the viewpoint of top managers (presidents of the universities), so a qualitative or mix method research such as an interview with the top management could be suggested in the future study in order to provide a different viewpoint and give more understanding the electronic information sharing concepts in in the higher education division.

- **Extension Study in the Scope of Research**

The related group affected in this research is the universities' employees who share information electronically with YCIT-HE. Future studies can extend the scope by involving all employees including those who do not share the information electronically. This coverage could be performed in the context of gaining a deep understanding and broader perspective on the perception of applying electronic information sharing between and/or among different units or centers. This could provide more information and can be juxtaposed with the information from the university. An inclusion of the study of horizontal electronic information in the higher education sector is also needed, such as a study providing detailed insights on information sharing among the ministry's directorates and also a study for electronic information sharing between university's departments, which too is needed.

A similar study can also be done at different environments or different countries.

Different factors might exist. The situations in one country may vary and thus may not be in the same degree or way; concepts can have a totally different meaning in different countries. Simply put, each country is different thus things may not work in the same way.

- **Additional Factors**

In the future, an important avenue work involves investigating the factors that influence electronic information sharing among government organizations. Thus, many factors may counteract when information is being shared among organizations at the same level (horizontal) (e.g between employees of the same department in one or more establishments) or when being shared on various levels, in government establishments (vertical) (between employees of different departments in one or more establishments) may therefore act in an opposing manner. Depending on the type of public sector, the aspects governing the electronic information sharing might change: e.g The information being shared among the establishment as part of the YCIT-HE and public universities.

Moreover, in this study, all the technological factors have been found as supported. Thus, it is useful to try to discover more technological factors such as, connectivity, IT technical support, awareness in IT and resistance to change. Finally, mobile and web applications need to be investigated in order to find their influence on electronic information sharing.

- **Cloud Computing**

This study found the positive effect of the cloud computing as a factor for increasing

electronic information sharing in the higher education sector. Thus, different technologies need to be researched such as data mart and even big data . However, the employees in public universities might not have a good knowledge of cloud computing. Therefore, cloud computing as a factor needs to be researched by the experts in order to understand and examine more of its effect on increasing the electronic information sharing. Moreover, cloud computing as a factor needs to be applied in electronic information sharing studies in different environments such as the Ministry of Health . Finally, the tools and concepts of cloud computing should be studied in order to illustrate and understand which tools and concepts of the cloud computing can share the information.

6.5 Conclusion

This study identified the influential factors of electronic information sharing which can increase the participation between the YCIT-HE and public universities in Yemen. Depending upon the previous research of electronic information sharing and well-established theories such as Social Exchange Theory and Information Sharing Theory, 12 hypotheses have been formulated. The model was developed based on Layered Behavior Model due the intention to understand the factors' behavior in layers. Moreover, hypotheses are formulated based on previous studies in order to create justifications for the model of research. These relative researches were analyzed in order to find the research questions and research objectives. This study contained the design and analysis of questionnaires that were collected from the Yemeni public universities in order to test the theoretical model and research hypotheses statistically.

The results presented the factors of electronic information sharing, in different categories such as technological, organizational and environmental group. Nine factors are determined increase the electronic information sharing among public universities and YCIT-HE. This factors namely IT capability, information quality, IT compatibility, social media, cloud computing, top management support, policy and Law, Financial capability, upper-level leadership. The study identified three unsupported factors including benefits, information stewardship and interagency trust. Thus, the research has a number of theoretical and practical contributions. This research contributes to extending the knowledge in the public information systems, IT adoption, intra-organizational electronic information sharing, e-services, e-government and e-governance in the public sector.

The findings of the research are essential and relevant to the YCIT-HE, public universities, IT managers, decision and policy makers, top managers of universities. It also contributes to add a lot of benefits to the universities' students and society. Moreover, this research presented knowlege and theoretical contributions regarding the role of cloud computing as one factor to increase the participation of electronic information sharing in between YCIT-HE and public universities in Yemen. Based on the results of this study, a list of factors have been identified and model of electronic information sharing between Yemen public universities and YCIT-HE have been finally proposed, These findings give a high contribution to both the ministry and universities' in terms of planning and implemented high-impact strategies; from the technological aspects, as well as from the individual,organizational and environmental aspects in order to increase the participation and usage of EIS among them.

REFERENCES

- Abbas, D. A. (2012). Examination the Role of Technical Information in the Development of Nursing Education for the Faculty of Nursing at the University of Baghdad. *Nursing national Iraqi specility*, 25(1), 48-55.
- Abdelsalam, H. M., Reddick, C. G., Gamal, S., & Al-Shaar, A. (2013). Social media in Egyptian government websites: Presence, usage, and effectiveness. *Government Information Quarterly*, 30(4), 406-416.
- Abdi, H., & Williams, L. J. (2010). Principal component analysis. *Wiley interdisciplinary reviews: computational statistics*, 2(4), 433-459.
- Akbulut, A. Y. (2003). An investigation of the factors that influence electronic information sharing between state and local agencies Doctoral dissertation, Louisiana State University.
- Akbulut, A. Y., & Motwani, J. (2008). Integration and Information Sharing in E-Government. *Encyclopedia of Networked and Virtual Organizations*, IGI Global Publishing: Information Science Reference,(2), 729-734.
- Akbulut, A. Y., Kelle, P., Pawlowski, S. D., & Schneider, H. (2009). To share or not to share? Examining the factors influencing local agency electronic information sharing. *International Journal of Business Information Systems*, 4(2), 143-172.
- Alghushami, A., Zakaria, N. H., & Aji, Z. M. (2018, September). The determinants impacting the adoption of cloud computing in Yemen institutions. In *AIP Conference Proceedings* (Vol. 2016, No. 1, p. 020022). AIP Publishing LLC.

- Alhamassy, S. A. A. (2012). Decision Support Systems Adoption Among Strategic Decision Makers in Higher Learning Institution in Yemen (Doctoral dissertation, Universiti Utara Malaysia).
- Al-Mamary, Y. H., Shamsuddin, A., & Nor Aziati, A. H. (2014). Key factors enhancing acceptance of management information systems in Yemeni companies. *Journal of Business and Management Research*, 5, 108-111.
- Al-sharafi, H., & Rajjani, I. (2013). Leadership Practices and Talent Turnover: Study on Yemeni Organizations. *Business and Management Research*, 2(3), p60.
- Al-Sultan, K.S. (2006). Information effectiveness on making the administrative decisions in the ministries of the Republic of Yemen. Unpublished master thesis, Faculty of Commerce, Sana'a University, Yemen.
- Alsurori, M., & Salim, J. (2009). Information and communication technology for decision-making in the Higher Education in Yemen: A review. In 2009 International Conference on Electrical Engineering and Informatics (Vol. 2, pp. 321-324). IEEE
- Anderson, J. C., & Narus, J. A. (1990). A Model of the Distributor-Manufacturer Working Relationships. *Journal of Marketing*, 54(1), 42-58.
- Anderson, J.C. and Narus, J.A. (1986) " Toward a better understanding of distribution channel working relationships" in *Industrial marketing: A German-American perspective*, eds. K. Backhaus and D. Wilson, Springer Verlag, Berlin, pp 320–336.
- Ardichvill, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge sharing communities or practice. *Journal of Knowledge Management*, 7(1), 64-77.

- Atabakhsh, H., Larson, C., Petersen, T., Violette, C., & Chen, H. (2004). Information sharing and collaboration policies within government agencies. Lecture notes in computer science, Vol. 3073/2004. (pp. 467–475)Springer: Berlin and Heidelberg.
- Baro, E. E., Ebiagbe, E. J., & Godfrey, V. Z. (2013). Web 2.0 tools usage: a comparative study of librarians in university libraries in Nigeria and South Africa. *Library Hi Tech News*, 30(5), 10–20. doi:10.1108/LHTN-04-2013-0021.
- Barua, A., Ravindran, S., & Whinston, A. B. (2007). Enabling information sharing within organizations. *Information Technology and Management*, 8(1), 31-45.
- Bellamy, C. and Raab, C. (2005) "Multi-agency working in British social policy: Risk, information sharing and privacy", *Information Polity*, vol. 10, no. 1, 2, pp. 51-63.
- Bellamy, C., Raab, C., Warren, A., & Heeney, C. (2007). Institutional shaping of interagency working: Managing tensions between collaborative working and client confidentiality. *Journal of Public Administration Research and Theory*, 17(3), 405-434.
- Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, 27(3), 264-271.
- Bigdeil, A. Z., Kamal, M., & de Cesare, S. (2013a). Information sharing through inter-organisational systems in local government. *Transforming Government: People, Process and Policy*, 7(2), 148-176.

- Bigdeli, A. Z. (2012). Inter-departmental information sharing in local government authorities (LGAs): The case of the United Kingdom, *PhD thesis Brunel University London*.
- Bigdeli, A. Z., Kamal, M., & de Cesare, S. (2012). *Information sharing in inter-departmental collaboration: a conceptual framework for local government authorities*. Paper presented at the Proceedings of the 6th International Conference on Theory and Practice of Electronic Governance.
- Bigdeli, A. Z., Kamal, M., & de Cesare, S. (2013b). Electronic information sharing in local government authorities: Factors influencing the decision-making process. *International Journal of Information Management*, 33(5), 816-830.
- Bigdeli, A. Z., Kamal, M., & deCesare, S. (2011). Inter-organisational electronic information sharing in local G2G settings: a socio-technical issue.
- Bock, G.W., Zmud, R., Kim, Y. and Lee, J. (2005). Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social Psychological Forces, and Organizational Climate. *MIS Quarterly*, 29(1), 87-111.
- Bock, G.W., Zmud, R., Kim, Y. and Lee, J. (2005). Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social Psychological Forces, and Organizational Climate. *MIS Quarterly*, 29(1), 87-111.
- Bonsón, E., Torres, L., Royo, S., & Flores, F. (2012). Local e-government 2.0: Social media and corporate transparency in municipalities. *Government information quarterly*, 29(2), 123-132.

- Bristow, R., Dodds, T., Northam, R., & Plugge, L. (2010). Cloud Computing and the Power to Choose. *Educause Review*, 45(3), 14-31.
- Calo, K. M., Cenci, K., Fillottrani, P., & Estevez, E. (2012). Information sharing-benefits. *Journal of Computer Science & Technology*, 12(2), 49-55.
- Cellary, W., & Strykowski, S. (2009, November). E-government based on cloud computing and service-oriented architecture. In *Proceedings of the 3rd international conference on Theory and practice of electronic governance* (pp. 5-10). ACM.
- Chadha, K., & Bajpai, A. (2012). Security Aspects of Cloud Computing. *International Journal of Computer Applications*, 40(8), 43-4.
- Chang, D. F., Wu, C. T., Ching, G., Tang, C. W., & Xiao, L. (2011). Globalization and Higher Education in Taiwan. DOI: 10.5772/18652.
- Chau, M., Atabakhsh, H., Zeng, D., & Chen, H. (2001). Building an infrastructure for law enforcement information sharing and collaboration: Design issues and challenges. Paper presented at the 7ational Conference on Digital Government, 2001.
- Chau, P. Y., & Tam, K. Y. (1997). Factors affecting the adoption of open systems: an exploratory study. *MIS quarterly*, 1-24.
- Chen, Y. N., Chen, H. M., Huang, W., & Ching, R. K. (2006). E-government strategies in developed and developing countries: An implementation framework and case study. *Journal of Global Information Management*, 14(1), 23-46.
- Chen, Z., Gangopadhyay, A., Holden, S. H., Karabatis, G., & McGuire, M. P. (2007). Semantic integration of government data for water quality management. *Government Information Quarterly*, 24(4), 716-735.

- Chin, W. W., Gopal, A., & Salisbury, W. D. (1997). Advancing the theory of adaptive structuration: The development of a scale to measure faithfulness of appropriation. *Information systems research*, 8(4), 342-367.
- Chong, A. Y. L., Lin, B., Ooi, K. B., & Raman, M. (2009). Factors affecting the adoption level of c-commerce: An empirical study. *Journal of Computer Information Systems*, 50(2), 13-22.
- Chow, W. S., & Chan, L. S. (2008). Social network, social trust and shared goals in organizational knowledge sharing. *Information & management*, 45(7), 458-465.
- Chwelos, P., Benbasat, I., & Dexter, A. S. (2001). Research report: Empirical test of an EDI adoption model. *Information systems research*, 12(3), 304-321.
- Coakes, S. J., Steed, L. G., & Ong, C. (2003). Analysis without anguish using SPSS Version 11.0 for windows. *Milton, Queensland: John Wiley & Sons*.
- Coakes, S. J., Steed, L. G., & Ong, C. (2003). Analysis without anguish using SPSS Version 11.0 for windows. *Milton, Queensland: John Wiley & Sons*.
- Constant, D., Kiesler, S., & Sproull, L. (1994). What's mine is ours, or is it: A study of attitudes about information sharing. *Information Systems Research*, 5(4), 400-421.
- Craig, R., Frazier, J., Jacknis, N., Murphy, S., Purcell, C., Spencer, P., & Stanley, J. (2009). Cloud Computing in the Public Sector: Public Manager's Guide to Evaluating and Adopting Cloud Computing. White Paper. Cisco Internet Business Solutions Group.
- Cresswell, A., Pardo, T. A., Canestraro, D. S., Dawes, S. S., & Juraga, D., (2005). Sharing justice information: A capability assessment toolkit: Center for Technology in Government, University at Albany, SUNY.

- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*: Sage.
- Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. *Handbook of mixed methods in social and behavioral research*, 209, 240.
- Cronbach, L. J. (1946). *Response sets and test validity. Educational and psychological measurement*, 6(4), 475-494.
- Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. *Journal of management*, 31(6), 874-900.
- Cross, R. L., Cross, R. L., & Parker, A. (2004). *The hidden power of social networks: Understanding how work really gets done in organizations*. Harvard Business Press.
- Curtis, B., Krasner, H., & Iscoe, N. (1988). A field study of the software design process for large systems. *Communications of the ACM*, 31(11), 1268-1287.
- Cusumano, M. A. (2010). Cloud computing and SaaS as new computing platforms. *Commun. ACM*, 53(4), 27-29.
- Dai, X., & Kumar, B. A. (2010). Comparing and Contrasting Campus Information Systems in South Pacific Regional Universities. In *International Conference on Computational and Information Sciences*, IEEE, pp. 721-724.
- Dawes, S. S. (1996). Interagency information sharing: Expected benefits, manageable risks. *Journal of Policy Analysis and Management*, 15(3), 377-394.
- Day, S., & Erturk, E. (2017). E-Learning objects in the cloud: SCORM compliance, creation and deployment options. *Knowledge Management & E-Learning: An International Journal*, 9(4), 449-467.

- Decoster, J., & Hall, G. P. (1998). Overview of Factor Analysis. Stat-Help. Retrieved October 18, 2010.
- Dos Santos, E.M. and Reinhard, N. (2007) "Setting interoperability standards for e-government: an exploratory case study", *Electronic Government, an International Journal*, vol. 4, no. 4, pp. 379-394.
- Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education*, 20(2), 129-135.
- Ercan, T. (2010). Effective use of cloud computing in educational institutions. *Procedia-Social and Behavioral Sciences*, 2(2), 938-942.
- Esposito Vinzi, V., Chin, W. W., Henseler, J., & Wang, H. (2010). *Handbook of partial least squares: Concepts, methods and applications*. Heidelberg, Dordrecht, London, New York: Springer.
- Estevez, E., Fillottrani, P., & Janowski, T. (2010). Information sharing in government—conceptual model for policy formulation. Paper presented at the Proceedings of the 10th European Conference on e-Government (ECEG). University of Limerick, Ireland.
- Estevez, E., Fillottrani, P., Janowski, T., & Ojo, A. (2011). Government Information Sharing: A Framework for Policy Formulation. *Governance and Cross-boundary Collaboration: Innovations and Advancing Tools*, 23-55.
- Evangelidis, A. (2005) "FRAMES—a risk assessment framework for e-services", *Electronic Journal of e-Government*, 2(1), 21-30.

- Evbuomwan, N. F., & Omwansa, T. (2017, April). Cloud Computing: The Next Generation Computing Model to Accelerate Innovation in Kenya. In Innovation Research Symposium 2017.
- Fan, J. & Zhang, P. (2007). A Conceptual Model for G2G Information Sharing in E-Government Environment. 6th Wuhan International Conference on E-Business.
- Fedorowicz, J., Gogan, J.L. and Williams, C.B. (2007) "A collaborative network for first responders: Lessons from the CapWIN case", *Government Information Quarterly*, vol. 24, no. 4, pp. 785-807.
- French, J. R., Raven, B., & Cartwright, D. (1959). The bases of social power. *Classics of organization theory*, 7, 311-320.
- Ganesan, S. (1994) "Determinants of long-term orientation in buyer-seller relationships". *Journal of Marketing*, 58(2), 1-19.
- Gay, L. R., Mills, G. E., & Airasian, P. (2006). *Educational research: Competencies for analysis and application*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.
- Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the association for information systems*, 4(1), 7.
- Ghannam, J. (2011). Social Media in the Arab World: Leading up to the Uprisings of 2011. Center for international media assistance, 3.
- Ghazizadeh, A. (2012, March). Cloud computing benefits and architecture in e-learning. In *Wireless, Mobile and Ubiquitous Technology in Education (WMUTE)*, 2012 IEEE Seventh International Conference on (pp. 199-201). IEEE.

- Gibbons, J. D., & Chakraborti, S. (2011). Nonparametric statistical inference. In *International encyclopedia of statistical science* (pp. 977-979). Springer, Berlin, Heidelberg.
- Gilbert, D., Balestrini, P., & Littleboy, D. (2004). Barriers and benefits in the adoption of e-government. *International Journal of Public Sector Management*, 17(4), 286-301.
- Gil-García, J. R., & Pardo, T. A. (2005). E-government success factors: Mapping practical tools to theoretical foundations. *Government Information Quarterly*, 22(2), 187-216.
- Gil-Garcia, J. R., Chengalur-Smith, I., & Duchessi, P. (2007). Collaborative e-Government: impediments and benefits of information-sharing projects in the public sector. *European Journal of Information Systems*, 16(2), 121-133.
- Gil-Garcia, J. R., Chun, S. A., & Janssen, M. (2009). Government information sharing and integration: Combining the social and the technical. *Information Polity*, 14(1), 1-10.
- Gil-Garcia, J. R., Schneider, C. A., Pardo, T. A., & Cresswell, A. M. (2005). Interorganizational information integration in the criminal justice enterprise: Preliminary lessons from state and county initiatives. In *proceedings of the 38th Annual Hawaii International Conference on System Sciences, IEEE*, pp. 118c-118c.
- Gil-Garcia, J.R., Guler, A., Pardo, T.A. and Burke, G.B. (2010) "Trust in Government Cross-Boundary Information Sharing Initiatives: Identifying the Determinants", 43rd Hawaii International Conference on System Sciences, IEEE, pp. 1-10.

- Gottschalk, P. and Solli-Saether, H. (2009) E-government interoperability and information resource integration: frameworks for aligned development, Information Science Reference.
- Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component patterns. *Psychological bulletin*, 103(2), 265.
- Guides, P. (1999), What Rules Govern the Use of Information, Center for Technology in Government, URL=
http://www.ctg.albany.edu/publications/reports/what_rule_govern.
- Gupta, B. B., & Badve, O. P. (2017). Taxonomy of DoS and DDoS attacks and desirable defense mechanism in a cloud computing environment. *Neural Computing and Applications*, 28(12), 3655-3682.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate Data Analysis* (ed.): Pearson Prentice Hall. Upper Saddle River, New Jersey.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis*, Pearson Prentice Hall Upper Saddle River, NJ (Vol. 6).
- Hair, J. F., Money, A. H., Samouel, P., & Page, M. (2007). *Research methods for business*: John Wiley & Sons Chichester, England.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.

- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013a). Editorial-Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning*, 46(1-2), 1-12.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013b). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance.
- Hair, J. F., Sarstedt, M., Pieper, T. M., & Ringle, C. M. (2012). The use of partial least squares structural equation modeling in strategic management research: a review of past practices and recommendations for future applications. *Long range planning*, 45(5-6), 320-340.
- Hart, P., & Saunders, C. (1997). Power and Trust: Critical Factors in the Adoption and Use of Electronic Data Interchange. *Organization Science*, 8(1), 23-42.
- Hatala, J. P. (2006). Social network analysis in human resource development: A new methodology. *Human Resource Development Review*, 5(1), 45-71.
- Hawkins, A., Jolliffe, F., & Glickman, L. (2014). *Teaching statistical concepts*. Routledge.
- Hayes, B. (2008), "Cloud computing", *Communications of the ACM*, Vol. 51, pp. 9-11.
- Hearn, G., Foth, M., & Gray, H. (2009). Applications and implementations of new media in corporate communications: An action research approach. *Corporate Communications: An International Journal*, 14(1), 49-61.
- Hedberg L., & Helenius, M. (2007). What leaders can do to keep their key employees. Master thesis, GÖTEBORG university, Sweden.

- Heeks, R. (2006). Benchmarking e-government: improving the national and international measurement, evaluation and comparison of e-government. *Evaluating Information Systems*, 257.
- He-jiang, W. A. N. G. (2010). *Influencing Factors on the Sharing of Electronic Government Affairs Information and the Countermeasures*. In International Conference on Information Management, Innovation Management and Industrial Engineering, IEEE, Vol. 3, pp. 195-200.
- Henseler, J., & Fassott, G. (2010). Testing moderating effects in PLS path models: An illustration of available procedures. In *Handbook of partial least squares* (pp. 713-735). Springer, Berlin, Heidelberg.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New challenges to international marketing* (pp. 277-319). Emerald Group Publishing Limited.
- Ho, R. C., Wah, S. K., Yi, C. W., To, B. K., & Kit, C. (2013). Knowledge Management using Social Media : A Comparative Study between Blogs and Facebook. *Proceedings of the American Society for Information Science and Technology*, (2000), 1–9.
- Hrastinski, S., & Aghaee, N. M. (2011). How are campus students using social media to support their studies? An explorative interview study. *Education and Information Technologies*, 17(4), 451–464. doi:10.1007/s10639-011-9169-5.
- Hrdinová, J., Helbig, N., & Peters, C. S. (2010). Designing social media policy for government: Eight essential elements. Center for Technology in Government, University at Albany.

- Hughes, A. L., & Palen, L. (2009). Twitter adoption and use in mass convergence and emergency events. *International Journal of Emergency Management*, 6(3-4), 248-260.
- Huijboom, N., van den Broek, T., Frissen, V., Kool, L., Kotterink, B., Nielsen, M. M., & Millard, J. (2009). *Public Services 2.0: the impact of social computing on public services*. Institute for Prospective Technological Studies, Joint Research Centre, European Commission. Luxembourg: Office for Official Publications of the European Communities.
- Humphreys, P., Lai, M. and Sculli, D. (2001). An inter-organizational information system for supply chain management. *International Journal of Production Economics*, 70(3), pp. 245-255.
- Hurbean, L., & Fotache, D. (2013). Mobile technology: binding social and cloud into a new enterprise applications platform. *Informatica Economica*, 17(2), 73.
- Jarvenpaa, S. L., & Staples, D. S. (2001). Exploring perceptions of organizational ownership of information and expertise. *Journal of Management Information*.
- Jason, P. (2009). From Many Tweets, One Loud Voice on the Internet. *The New York Times*. <http://www.nytimes.com/2007/04/22/business/yourmoney/22stream.html>. Retrieved, 06-21.
- Java, A., Song, X., Finin, T., & Tseng, B. (2007, August). Why we twitter: understanding microblogging usage and communities. In *Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 workshop on Web mining and social network analysis* (pp. 56-65). ACM

- Jeffreys, P. W. (2011). A review of Cloud Computing and Shared IT Services in the context of the University of Oxford. From <http://www.ict.ox.ac.uk/odit/ITcoordination/sharedservices/>
- Jing, F., & Pengzhu, Z. (2007a). A case study of G2G information sharing in the Chinese context. Paper presented at the Proceedings of the 8th annual international conference on Digital government research: bridging disciplines & domain, (pp. 234-235). Digital Government Society of North America.
- Jing, F., & Pengzhu, Z. (2007b). What Factors Influence the Information Sharing across Government Agencies?. In International Conference on Service Systems and Service Management, IEEE, pp. 1-4.
- Jing, F., & Pengzhu, Z. (2009). *A Field Study of G2G Information Sharing in Chinese Context Based on the Layered Behavioral Model*. In 42nd Hawaii International Conference on System Sciences, IEEE, pp. 1-13.
- Jing, F., Pengzhu, Z. & Yen, D. C. (2014). G2G information sharing among government agencies. *Information & Management*, 51(1), 120-128.
- Julibert. S. (2008). Employee attitudes to information sharing: a case study at the European Central Bank. *Records Management Journal*, 18(3), 194-204.
- Kamal, M. R., Singh, D. S., & Ahmad, K. (2012). *Factors Influencing Interdepartmental Information Sharing Practice in Electronic Government Agencies* Paper presented at the Knowledge Management International Conference (KMICe), pp. 292-298.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business horizons*, 53(1), 59-68.

- Kapur, D., & Crowley, M. (2008). Beyond the abcs: Higher education and developing countries. *Center for Global Development Working Paper*, (139)
- Kenneth S. Bordens, B. B. A. (2005). *Research and Design Methods A Process Approach (Sixth Editioned.)* New York: McGraw-Hill.
- Kim, Y. S. (2006). Challenges and barriers in implementing E-government: Investigation on NEIS of Korea. *Advanced Communication Technology*, 2006 (ICACT 2006) The 8th International Conference, 3:635-1640.
- Kimberly, J.R. and Evanisko, M.J. (1981) "Organizational innovation: The influence of individual, organizational and contextual factors on hospital adoption of technological and administrative innovations", *Academy of management journal*, , pp. 689-713.
- Klischewski, R., & Scholl, H. J. (2006). Information quality as a common ground for key players in e-Government integration and interoperability. Paper presented at the Hawaii International Conference on System Sciences (HICSS-39), Hawaii.
- Kochan, C. G., Nowicki, D. R., Sauser, B., & Randall, W. S. (2018). Impact of cloud-based information sharing on hospital supply chain performance: A system dynamics framework. *International Journal of Production Economics*, 195, 168-185.
- Kolekofski Jr., K. E., & Heminger, A. R. (2003). Beliefs and attitudes affecting intentions to share information in an organizational setting. *Information & Management*, 40, 521-532.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.

- Kouzes, J. & Posner, B. (2007). *The leadership challenge*. San Francisco, CA: Wiley & Sons.
- Kudrass, T. (2006). "Integrated university information systems," Proc. Eight International Conference on Enterprise Information Systems, Databases and Information Systems Integration, pp. 208–214.
- Kumar, R. (2011). *Research Methodology: A Step-by-Step Guide for Beginners* (Third Edition ed.): SAGE Publications Ltd.
- Kurnia, S. and Johnston, R.B. (2000) "The need for a processual view of inter-organizational systems adoption", *The Journal of Strategic Information Systems*, 9(4), pp. 295-319.
- Lam, W. (2005) "Barriers to e-government integration", *Journal of Enterprise Information Management*, 18(5), 511-530.
- Landsbergen Jr, D., & Wolken Jr, G. (2001). Realizing the promise: Government information systems and the fourth generation of information technology. *Public Administration Review*, 61(2), 206-220.
- Laroche, M., Habibi, M. R., & Richard, M.-O. (2013). To be or not to be in social media: How brand loyalty is affected by social media? *International Journal of Information Management*, 33(1), 76–82. doi:10.1016/j.ijinfomgt.2012.07.003.
- Leavitt, N. (2009). Is cloud computing really ready for prime time?. *Computer*, (1), 15-20.
- Lee, J., & Rao, H. R. (2007). Exploring the causes and effects of inter-agency information sharing systems adoption in the anti/counter-terrorism and disaster management domains. Paper presented at the Proceedings of the 8th annual

- international conference on Digital government research: bridging disciplines & domains. (pp. 155-163).
- Lee, Y. O., & Park, H. W. (2014). Introduction to the special issue: social media interaction between public and government in Asia-Pacific. *Asian Journal of Communication*, 24(1), 1-4.
- Levy, A., Bagby, J. W., & Trauth, E. M. (2013, June). E-government evolution in small municipalities in Pennsylvania in web 2.0 social environment: a poster. In *Proceedings of the 14th Annual International Conference on Digital Government Research* (pp. 273-274). ACM.
- Lewis, B. K. (2009). *Social media and strategic communications: Attitudes and perceptions among college students*. Oklahoma State University.
- Liang, K., & Lan, Z. (2010). Local universities of china management information system integration model design. In *Intelligence Information Processing and Trusted Computing (IPTC), 2010 International Symposium on* (pp. 18-20). IEEE.
- Lin, G., Fu, D., Zhu, J., & Dasmalchi, G. (2009). Cloud computing: IT as a service. *IT professional*, (2), 10-13.
- Liu, L., Li, Q., & Lu, P. (2011). A Study of Financial Management Information System Construction in Colleges and Universities. In *International Conference on Control, Automation and Systems Engineering*, IEEE, pp. 1-3.
- Luna-Reyes, L. F., Gil-Garcia, J. R., & Cruz, C. B. (2007). Collaborative digital government in Mexico: Some lessons from federal Web-based interorganizational information integration initiatives. *Government Information Quarterly*, 24(4), 808-826.

- Lv, Z. (2010). Case study: strategic information systems planning in Shanghai key universities in Yang pu district. In e-Education, e-Business, e-Management, and e-Learning, 2010. IC4E'10. International Conference on (pp. 445-450). IEEE.
- Magro, M. J. (2012). A review of social media use in e-government. *Administrative Sciences*, 2(2), 148-161.
- Malik, S., & Rana, A. (2018). Cloud Computing: A Backbone for Educational Platform in E-learning. *IITM Journal of Management and IT*, 9(1), 27-33.
- Malliga, P. (2012). Database services for cloud computing—an overview. *International Journal of Computers & Technology*, 2(3).
- Manoharan, A. P., & McQuiston, J. (2016). Technology and pedagogy: Information technology competencies in public administration and public policy programs. *Journal of Public Affairs Education*, 22(2), 175-186.
- Mendes Calo, K., Cenci, K. M., Fillotrani, P.R., & Estevez, E.C. (2012). Information sharing-benefits. *Journal of Computer Science & Technology*, 12.
- Ministry of Finance, (2005). Online book, <http://www.cso-yemen.org/content.php?lng=english&id=495>. Retrived at 8:25 pm 20-4-2007.
- Ministry of Higher Education and Scientific Research, (2006). *National strategy for the development of higher education in Yemen*. Ministry of Higher Education & Scientific Research publications yemen2006.
- Ministry of higher education. (2004). Education act no. 45 of 1992, the law of the Yemeni universities number 18 for the year in 1995, and the law of private universities No. 13 of 2004.

- Mircea, M., & Andreescu, A. I. (2011). Using cloud computing in higher education: A strategy to improve agility in the current financial crisis. *Communications of the IBIMA*.
- Miskon, S. (2013). ICT shared services in the higher education sector: foundations, benefits, success factors and issues.
- Mohammed Al-Nashmi, M., & Syd Abdul Rahman Hj. Syd Zin, H. (2011). Variation in communication satisfaction of academic staff in universities in Yemen depending on national culture. *Cross Cultural Management: An International Journal*, 18(1), 87-105.
- Mohammed, F., & Ibrahim, O. (2013). Refining E-government Readiness Index by Cloud Computing. *Jurnal Teknologi*, 65(1).
- Mohammed, M. A., Huda, I. and Maslinda, M. N., (2015). Electronic Information Sharing between Public Universities and Ministry of Higher Education and Scientific Research: A Pilot Study. *Journal of Theoretical and Applied Information Technology* .
- Mohammed, M. A., Huda, I., & Maslinda, M. (2014). Electronic Information Sharing to Improve Decision Making in Public Universities. *Asian Journal of Applied Sciences*, 2(6).
- Molinari, F., & Ferro, E. (2009). Framing Web 2.0 in the process of public sector innovation: Going down the participation ladder. *European Journal of ePractice*, 9(1), 20-34.
- Nash, R. (2008) Data and Privacy; How concerned are citizens about data sharing in the public services?, Institute for Insight in the Public Services (IIPS).

- Norris, D. F. (2003). Leading-edge information technologies and American local governments. *Public information technology: Policy and management issues*, 139-169.
- Norris, D. F., & Moon, M. J. (2005). Advancing e-government at the grassroots: tortoise or hare?. *Public Administration Review*, 64-75.
- OECD Joint Learning Study (2010): Enhancing Integrity in Public Procurement in Yemen
- Otjacques, B., Hitzelberger, P., & Feltz, F. (2007). Interoperability of e-government information systems: Issues of identification and data sharing. *Journal of Management Information Systems*, 23(4), 29-51.
- Ouma, F. K. (2014). Impediments to interagency statistical information sharing amongst government agencies in Uganda: A G2G adoption. In *Proceedings at IST-Africa Conference, IEEE* (pp. 1-11).
- Panahi, S., Watson, J., & Partridge, H. (2012). Social Media and Tacit Knowledge Sharing: Developing a Conceptual Model. *World Academy of Science, Engineering and Technology*, 1095–1102.
- Pardo, T. A., & Tayi, G. K. (2007). Interorganizational information integration: A key enabler for digital government. *Government Information Quarterly*, 24(4), 691-715.
- Pardo, T. A., Cresswell, A. M., Dawes, S. S., & Burke, G. B. (2004). Modeling the social & technical processes of interorganizational information integration. *Proceedings of the 37th Annual Hawaii International Conference on System Sciences*.

- Pardo, T. A., Cresswell, A. M., Thompson, F., & Zhang, J. (2006). Knowledge sharing in cross-boundary information system development in the public sector. *Information Technology and Management*, 7(4), 293-313.
- Pocatilu, P., Alecu, F. & Vetrici, M., (2009). "Using Cloud Computing for E-Learning Systems," *Recent Advances on Data Networks, Communications, Computers*, ISBN: 978-960-474-134-2, [Online],[Retrieved October 5, 2010], <http://www.wseas.us/elibrary/conferences/2009/baltimore/DNCOCO/DNCOC O-06.pdf>.
- Pocatilu, P., Alecu, F., & Vetrici, M. (2010). Measuring the efficiency of cloud computing for e-learning systems. *WSEAS Transactions on Computers*, 9(1), 42-51.
- Polit, D. F., & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice*. Lippincott Williams & Wilkins.
- Premkumar, G. and Ramamurthy, K. (1995) "The Role of Interorganizational and Organizational Factors on the Decision Mode for Adoption of Interorganizational Systems, *Decision Sciences*, 26(3), 303-336.
- Premkumar, G., Ramamurthy, K., & Nilakanta, S. (1994). Implementation of electronic data interchange: an innovation diffusion perspective. *Journal of Management Information Systems*, 157-186.
- Prybutok, V. R., Zhang, X., & Ryan, S. D. (2008). Evaluating leadership, IT quality, and net benefits in an e-government environment. *Information & Management*, 45(3), 143-152.
- Ractham, P., & Firpo, D. (2011). Using Social Networking Technology to Enhance Learning in Higher Education: A Case Study Using Facebook. In 2011 44th

- Hawaii International Conference on System Sciences (pp. 1–10). Ieee.
doi:10.1109/HICSS.2011.479.
- Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of research in Marketing*, 26(4), 332-344.
- Rittinghouse, J. W., & Ransome, J. F. (2017). Cloud computing: implementation, management, and security. CRC press.
- Rogers, E.M. (1995) *Diffusion of innovations*, Simon and Schuster.
- Sandelowski, M. (2000). Focus on research methods-whatever happened to qualitative description? *Research in nursing and health*, 23, 334-340.
- Sapsford, R., & Jupp, V. (1996). Validating evidence. *Data collection and analysis*, 1-24.
- Saunders, C.S. and Clark, S. (1992) "EDI adoption and implementation: A focus on interorganizational linkages.", *Information Resource Management Journal*, 5(1), 9-19.
- Saunders, M., Lewis, P. and Thornhill, A. (2009) *Research methods for business students*, *Financial Times/Prentice Hall*.
- Sayogo, D. S., & Gil-Garcia, J. R. (2014). Understanding the determinants of success in inter-organizational information sharing initiatives: results from a national survey. In *Proceedings of the 15th Annual International Conference on Digital Government Research* (pp. 100-109). ACM.
- Scholl, H.J.J. and Klischewski, R. (2007) "E-government integration and interoperability: framing the research agenda", *International Journal of Public Administration*, vol. 30, no. 8, pp. 889-920.

- Seddon, P. B., Calvert, C., & Yang, S. (2010). A multi-project model of key factors affecting organizational benefits from enterprise systems. *MIS quarterly*, 34(2), 305-328.
- Sekaran, U. (2006). *Metodologi penelitian untuk bisnis*.
- Sekaran, U., & Bougie, R. (2006). *Research methods for business: A skill building approach*(5th ed.). John Wiley and Sons, Chichester.
- Sekaran, U., & Bougie, R. (2010). *Research methods for business: A skill building approach*. Wiley: London.
- Sekaran, U., & Bougie, R. (2013). *Elements of research design*. Chichester: John Wiley & Sons.
- Sekaran, U., & Bougie, R. (2013). *Research methods for business: A skill building approach*. Wiley: London.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
- Selviandro, N., Suryani, M., & Hasibuan, Z. (2014, February). Open learning optimization based on cloud technology: Case study implementation in personalization e-learning. In *Advanced Communication Technology (ICACT)*, 2014 16th International Conference on (pp. 541-546). IEEE.
- Selwyn, N. (2012). *Social media in higher education*. The Europa World of Learning.
- Shin, S. K. Ishman, M.Sanders, G.L. (2007). An empirical investigation of socio-cultural factors of information sharing in China. *Information & Management* 44 (2), 165–174.

- Siriwardana, Y. N. (2012). A Framework to Improve the Usability of Web 2 . 0 Tools among IT Students in Tertiary Education.
- Smith, D. M. (2011). Hype cycle for cloud computing, 2011. *Gartner Inc., Stamford, 71*.
- Smith, T. (2009). The social media revolution. *International journal of market research*, 51(4), 559-561.
- Sohn, K. J., Yoo, W. J., & Lee, C. G. (2007). The Design and Implementation of Information System for the MBO of National R&D Projects Cooperated by Industries, Universities and Government-supported Research Institutes. In *Management of Engineering and Technology*, Portland International Center for (pp. 959-966). IEEE.
- Son, J.Y., Narasimhan, S. and Riggins, F.J. (1999). Factors affecting the extent of electronic cooperation between firms: economic and sociological perspectives. *Proceedings of the 20th international conference on Information Systems Association for Information Systems*, pp.556 6-560.
- Stahl, B. C. (2019). Teaching ethical reflexivity in information systems: How to equip students to deal with moral and ethical issues of emerging information and communication technologies. *Journal of Information Systems Education*, 22(3), 8.
- Straub, D., Boudreau, M. C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications of the Association for Information systems*, 13(1), 24.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. 5th edn.(Pearson: Boston, MA.).

- Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics. Allyn & Bacon/Pearson Education.
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. *Computational statistics & data analysis*, 48(1), 159-205.
- Thong, J.Y.L. (1999) 'An integrated model of information systems adoption in small business', *Journal of Management Information Systems*, 15(4), 187–214.
- Thorsteinsson, G., Page, T. & Niculescu, A. (2010). "Using Virtual Reality for Developing Design Communication," *Studies in Informatics and Control*, 19 (1), 93-
- Tisdall, K., Davis, J. M., & Gallagher, M. (2008). Researching with children and young people: Research design, methods and analysis. Sage.
- Tisdall, K., Davis, J. M., & Gallagher, M. (2008). Researching with children and young people: Research design, methods and analysis. Sage.
- Tornatzky, L., & Fleischer, M. (1990). The Process of Technological Innovation: Lexington Books.
- Tung-Mou Yang. (2011). Extending current theories of crossboundary information sharing and integration: a case study of Taiwan e-government. (Doctoral dissertation, University at Albany, State University of New York).
- Wang, C., Wang, Q., Ren, K., & Lou, W. (2010, March). Privacy-preserving public auditing for data storage security in cloud computing. In *INFOCOM, 2010 Proceedings IEEE* (pp. 1-9). Ieee.
- Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., & Liu, M. (2012). Using the Facebook group as a learning management system: An exploratory study. *British Journal of Educational Technology*, 43(3), 428-438.

- Wixom, B. H., & Watson, H. J. (2001). An empirical investigation of the factors affecting data warehousing success. *MIS quarterly*, 25(1), 17-32.
- Wyld, D. C. (2009). Cloud computing 101: Universities are migrating to the cloud for functionality and savings. *Computer Sight*. [Online], [Retrieved October 5, 2010], <http://computersight.com/programming/cloud-computing-101-universities-aremigrating-to-thecloud-for-functionalityand-savings>.
- Xiao-rong, J., & Sui-cheng, L. (2010). The Study on the Influencing Factors on Information Sharing and Information Quality. In *International Conference on Information Management, Innovation Management and Industrial Engineering*, IEEE, Vol. 1, pp. 57-61.
- Xu, J., Li, X., & Zhao, X. (2011). Design of database architecture in the saas-based multi-tenant educational information system. Paper presented at 6th International Conference on the Computer Science & Education, IEEE, pp. 114-119.
- Yan, Z., Sun, B., & Wang, T. (2009). A study on information sharing of e-government. *IEEE International Conference on Grey Systems and Intelligent Services*, 2009. *GSIS 2009*, 1331-1335.
- Yang, T., & Maxwell, T. A. (2011). Information-sharing in public organizations: A literature review of interpersonal, intra-organizational and inter-organizational success factors. *Government Information Quarterly*, 28(2), 164-175.
- Yang, T., Zheng, L., & Pardo, T. (2012). The boundaries of information sharing and integration: A case study of Taiwan e-Government. *Government Information Quarterly*, 29, S51-S60.

- Yeung, P. (2014). SPSS survival manual. A step by step guide to data analysis using IBM SPSS [Book Review]. *Aotearoa New Zealand Social Work*, 26(4), 92.
- Young-McLear, K., Mazzuchi, T. A., & Sarkani, S. (2015). Large-Scale Disaster Response Management: Social Media and Homeland Security. In *Social Media and the Transformation of Interaction in Society* (pp. 93-131). IGI Global.
- Youssef, A. (2013). Towards pervasive computing environments with cloud services. *International Journal of Ad hoc, Sensor & Ubiquitous Computing (IJASUC)*, 4(3), 1-9.
- Youssef, A. E. (2012). Exploring Cloud Computing Services and Applications. *Journal of Emerging Trends in Computing and Information Sciences*, 3(6), 838-847.
- Zhang, J., & Dawes, S. S. (2006). Expectations and perceptions of benefits, barriers, and success in public sector knowledge networks. *Public Performance & Management Review*, 29(4), 433-466.
- Zheng, L. (2009). Leadership behaviours in cross-boundary information sharing and integration: comparing the US and China. (Doctoral dissertation, University at Albany, State University of New York).
- Zhou, N., Wang, H., Han, X., & Zhang, X. (2010). Constructing Performance Management Information System for Academic Staff: A Model for Research-intensive Universities. In *E-Business and E-Government (ICEE)*, 2010 International Conference on (pp. 464-467). IEEE.
- Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business research methods*. Cengage Learning.
- Zikmund, W.G. (2003). *Business research methods* 7th ed., Thomson/South-Western.

Appendix A Questionnaire

SURVEY QUESTIONNAIRE

Purpose:

I am Eman Yahya Maarof a PhD candidate at Universiti Utara Malaysia. I conduct a research on increase electronic information sharing between public universities and Yemen center information technology in Higher Education.

Definition:

Electronic information sharing now plays an important role in modern institutions by providing services to the universities and providing more information which can be a useful resource for the decision makers. The increment of information can help the employee, staff and decision makers to make better decision. With these concerns, this study intends to bases on electronic information sharing in Yemen higher education sector by studying the factors influences that increase of electronic information sharing among universities and (Yemen center information technology higher education) YCIT-HE. Moreover, this study uses concept of a common storage (cloud computing) as factor to increase the electronic information sharing indirectly because it can store huge amount of information of the Ministry and universities in one repository which make information available and accessible to Ministry and universities members.

I respect your busy schedule; however I am seeking your assistance in completing this questionnaire. I anticipate that the results can help Yemen center information technology to provide the public university better service.

Thank you for showing an interest in this research project.

Instructions:

Please read the information sheet before completing survey.

Select the answer that best reflects your views. Answer all questions as honestly as possible. There are no correct or best answers.

For all questions please mark (X) in the appropriate box unless instructed to do otherwise. Please indicate the degree to which you agree or disagree with statement base on 5-1point Like scale (1=Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Disagree (D) 5= Strongly Agree (SA)

Part 1: Demographic Characteristics

1. **What is your gender?**

Male [] Female []

2. **Identify the category that best describes your age group.**

Under 30 [] 30-40 [] 41-50 [] 51 or older []

3. **Identify your highest education qualification.**

Bachelor [] Master [] PhD [] Other -----

4. **Identify the years of your experience in the higher education sector.**

1-5 [] 5-10 [] 11-15 [] over 16 []

5. **What is your work type?**

Administrative [] Academic []

6. **What is your position?**

Top Manager [] Manager [] Responsible [] Employee
[]

7. **What is name of your office, department or center? If it is not found in the list, please write it down in the last row.**

Department Name	Select one only (√)
Presidency of university	
Research and Development	
Division of Student Affairs	
Studies, planning and follow-up	
Continuing Education	
Ratifications and documents	
Missions and Cultural	
Public Relations and Media	
Physical Education	
Relations Affairs	
Engineering Affairs	
General Secretariat of the library	
Finance Affairs	
Audit	
Dormitories	
Quality	
Legal Affairs	

Part 2: States of Electronic Information Sharing Practices

1. **Do you use any of these services to share the information electronically with other staff in YCIT-HE in the table below?**

Yes [] No []

2. How frequently do you use these devices to share the information ?If you use another services please name it in the empty raw.

Electronic device	Never	one time in a year	Once a month	few times a month	a few times a week	Few times a day
Phone line/ Mobile						
Email						
Websites						
Webcam						
Facebook						
Twiter						
Shared Databases						
Others (Please name it)						

3. Approximately what is the percent of all information shared electronically between your university and YCIT-HE?

0% [] 1-20% [] 21-40% [] 41-60% [] 61-80% [] 81-100% []

4. Approximately how long has your university been sharing information electronically with YCIT-HE?

0% [] < 1 Year [] 1-3 Years [] 4-6 Years [] 7-9 Years [] 10+ Years []

5. Describe the types of information (e.g. student information, staff information, Policies and Rules, etc.) that your university shares with YCIT-HE. If you use another type of information please name it in the empty raw.

Types of information	Percentage of Sharing Electronically					
	0%	1-20%	21-40%	41-60%	61-80%	81-100%
Student information						
Administrative staff information						
Academic staff information						
Guidelines and suggestions						
Dispatches						
Scholarships and studies						
Policies and rules						
Guidelines						
Others (Please name it)						

6. Electronic information sharing between your university and YCIT-HE help to exchange the information, objection, rules and guidelines easily and fast.

Yes [] No []

7. Electronic information sharing between your university and YCIT-HE provide information, requests, rules and guidelines within the right time.

Yes [] No []

8. The increment of the information, requests, rules and guidelines within the right time can provide service to universities to help or support decision makers when they make the university's decisions.

Yes []

No []

9. If YCIT-HE develops a new technology to increase the electronic information sharing between your university and them, will you use it?

Yes []

No []

Part 3: External Environmental layer

External Environmental	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
LP1:Our university needs to have legislation and policies to organize electronic information sharing with YCIT-HE.	1	2	3	4	5
LP2: Legislation and policies build good relationships and trust among our staff and YCIT-HE staff.	1	2	3	4	5
LP3: Legislation and Policies decrease the risk of sharing information electronically between our university and YCIT-HE.	1	2	3	4	5
UL1:Ministry of Higher Education requests that our university share information electronically with YCIT-HE.	1	2	3	4	5
UL2:Ministry of Higher Education recommends that our university share information electronically with YCIT-HE.	1	2	3	4	5
UL3: Ministry of Higher Education provides information regarding the advantages and disadvantages of sharing information.	1	2	3	4	5
UL4: Ministry of Higher Education influences our decision to participate/not participate in electronic information sharing with YCIT-HE.	1	2	3	4	5

Part 4: Organization layer

Organization layer	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TS1: Top management motivates the university staff by incentives or rewards and punishments to share information with YCIT-HE.	1	2	3	4	5
TS2:Top management believes to the importance of to share the university's information electronically with YCIT-HE .	1	2	3	4	5

TS3: Top manager considers sharing information electronically with YCIT-HE important to our university.	1	2	3	4	5
TS4: University top manager has no role to support the electronic information sharing with YCIT-HE.	1	2	3	4	5
TR1: Our university and YCIT-HE have a high level of mutual trust.	1	2	3	4	5
TR2: YCIT-HE should protect universities staff when they shared information electronically to increase their trust in sharing.	1	2	3	4	5
TR3: Trust between the university and YCIT-HE increase the participation and collaboration.	1	2	3	4	5
TR4: The trust between the university and YCIT-HE staffs give positive impression.	1	2	3	4	5
Fc1: Our university has enough financial power to develop the information sharing system.	1	2	3	4	5
Fc2: Our university has enough financial power to integrate the system with YCIT-HE.	1	2	3	4	5
Fc3: Our university has enough financial power to maintain the system with YCIT-HE.	1	2	3	4	5
Fc4: Our university has enough financial support to train our employees for participating in the information sharing.	1	2	3	4	5

Part 6: Technological layer

Technological layer	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
IT1: The university needs information systems applications and good technical support.	1	2	3	4	5
IT2: The university needs good telecommunications infrastructure.	1	2	3	4	5
IT3: The administrative staff need good computer knowledge and understanding.	1	2	3	4	5
IT4: The Electronic information sharing project requires understanding of hardware, software and IT skills.	1	2	3	4	5
IQ1: The information quality increases the trust and collaboration between universities staff and YCIT-HE staff.	1	2	3	4	5
IQ2: Information quality enhances the relationship among universities staff and YCIT-HE staff	1	2	3	4	5
IQ3: Information quality reduces the quality service between university staff and YCIT-HE staff.	1	2	3	4	5
IQ4: Information in the university has the quality to be shared with YCIT-HE.	1	2	3	4	5
ITC1: Information sharing with YCIT-HE is compatible with our university existing information systems and/or other electronic applications.	1	2	3	4	5

ITC2: Our university has the same data standards as YCIT-HE for information sharing.	1	2	3	4	5
ITC3: Telecommunication infrastructure and database in the university are different than in YCIT-HE.	1	2	3	4	5
ITC4: Electronic information sharing with YCIT-HE conflicts with our university's needs.	1	2	3	4	5
CC1: The University need to share information by sharing our databases with YCIT-HE.	1	2	3	4	5
CC2: Save the university information and the YCIT-HE information in one repository to support the information sharing.	1	2	3	4	5
CC3: Need to store our university information with YCIT-HE's information in one data repository to be accessible.	1	2	3	4	5
CC4: Accessibility of access database and information sharing. is complicated and cause conflict	1	2	3	4	5
Sm1: Social media help exchange opinions, and sharing information between staff in the university and YCIT-HE.	1	2	3	4	5
Sm2: Social media provides employees accessibility for information between the university and YCIT-HE	1	2	3	4	5
Sm3: Social media enable increased information sharing. at a more rapid pace.	1	2	3	4	5

Part 7: individual layer

individual layer	Strongly Disagree	Disagree	Neutral	Agree	Strongly Disagree
BE1: Electronic information sharing less cost paper sharing.	1	2	3	4	5
BE2: Electronic information sharing provides information timeliness.	1	2	3	4	5
BE3: Electronic information sharing improves university services.	1	2	3	4	5
BE4: Electronic information sharing makes the answering and responding fast and easier.	1	2	3	4	5
BE5: Electronic information sharing improves connection and interaction with YCIT-HE	1	2	3	4	5
BE6: Electronic information sharing improves the trust between staffs in University and YCIT-HE.	1	2	3	4	5
IS1: YCIT-HE needs improving data management practices with Our University.	1	2	3	4	5
IS2: The university is adopting data standards, standard formats and information quality	1	2	3	4	5

إيمان يحيى عثمان معروف
المؤرخ لجيل شقة الديقك ستورا ه من جامعة أوتارالم الي نزيه.
يهايل:- emarroof94@yahoo.com

العليق من اعطاء صور ه مجده وايارات غنية, ال جيلغ ي هذا اليني انظفون على الالاس الفللي:
1 = ال افنق ويشده
2 = ال افنق
3 = م جليد
4 = نطق
5 = نطق ويشده

ال حظه م ه مة: ع والقي ا ب على ا ايجار ال جلياتغ ي ع لنيك ان تنك رب عضا النى ا طالغاليه:

1. ان هذا اليني ان يظفون من ست اجزاء (الول- لالاس) وكل جز عويض من عدد من العولة.
2. ارجوك ا ب عن كل العولة في كل جز عويل طوض ع ال مةصح (/ على ال ايجار الذي تجده في ليل جيلك.
3. ب عضا ال جليات ب ماس و فنتفون ق ا ب لولف لك مة حمل مة على مة صيف ارجو فيك ان تقراء العولة قبل ان يمدقه.
4. تكهبل لك قد ا هت على عي العولة وبدون ترك ايس وال بدون ا ب لة.
5. ال تقو ب على ا ايجار ا ب لالاسي لالوال ال واحد.

ل جزء الول: لخص في نص لي مو غر فلي ة

8. ما هو جيلك?

نشر [] نثى []

9. اختار عمرك,

اقل من 33 [] بين 33-43 [] بين 41-53 [] لشر من 53 سنة []

01. اختار درج لتيغ م ل اعلي,

بلك الويوس [] م ا ج يير [] لظورة [] اخرى

00. عدد سنين ل تجرب لتيغ م ل اعلي,

من ال الى 5 [] من ال الى 13 [] من ال الى 15 [] لشر من 15 []

01. نوع لمر كز لظ فلي,

اداري [] اداري و كافي م []

01. ما هو حق عك?

م ج ر اعلى (نطق جامعه, م ن اع و نطق, امين ل لجلس) [] م ج ر (م ج ر م ر كز, م ج ر ق م, م عاون م ج ر) [] م ن و ل ش عة []
م ق د س ي ق و ية ع ل و م ا ت [] م و ظ ف []

01. ما هواس م ل ل م ل ق ب, ل ل م ر كز او ل ق س م ل ذ ي ن ت م ل ي ه ? انا لكان ال م م غ ي ر م و ج و ب و ي ر ج ا ه ف ي ا ت ف ي ا خ ر ص ف ن ف ي ل ج د و ل ا د ن ا ه.

اسم للفتب, لمر كز او ل ل م ر كز	ا خ ت ا ر و ا ح ن ط ب و ن ع ع ل م ة) (
نطق ل ل ا ج ا م ة	
ال ب ح و ث و ل ت ط و ر	
ش و ر و ل ل ط ب ة	
ال د ر ل ا ت و ل ت خ ط ي ط و ل م ب ل ع ة	
الن ع ل ي م ل م ت م ر	
الن ص ي ق ا ت و ل ل و ط ي ق	
ال ب ع ا ت و ل ل م ن ق ا ت ا ل ت ق ف ي ة	
الش و ر و ن ال م ل ي ة	
ال م ن ق ا ت ا ل ت ا ل ع ا م ة و ل ع ل م	
م ر كز ل ل ج ل ب ال ل ي	
الش و ر و ن ال ف ر ي ة	
الش و ر و ن ال ق و ر ي ة	
الن ت ق ف ي ق	
ال ج و د ة	
ال م ل ة ا ل ع ا ل م ل ل ل م ب ة	

لجزء الثاني: حل قنباذل لمعلومات للتدريية

01. هل قنباذل لمعلومات للتدريية عن طوي قيس استخدام الة هزة اللتدريية (خط اضي وبها اي لاي ميل. مقع اللتدريية لم يرة وب ولخ) مع موقفي للمركز ليل قيقن ية للمعلومات التفتي لم عيم لعلي ycit-he?
نعم [] كمال []

00. كم مر قق وب علي قنباذل لمعلومات للتدريية مع للمركز ليل قيقن ية للمعلومات التفتي لم عيم لعلي (YCIT-HE) عن طري قيس استخدام الة هزة اللتدريية? اذكن تتنتخدم ج هاز اري رج يتيتم ي تفتي لصف همارغ.

اللة هزة اللتدريية	وال مررة	مررة واح قظيلنة	مرهفي لئ مر	عدد من لمراتفتي لئ مر	عدد من لمراتفتي لاسبوع	عدد من لمراتفتي ليل يوم
الليل ال خط الرضي البيد اللتدريية (الليل) الوقع اللتدريية ليل مركز كاهرة ال ليل (م ح ا ث ق ي و) في سبوك تيفر دروبوكس ألة هزة أةري (رج اعنت ية)						

01. تقريبا ما هي لصف قلام يوي قنباذل لمعلومات للتدريية اللليل يي ج اعنتك والمركز ليل قيقن ية للمعلومات التفتي لم عيم لعلي ycit-he?
%0 [] %20-1 [] %40-21 [] %60-41 [] %80-61 [] %100-81 []

01. من قنتي بدا لطلب اذل اللتدريية للمعلومات التفتي ج اعنتك والمركز ليل قيقن ية للمعلومات التفتي لم عيم لعلي ycit-he?
%0 [] اقل من سنة [] 1-3 سنين [] 4-6 سنين [] 7-9 سنين [] اقل من 13 سنين []

01. صفانواع للمعلومات التفتي قنباذل من ولى للمركز ليل قيقن ية للمعلومات التفتي لم عيم لعلي ycit-he. اذنتتست تخم نوع أةري من للمعلومات يري
تسويبت هفي لصف همارغ.

نوع المعلومات	%3	%20-1	%40-21	%60-41	%80-61	%100-81
معلومات لطلب						
معلومات للموظفين						
معلومات لتدريية						
طلبات اوقترات						
اقيادات						
البيئات ولدراسات						
قنباذل للتدريية						
تويجات						

01. ان عيم قنباذل لمعلومات للتدريية يي ج اعنتك والمركز ليل قيقن ية للمعلومات التفتي لم عيم لعلي ycit-he يتس اع ليل قنباذل اللليل انات, للمعلومات, لطبات, لقنباذل للتدريية هاتبصوره هل وليرج?
نعم [] كمال []

ش1: جامعتنا و و لمركزنا في تحقيق نية الامتثال لمتطلبات العمل لـ cit-he في دم فب هوم
تعلق ج ي د.

ش2: هوس توى فب هوم في اوعاين موظفي جامعتنا ج ي د.

ش3: في اوعاين ج ي ب ي ن جامعتنا و لمركزنا في تحقيق نية الامتثال لمتطلبات العمل لـ cit-he
ي زيد منصب ابدل لخدمات الانترنت.

جامعتنا و لمركزنا في من يثق في نية الامتثال لمتطلبات العمل لـ cit-he في دم فب هوم في اوعاين قنات تطوير نظام
متبادل لخدمات الانترنت.

جامعتنا و لمركزنا في من يثق في نية الامتثال لمتطلبات العمل لـ cit-he في دم فب هوم في اوعاين قنات تطوير نظام
تبادل لخدمات الانترنت.

جامعتنا و لمركزنا في من يثق في نية الامتثال لمتطلبات العمل لـ cit-he في دم فب هوم في اوعاين قنات تطوير نظام
مع YCIT-HE.

جامعتنا و لمركزنا في من يثق في نية الامتثال لمتطلبات العمل لـ cit-he في دم فب هوم في اوعاين قنات تطوير نظام
موظفين للخدمات المتبادلة لخدمات الانترنت.

لجزء ل خامس: لخص على ص في اثنى و لوجي ة

افسق وبشدة	محايد افسق	ال افسق	ال افسق وبشدة
---------------	---------------	------------	------------------

ب1: جامعتنا في تحتاج لـ تطبيق نظام لخدمات و دعم ج ي ب ي ن في اوعاين قنات تطوير نظام لخدمات الانترنت.

ب2: جامعتنا في تحتاج لـ تطبيق في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

ب3: موظفينا في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

ب4: منصب ابدل لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

ج1: موظفينا في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
تاعلي لـ ج ي ب ي ن .

ج2: جودة لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
تاعلي لـ ج ي ب ي ن .

ج3: جودة لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
تاعلي لـ ج ي ب ي ن .

ج4: الامتثال لمتطلبات العمل لـ cit-he في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

1 ميسر توظيف خبرات في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
موظفي لمركزنا في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

2 لـ في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
لـ في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

3 متبادل لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
مع ايعاين قنات تطوير نظام لخدمات الانترنت.

ان تواجدهم لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
و حدة في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

نحتاج لـ ج ي ب ي ن و و لمركزنا في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
مبتدوع موحدة لـ ج ي ب ي ن في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

س هولة لـ ج ي ب ي ن في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

اذ تبنى لمركزنا في من يثق في نية الامتثال لمتطلبات العمل لـ cit-he في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.
لـ في اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

تحتسب من اوعاين قنات تطوير نظام لخدمات الانترنت في اوعاين قنات تطوير نظام لخدمات الانترنت.

ولاحظية الساحة في نفس اعد لجامعة وللمركز في المنهجية في لم علوم انفسيا لتطويع لاعلي غي
التوصيل لتعويض ابدل للمعلومات لخص قبة دم عيبر .multiple platform
وسائل العالم (Social media) (نفس اعد في قبة ابدل الراء وشاركه للمعلوم انتبهين موقعي
لجامعات وموقعي للمركز في المنهجية في لم علوم انفسيا لتطويع لاعلي
وسائل العالم (Social media) (ق ادره في في القبة ابدل للمعلوم انتبهين لمرع من لوسائل
الخرى .
استخدام وسائل العالم (Social media) (سوف يطور لاعلي في موقعي لجامعات وموقعي
لمركز في المنهجية في لم علوم انفسيا لتطويع لاعلي .

لجزء لهن ادس



خصائص: صل فرد

انفسق وبشدة	محايد انفسق	ال انفسق	ال انفسق وبشدة
			ف1: يتطلب اداء الليكتروني للخدمات في التكلفة من يتطلب اداء لوقتي للخدمات.
			ف2: يتطلب اداء الليكتروني للخدمات في اقل وقت لخدمة العميل قبل طرق لوقتي.
			ف3: يتطلب اداء الليكتروني للخدمات في حين من الخدمات لاجاعي.
			ف4: يتطلب اداء الليكتروني للخدمات في جعل عهدة لرد او الجابة للسرع وبلن هل.
			ف6: يتطلب اداء الليكتروني للخدمات في حين من سميت وائلتوهزل وائلتصل مع لمرکز في من ي تقني لخدمة للخدمات انفسق لخدمة لعللي .
			ف7: يتطلب اداء الليكتروني للخدمات في مس ت وائلتقيني موهلي جاعنا وموهلي لمرکز لاي جيني في لخدمة للخدمات انفسق لخدمة لعللي .
			1: لمرکز في من يظن في لخدمة انفسق لخدمة لعللي طور ممارسات ادار لعللي مع لخدمات .
			2: لمرکز في من يظن في لخدمة انفسق لخدمة لعللي في امانة لخدمة لعللي ان اتتوصح أخطا لعللي .
			3: لمرکز في من يظن في لخدمة انفسق لخدمة لعللي في لخدمة لعللي لوصول لى للخدمات للخدمة في موظفين مع كاهم ستوى اداري .

أشركك في بحث عن نفسي لخدمة من هلاله جيتي ان، إذ كنتش عريان من الكافي نقطة ذات أهي قبش أتب اداء للخدمات الليكتروني في حين جاعتك وز ليل لعللي وأن هذه لدر لعللي نفسك في ذكره افا لعللي في ذكره وي لعللي لعللي هالاناه.



Appendix B Official Letter

YCIT-HE'S OFFICIAL LETTER

YCIT-HE
Yemen Center For Information
Technology in Higher Education
مركز تقنية المعلومات في التعليم العالي


Ministry of Higher Education
& Scientific Research
وزارة التعليم العالي و البحث العلمي

إفادة

من: المدير العام التنفيذي لمركز تقنية المعلومات في التعليم العالي: م. مصطفى يحيى الخالد
إلى : عميده كلية الحاسب الآلي في جامعة أوتارا الماليزية: أ.د. هدى إبراهيم حجي

أفيدكم علما بأن الطالبه إيمان يحيى عثمان معروف صاحبه جواز 03586442 مرشحه لنيل شهادة الدكتوراه من جامعة أوتارا الماليزية , وبحثها في مجال تقنية المعلومات في بيئة التعليم الجامعي اليمني وعنوان أطروحتها

" العوامل المؤثرة لزيادة تبادل المعلومات الإلكترونية بين الجامعات الحكومية اليمنية ومركز تقنية المعلومات في التعليم العالي "

"FACTORS INFLUENCING FOR INCREASED PARTICIPATION ELECTRONIC INFORMATION SHARING BETWEEN YEMEN PUBLIC UNIVERSITIES AND YEMEN CENTER FOR INFORMATION TECHNOLOGY AT HIGHER EDUCATION (YCIT-HE)" .

وقد قامت وتحت اشراف المركز بالتالي:

- 1- عمل مقابلة مع قيادات المركز في بداية الدراسة لمعرفة العوامل المؤثرة لتبادل المعلومات بين الجامعات الحكومية والمركز.
- 2- توزيع استبيان دراستها على موظفي الجامعات اليمنية الحكومية الذين يتبادلون المعلومات مع المركز ووزارة التعليم العالي لجمع البيانات التي تحتاجها لدراستها.
- 3- الحصول على أسماء الأقسام والإدارات التابعة للجامعات الحكومية التي تتبادل المعلومات مع المركز.
- 4- الحصول على عدد الموظفين العاملين بتلك الإدارات والأقسام لأنهم عينه البحث.
- 5- جمع البيانات من موظفي الجامعات خلال الفترة 2016/11/25 م إلى 2017/4/14 م.

مع خالص الشكر والتقدير.....

المدير العام التنفيذي
م. مصطفى يحيى الخالد



Sana'a –Republic of Yemen. P.O. Box (1٥٦٤٣), Algeria St. (Intersection with Amman Street),
Tel: ٩٦٧+١- ٤٤٤٤٢٠٧٧/٤٤٢٠٧١/٣١٦; Fax: ٤٤٤٠٥٣, Website: www.YCIT-HE.org

OFFICIAL LETTERS



PUSAT PENGAJIAN PENGKOMPUTERAN
SCHOOL OF COMPUTING
Universiti Utara Malaysia
06010 UUM SINTOK
KEDAH DARULAMAN
MALAYSIA



Tel: 004-02850565000/2000
Faks (Fax): 004-920 5067
Laman Web (Web): uump001.uum.edu.my

Date: 07 August 2018

To whom it may concern

DATA COLLECTION AND SAMPLING

EMAN YAHYA OTHMAN MAAROF (Passport no 03586442) is a PhD student of Universiti Utara Malaysia. Under my supervision, she is doing a study on Yemen public universities regarding Electronic Information Sharing between Yemen Public Universities and Yemen center Information Technology Higher Education. As a part of completing her study, she needs to do data collection from the public universities. Kindly please give your full assistance and support to her in conducting data collection from your institution.

Thanks for your cooperation.

Yours sincerely

PROF. DR. HUDA HAJI IBRAHIM
Dean School of Computing
UUM College of Arts & Sciences
University Utara Malaysia
huda753@uum.edu.my

PROF. DR. HUDA HJ. IBRAHIM
Dean
School of Computing
UUM College of Arts and Sciences
Universiti Utara Malaysia

Universiti Pengurusan Terkemuka
The Eminent Management University



Appendix C Interview Questions

Part1: This is questions for the admin in YCIT-HE))

- How does work the current system ?
اللقصود من مذل سؤال لي في عمل للنظام اليل ليكم مثال لاطالبة رايد ليحجيل في جام عمن عاء واحضر تاكل
الورا قال طلبية ملعيتم القيق لمكم عن طريق موقع معين اتسل لي ملول مركز يدوي او عن طريق فاكس ؟
اذ لقت يتسألين عن علمي تقادم لال للاح اقبال جامعة فعيه غي على لاطالبن ايق دم طلبيه يعر موقع النظام مو ح لتي سيق
القبول عبر الانترنت
Oasyemen.net
وتبا عمل خطوات الوضحة في الموقع نفسه
- What is the purpose of building the system?
ما هو الغرض ول هدف من بناء ال مركز؟ أنا قرعت في الموقع عن اء ال مركز لكتس لي لطلالب بالبحرين عن
الجامع اعانوا حائل لي حاج ال طلب ليل لفر ليلوق ففتنره طويل ليحجيل فل هذا هو الفه فقط ؟
لسوال فنا غير واضح ملتسألين عن ال مركز أم عن نظام معين,, من انك مركز قوني فال عمل وماتلي يقد م ال يعيد من
الخدم المتقوني غير جي ال طال ععلي ها على موقع ال مركز :
ycit-he.org
الى جلب الوثائق لتي لول ها دخال ليا ليكي فنترض ان تحطيك صورة لفعلية عن الغرض من لشاء ال مركز وخدمك
التم لصفه.. ارج قراءة الوثائق جيها وال طال عمل ال موقع لخال اصي ل مركز
- What are the services provided by the system in general?
ماهي ال خدمات التي يقدمه ال مركز بشكل عام و اذا يوجد نظام للخرن يي لضا ماهي ال خدمات اذا ال يوجد أي ن ظلم بشكل
عام ماهي ال خدمات
اجبة مذل سؤال هي قيس اجب لئس وال للاس ليق.. يرجى ال طال عمل ال الوثائق وال موقع,, من الكال لغير في ال خدمات التي
من ال مخطط لها ان تقب في حال وفرت ال مواد ال طلبية..
عموم ال خدمات التي يتعمل حلها هي :
-النظام مو ح لتي يقيق وال قبول – وي عمل عبر الانترنت
-نظام علمات شئون ال طالب – وي عمل على لفاش بكت اتل م ح لية
-التدريب والبتش ار المتقوني لئوس س ات ال لي لالي عالي
-الخطط والشارف على وقت ذن بكت ات ال بي فالي في عدد من ال جامعات ال بيوية
- What are the services provided by the system for the student?
من لسؤال مخصص لئتر ماهي ال خدمات التي يقدمه ال مركز لئق طال طالب
-النظام مو ح لتي يقيق وال قبول – وي عمل عبر الانترنت
-نظام علمات شئون ال طالب – وي عمل على لفاش بكت اتل م ح لية
- What are the problems faced by students led to the construction of this system?

ما هي المشكل التي واجه لاطالب في ائس جلال جامعات ادبكي فكر قناء هذا مركز

ارج قراءة الوثائق جيدا والاطال على الموقع لاصريل مركز, بتأسيس مركز تئوي فالم عمل وماتل جكين أ ل ج ل مشكلية
لئس جلال جامتع فقط ولكن من أ ج لتقيم ح زمة خلت تئوية اللص الت وال عملات لقطاع التئوي الم اع ال... أهداف
ال مركز لئير قواسعة موجدودة فيال وثائق ال وسلة وال موقع

- What are the problems with the system now?

ما هي المشكل التي واجههم في بناء هذا المركز و بناء الموقع لمثال البيئية التئوية للي لمن تطل فله ولنا فال ضرة أي مشكل
واجتلكم ارجوا لكره الل المشكل سرف تدع م درلتي
ي ج ب أن تكون السهولة م حدقل حصول على اجبة واضحة,, هل سألين قا عن التزم لئفسه أم الموقع لاصريل نظام
التئوي لئ قبول يعر التئنت أم عن نظام عملات شئون ال طال ب...

ال اجبة عن كل واحد ما سبق تتخلف

- What are the problems during the development?

خال لتطور لكل مركز ما هي المشكل التي واجهتك ايضا

ن جدي ق لي ج لئتف ي ق ي ن ال مركز لئفسه, وي ن ال خدمات وال ن ظ ل ق ت ي ق ي و م ت و ي ن ال ج اع اتب ها

- What are the future plans for the system?

ما هي ال خطط التئوية له هذا المركز ارجو التوضيح الشامل لجي عمل خطط انه يبيت ل ش ا ط ل ا ع ي ب عض ال خططي
دراستي



ارج قراءة الوثائق جيدا والاطال على الموقع لاصريل مركز انن هل تجيب عن هذا سؤال
Universiti Utara Malaysia

إحصائيات حسب الجامعة

إحصائيات المتقدمين في الجامعات

م	اسم الجامعة	ذكور	إناث	إجمالي
1	جامعة إب	621	244	865
2	جامعة تعز	737	698	1435
3	جامعة حضرموت	2314	464	2778
4	جامعة ذمار	580	108	688
5	جامعة صنعاء	214	37	251



إحصائيات طلاب التقديم في الجامعات

م	اسم الجامعة	الطلاب الصراحة		إجمالي طلاب التقديم
		مقبولة	مرفوضة	
1	جامعة إب	229	27	480
2	جامعة تعز	858	40	995
3	جامعة حضرموت	1621	43	3772
4	جامعة ذمار	122	5	238
5	جامعة صنعاء	0	0	41



- I need explain to me in detail this table?
- What does the third column Unsatisfied Requests review?
- Do you have any previous studies have talked about this system?

ملبيو جد لويكم أي دراس استيا بقتمت وس لندت مزال مركز نهل الالتهكالت لاي لس لتعلي اداك تور غل ذلك لت اتهكالت
لوي بعت حدثن عت وزيه التصل التفلي تاع ليم الي في حت يتيم تدعيم لس تي ان الف بال طالب الي بي عان ون من ثم لقة
وله الم صادر والتهات في الي من

ال أعرفم عن رالتهكالت" ملق ص فين "ملقالت"

Articles

أعتقد ان الوطوق ال مرسله للفني في مزال مجال ألن ها ووفيس ها بعبيده على دراسات قامتها جاهات أجنبية, يتلخ هذه
الدراسات هي الوطوق التي بيين يويك,, عدا ذلك فكل ال دراسات هي محوالتش خصر ليقاب ارضين اب وبن ليس تموت قتل بينا
في ال مرلقو ولكن لمكن الوجود ال ال مرلقو الوطن ليل جلوات في حال كلت موح وتلدي هم من أس لسه

- Give me a sample form to populate the registry? I want see the form used for student in the Register.

إذا جاء الطالب للقيام للاختبار بأي جامعتنا مل يوج دلكم لتدارتصية معين ائس حمل اذ يوج د ار جوا افاق
السيت مار قةيتم دراستها ومن شمت طهره ١١١

حلياً،، السيت ماراة لامو حدة هي فيس هالامو جودة نغى مو عن نظام للتصريف والقبول

Oasyemen.net

قوم يه يوت هونل اء حربل جدي وبععي لا خطوات ائتم جدي لالطال ععل الالسيت ماراة اللتصريفية

ولك حيزي للشركر

Interview Questions (B)

الجبلي مزال سيني انتفون ععلى الساسنالكالي



الجزء الاول لاض ائصل لك دي موغياية

01. ماهو جنسك؟

[] نثى

[1] ثمر

01. اختار عمرك،

لثمر من 53

[] بين 41-53

[1] بين 33-43

[] اقل من 33

[] سنة

01. اختار درجالتصغىم لاعلي،

[] لفتورة

[1] ماجستير

[] بكالوريوس

08. عددسرين لخب لقتيتم بلك ها،

[] من 11 الى 15

[1] من 6 الى 13

[] من 5 الى 11

[] لثمر من 15

09. نوع لمركز لوظيفي،

[1] اداري و كافيي

[] اداري

الجزء لثمنى ج هز يقب اءل لام علوم ات التورىأ

09. هل تستخدم الاجهزة اللتونية (قباي لالخط الرضى بلري د اللتونى) لئم ل(، موقع لمركز اللتونى او اجهزة هزية اخرى صياتلل يومية داخل
المركز؟

[] نال

[1] نعم

11. اختار لاج هازيلفتستتخدمها

الاج هزة الليتروية	نعم	كنا
الجهيلالخط الرضوي	1	
الجهيدالليكتروني(الجهيل)	1	
مواقعالليكتروني	1	
اج هزة موهية اخر	1	

10. اذكرف مدولستخدامك لهذا الاج هزوي حلك يوي?

الاج هزة الليتروية	وال مرة	قل من مرهوي	مرهوي	عدد من لمراتفوي	عدد من لمراتفوي	عدد من لمراتفوي
		لثن هر	لثن هر	لثن هر	اللسبوع	الويوم
الجهيلالخط الرضوي						1
الجهيدالليكتروني(الجهيل)						1
مواقعالليكتروني						1
اج هزة موهية او موهية اخر						1

11. هلقتب عهيقب ابدال مغلومات الليتروية عن طوي قيستخدام الاج هزة الليتروية مع موهوي لجام عاتقيقسم (مركز للاحاسوب او الإدارات ذات العالقة او مع مشرفي وم شغلي النظم في الجامعات)?

نعم [1] كنا []

11. اذكرف نوع الاج هزة الليتروية التي تتستتخدم لانتبدال المغلومات,

الاج هزة الليتروية	نعم	كنا
الجهيلالخط الرضوي	1	
الجهيدالليكتروني(الجهيل)	1	
مواقعالليكتروني	1	
اج هزة موهية اخر		1

11. كم حيقوم بعهيقب ابدال المغلومات الليتروية مع لجامعات عن نظري قيستخدام الاج هزة لكاميوي?

الاج هزة الليتروية	وال مرة	قل من مرهوي	مرهوي	عدد من لمراتفوي	عدد من لمراتفوي	عدد من لمراتفوي
		لثن هر	لثن هر	لثن هر	اللسبوع	الويوم
الجهيلالخط الرضوي						1
الجهيدالليكتروني(الجهيل)						1
مواقعالليكتروني				1		
اج هزة موهية اخر	1					

11. تقويبا ما هي لثقب قلم يوي قلاب ابدال المغلومات الليتروية اللثيبين للمركز و لوزارة لجامعات (مركز للاحاسوب او الإدارات ذات العالقة او مع مشرفي وشغلي النظم)?

20-1% [] 40-21% [] 60-41% [] 80-61% [1] 100-81% [] 0% []

11. تقويبا, ما طويقتب ابدال المغلومات الليتروية بقين للمركز و لجامعات (مركز للاحاسوب او الإدارات ذات العالقة او مع مشرفي وشغلي النظم)?

سنة [] اقل من سنة [] 1-3 سنويون [] 4-6 سنويون [1] 7-9 سنويون [] اكثر من 13 سنويون []

11. ان عمليتي تبادل للمعلومات التكنولوجية في المراكز ولجامعات استساعا عد غيتب ادل ليلي انات, لخببرات, لالم عفةة, لولوج لملاكل الولوجي هات؟ انا كان لاجوابين عم ظلي لملخ الالطرحي ح)

نعم [1] كمال []

18. ان عمليتي تبادل للمعلومات التكنولوجية في المراكز ولجامعات استساعا وفتودي في زيدة كم ليلي ان اتل خبرات, لالم عفةة و لولوج لملاكل الولوجي هات؟

نعم [1] كمال []

19. ان زيدة كم ليلي انات, لخببرات, لالم عفةة, لولوج لملاكل الولوجي هاتس ف يدعص ان عي لقراري عمي هاتخذ لقرارات للمراكز?

نعم [1] كمال []

11. اذا طور اتل حكوم قايمني قتي ات حث فصيل لملحق بل لتي تس ادع لزي انقلب ادل للمعلومات التكنولوجية في المراكز ولجامعات, هل سوف تقوم بلس خدام ه؟

نعم [1] كمال []

10. ما هو نوع لملحومات لتي تسول دا للمركز لى لجامعات بملكانك لملخ ارلكلر من اجبة.

سولمة عامة مجازية تكنولوجية تشويية اخرى

11. ما هو نوع لملحومات لتي تسول دا لجامعات للمركز بملكانك لملخ ارلكلر من اجبة.

بيلات عامة قترحات افكار اعرضات اخرى

لجزء لملثلت حث ص تبادل للمعلومات التكنولوجية

الافضل ويشدة	الافضل	الافضل والافضل	الافضل	الافضل ويشدة
1				انقلو دقتلبادل اللكتروني للمعلومات هيتقلل من الالعمل لتهريه.
	1			انقلو دقتلبادل اللكتروني للمعلومات هيتقلل لملتلقفة الالعمل للمركز.
1				انقلو دقتلبادل اللكتروني للمعلومات هيتسجن من هة للمعلومات.
1				انقلو دقتلبادل اللكتروني للمعلومات هيتقلل من شابه للمعلومات.
1				انقلو دقتلبادل اللكتروني للمعلومات هيتسجن من تهريه لملصول على للمعلومات.
1				انقلو دقتلبادل اللكتروني للمعلومات هيتسجن من تصنع لقرار ولهريه ات.
1				انقلو دقتلبادل اللكتروني للمعلومات هيتسجن لالاعات مع لجامعات.
1				انقلو دقتلبادل اللكتروني للمعلومات هيتسجن من خدامات للمركز.
1				انقلو دقتلبادل اللكتروني للمعلومات هيتسجن من ملتك الهليبي انات داخل او خارج المراكز.
	1			انقلو دقتلبادل اللكتروني للمعلومات هيتسجن من صورة للمركز.
	1			من لك حدي ات من هة وصال لملحومات لتبادل.
		1		من لملحق بيهم وملتقادات لملحومات لتبادل.
		1		تقلل من ملية لهريه لملكامل للمعلومات.
1				جودة للمعلومات هيتسجن من تصار دا على ان دا عمل حوي على ملية تبادل للمعلومات التكنولوجية.
		1		للمعلومات لملخية ال دا جودتقلمننا متبادل لملين للمركز و لجامعات.

لجزء لربيع لخصائص الدارة

انفسق	ال اوفلق والانسق	ال اوفلق	ال اوفلق ويشدة	انفسق ويشدة
1				مؤزن لادي من يتحقق هل اللفص القاجيدة.
1				مؤزن لادي تطبيق انظم مغموم جيدة.
1				مؤزن لادي من يتحقق في جيدي.
1				موظفين الديليري لادي دم مع فده غي لحوبي جيدة.
1				تخص بيبيتيحتي فيكون مختلف.
1				انش و نظم لامغوموات مختلف.
1				تدريبي ل مختلفين مختلف.
1				صيان لبرامج وال ج هزة مختلف.
1				تبادل لامغوموات لكتروني أ مع لاج اع اتتمت ولفلق مغلبيتي يخلق تي اللفص التسفي للمركز.
1				تبادل لامغوموات لكتروني أ مع لاج اع اتتمت ولفلق معنظم لامغوموات لموج ودفقي مؤزنا أو مغل بتطبيقات اللكتروني أ أخرى.
	1			بشكل عام يمكن فوجي لامغوموات لالزم تكيب اديل لامغوموات اللكتروني أ يصعب فهمها او استخدامها.
		1		بصفة عام متب اديل لملغوموات اللكتروني أ هي غموية جديدة.
		1		توفر لامغوموات انفسق مخزن جود (مشاوير هوسيزي) متب اديل لامغوموات اللكتروني أ.
		1		لوصول لاي لامغوموات متب اديل لامغوموات اللكتروني أ.
		1		نحت املجلى بتبادل لملغوموات مع لاج اع ات.
			1	مزن بي انات لاج اع ات ول مركز انفسق مخزن جود يدي عقب اديل لامغوموات لكتروني أ قصوره غي رمبشرة.

لجزء ل خامس لخصائص لنيظمة

انفسق	ال اوفلق والانسق	ال اوفلق	ال اوفلق ويشدة	انفسق ويشدة
1				الدارة غلدي ال دا دورا هاملهم بتبادل لملغوموات اللكتروني أ.
	1			الدارة غلدي لتتطوحت حفي ز موظفي لاج اع ات عن طريقي لحوطنز او لملفقات ولا عيبات (مشاكل قوب دم الملل تخدموا لوق يتوش جدم ع اللكتروني).
		1		جاسكن ا وزار لملغوموات لملغوموات اللكتروني أ.
		1		فها موم لملغوموات اللكتروني أ متب اديل لامغوموات اللكتروني أ.
		1		ججم جاسكن بيتطوحت عن يشر فتي بتبادل لملغوموات اللكتروني أ مع وزارة لملغوموات اللكتروني أ.
	1			لكن منظم لامغوموات تتطوحت عن يشر فتي بتبادل لامغوموات اللكتروني أ مع لاج اع ات.
			1	علا مملوظفي ني يتطوحت عن يشر فتي بتبادل لامغوموات اللكتروني أ مع وزار لملغوموات اللكتروني أ.

لجزء ل سدس لخصائص لنيظمة

انفسق	ال اوفلق والانسق	ال اوفلق	ال اوفلق ويشدة	انفسق ويشدة
		1		لتشريع ات لمرکز قباي أ افسق لملغوموات لنيظمة جود قونن فتي بتبادل لامغوموات اللكتروني أ مع لاج اع ات.
		1		لتشريع ات لمرکز افسق لملغوموات لنيظمة جود وتو بتبادل لامغوموات اللكتروني أ مع لاج اع ات.
	1			الشفق هي بتبادل لملغوموات اللكتروني أ لملغوموات اللكتروني أ لمرکز ول ججم اع ات يمكن أنت عطتي نطب اع للفسق اول.
		1		لمرکز ول ججم اع ات لادي مملستوى عال مللشفق لنيظمة.
		1		مؤزن اي جيبان تحمي لملغوموات اللكتروني أ عن دجلاب الون لامغوموات اللكتروني أ.

Appendix D

Discriminant Validity Results

Reliability Statistics				
Variables	Number of Items	Cronbach's Alpha	items Deleted	Cronbach's Alpha if Item Deleted
LP	3	.758		
UL	3	.704		
TR	4	.713		
TS	4	.794	TS4	
CO	3	.747		
FC	4	.933		
ITC	4	.764		
IQ	4	.744		
IT	3	.823		
CC	5	.712		
SM	3	.709		
BE	6	0.793		
RI	4	.731		
IS	3	.856	IS4	

Information quality

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.744	4

Item Statistics

	Mean	Std. Deviation	N
Information quality	4.3134	.70084	67
V60	4.2388	.55294	67
V61	4.2836	.59813	67
V62	4.2985	.65169	67

the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.744	4

Item Statistics

	Mean	Std. Deviation	N
Information quality	4.3134	.70084	67
V60	4.2388	.55294	67
V61	4.2836	.59813	67
V62	4.2985	.65169	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Information quality	12.8209	2.483	.271	.843
V60	12.8955	2.216	.638	.638
V61	12.8507	2.068	.666	.614
V62	12.8358	1.957	.653	.615

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
17.1343	3.573	1.89013	4

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.758	3

Item Statistics

	Mean	Std. Deviation	N
Legislation and Policy	4.3582	.48309	67
V34	4.1493	.50011	67
V35	4.1045	.76146	67

Item Statistics

	Mean	Std. Deviation	N
Legislation and Policy	4.3582	.48309	67
V34	4.1493	.50011	67
V35	4.1045	.76146	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Legislation and Policy	8.2537	1.313	.545	.736
V34	8.4627	1.131	.723	.562
V35	8.5075	.769	.600	.742

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
12.6119	2.150	1.46634	3

RELIABILITY

```
/VARIABLES=trust V41 V42 V43  
/SCALE('ALL VARIABLES') ALL  
/MODEL=ALPHA  
/STATISTICS=DESCRIPTIVE SCALE  
/SUMMARY=TOTAL.
```

Reliability

➔ **Reliability**

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.704	3

Item Statistics

	Mean	Std. Deviation	N
Upper level leadership	3.9552	.74738	67
V37	3.9254	.74495	67
V38	2.7463	.89347	67

Reliability Statistics

Cronbach's Alpha	N of Items
.704	3

Item Statistics

	Mean	Std. Deviation	N
Upper level leadership	3.9552	.74738	67
V37	3.9254	.74495	67
V38	2.7463	.89347	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Upper level leadership	6.6716	1.739	.661	.444
V37	6.7015	1.879	.571	.556
V38	7.8806	1.895	.369	.825

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.6269	3.601	1.89765	3

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.856	3

Item Statistics

	Mean	Std. Deviation	N
Information stewardship	2.7910	1.05223	67
V86	2.6567	.99319	67
V87	2.2985	.87065	67

Reliability Statistics

Cronbach's Alpha	N of Items
.856	3

Item Statistics

	Mean	Std. Deviation	N
Information stewardship	2.7910	1.05223	67
V86	2.6567	.99319	67
V87	2.2985	.87065	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Information stewardship	4.9552	2.710	.817	.713
V86	5.0896	3.052	.751	.778
V87	5.4478	3.736	.640	.879

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
7.7463	6.647	2.57813	3

➔ **Reliability**

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
Total		284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.793	6

Item Statistics

	Mean	Std. Deviation	N
Benefits	4.5522	.50102	67
V76	4.6567	.47839	67
V77	4.6716	.47316	67
V78	4.6567	.47839	67
V79	4.5075	.58706	67
V80	4.2687	.72993	67

Item-Total Statistics

Cronbach's Alpha	N of Items
.793	6

Item Statistics

	Mean	Std. Deviation	N
Benefits	4.5522	.50102	67
V76	4.6567	.47839	67
V77	4.6716	.47316	67
V78	4.6567	.47839	67
V79	4.5075	.58706	67
V80	4.2687	.72993	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Benefits	22.7612	4.185	.441	.784
V76	22.6567	4.047	.553	.762
V77	22.6418	3.900	.651	.742
V78	22.6567	3.805	.700	.731
V79	22.8060	3.644	.603	.747
V80	23.0448	3.589	.440	.805

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
27.3134	5.340	2.31077	6

➔ **Reliability**

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.747	3

Item Statistics

	Mean	Std. Deviation	N
Collaboration	3.3731	.90178	67
V49	3.4925	1.07834	67
V50	3.9701	.99955	67

Reliability Statistics

Cronbach's Alpha	N of Items
.747	3

Item Statistics

	Mean	Std. Deviation	N
Collaboration	3.3731	.90178	67
V49	3.4925	1.07834	67
V50	3.9701	.99955	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Collaboration	7.4627	3.404	.514	.730
V49	7.3433	2.653	.601	.634
V50	6.8657	2.845	.618	.611

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.8358	5.927	2.43458	3

➔ **Reliability**

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.933	4

Item Statistics

	Mean	Std. Deviation	N
Financial Capability	1.7313	.84535	67
V52	1.6866	.78256	67
V53	1.8060	.87454	67
V54	1.9254	.98954	67

Reliability Statistics

Cronbach's Alpha	N of Items
.933	4

Item Statistics

	Mean	Std. Deviation	N
Financial Capability	1.7313	.84535	67
V52	1.6866	.78256	67
V53	1.8060	.87454	67
V54	1.9254	.98954	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Financial Capability	5.4179	5.974	.854	.908
V52	5.4627	6.222	.867	.907
V53	5.3433	5.744	.885	.898
V54	5.2239	5.570	.786	.937

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
7.1493	10.220	3.19684	4

→ **Reliability**

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.764	4

Item Statistics

	Mean	Std. Deviation	N
IT Capability	4.7015	.49283	67
V56	4.7164	.54512	67
V57	4.6567	.47839	67
V58	4.5970	.57891	67



UUM
Universiti Utara Malaysia

Reliability Statistics

Cronbach's Alpha	N of Items
.764	4

Item Statistics

	Mean	Std. Deviation	N
IT Capability	4.7015	.49283	67
V56	4.7164	.54512	67
V57	4.6567	.47839	67
V58	4.5970	.57891	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IT Capability	13.9701	1.787	.423	.777
V56	13.9552	1.589	.510	.738
V57	14.0149	1.530	.700	.642
V58	14.0746	1.373	.648	.660

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
18.6716	2.588	1.60858	4

→ Reliability**Scale: ALL VARIABLES****Case Processing Summary**

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.712	4

Item Statistics

	Mean	Std. Deviation	N
cloudcomputing	4.5821	.52655	67
V68	4.5821	.52655	67
V69	4.3582	.54220	67
V70	4.2985	.60340	67

Reliability Statistics

Cronbach's Alpha	N of Items
.712	4

Item Statistics

	Mean	Std. Deviation	N
cloudcomputing	4.5821	.52655	67
V68	4.5821	.52655	67
V69	4.3582	.54220	67
V70	4.2985	.60340	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
cloudcomputing	13.2388	1.851	.332	.742
V68	13.2388	1.700	.457	.675
V69	13.4627	1.495	.615	.578
V70	13.5224	1.374	.612	.574

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
17.8209	2.604	1.61363	4


→ Reliability
Scale: ALL VARIABLES**Case Processing Summary**

		N	%
Cases	Valid	223	78.5
	Excluded ^a	61	21.5
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.823	3

Item Statistics

	Mean	Std. Deviation	N
IT compatibility	3.5919	.97691	223
V64	3.6592	.96818	223
V65	3.4888	.94374	223

Reliability Statistics

Cronbach's Alpha	N of Items
.823	3

Item Statistics

	Mean	Std. Deviation	N
IT compatibility	3.5919	.97691	223
V64	3.6592	.96818	223
V65	3.4888	.94374	223

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IT compatibility	7.1480	2.892	.698	.736
V64	7.0807	2.795	.752	.680
V65	7.2511	3.261	.591	.840

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.7399	6.166	2.48320	3



UUM
Universiti Utara Malaysia

Reliability Statistics

Cronbach's Alpha	N of Items
.709	3

Item Statistics

	Mean	Std. Deviation	N
Social media	3.9689	.81499	225
V72	3.6311	.93155	225
V73	3.3022	1.14066	225

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Social media	6.9333	3.286	.482	.680
V72	7.2711	2.627	.622	.504
V73	7.6000	2.295	.515	.665

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.9022	5.374	2.31826	3

→ Reliability**Scale: ALL VARIABLES****Case Processing Summary**

		N	%
Cases	Valid	225	79.2
	Excluded ^a	59	20.8
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.709	3

Item Statistics

	Mean	Std. Deviation	N
Social media	3.9689	.81499	225
V72	3.6311	.93155	225
V73	3.3022	1.14066	225

Reliability Statistics

Cronbach's Alpha	N of Items
.709	3

Item Statistics

	Mean	Std. Deviation	N
Social media	3.9689	.81499	225
V72	3.6311	.93155	225
V73	3.3022	1.14066	225

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Social media	6.9333	3.286	.482	.680
V72	7.2711	2.627	.622	.504
V73	7.6000	2.295	.515	.665

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.9022	5.374	2.31826	3

Reliability**Scale: ALL VARIABLES****Case Processing Summary**

		N	%
Cases	Valid	67	23.6
	Excluded ^a	217	76.4
	Total	284	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.713	4

Item Statistics

	Mean	Std. Deviation	N
trust	3.7463	.92676	67
V41	4.4776	.53252	67
V42	4.3582	.64436	67
V43	4.3731	.51745	67

the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.713	4

Item Statistics

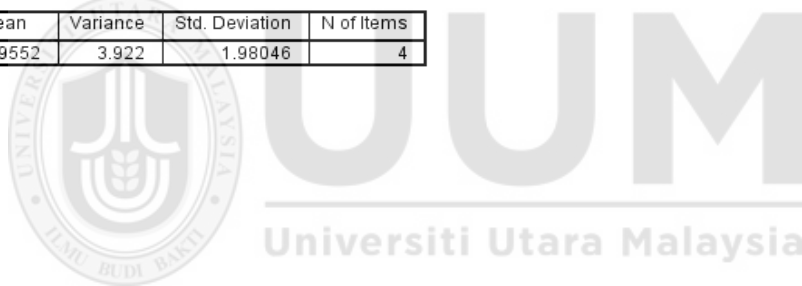
	Mean	Std. Deviation	N
trust	3.7463	.92676	67
V41	4.4776	.53252	67
V42	4.3582	.64436	67
V43	4.3731	.51745	67

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
trust	13.2090	1.895	.458	.735
V41	12.4776	2.799	.471	.674
V42	12.5970	2.365	.576	.606
V43	12.5821	2.611	.624	.605

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.9552	3.922	1.98046	4



Appendix F

Questionnaire Submission

لا تتلق من اعطاء صوره جيدة والخيارات عالية، الاجابة في هذا الاستبيان تتكون على الاساس التالي:

- 1 = لا اوافق وبشدة
2 = لا اوافق
3 = محايد
4 = اتفق
5 = اتفق وبشدة

ملاحظة مهمة: عند القيام بعملية اختيار الاجابات فيجب عليك ان تتذكر بعض النقاط التالية:

1. ان هذا الاستبيان يتكون من ست اجزاء (الاول- السادس) وكل جزء يتضمن عدد من الاسئلة.
2. ارجوك اجب عن كل الاسئلة في كل جزء بواسطة وضع علامة مسح (√) على الاختيار الذي تجده مناسب لاجابك.
3. بعض الاجابات ربما سوف تكون مقاربة ولكنها تحمل معنى مختلف ارجو منك ان تقرأ الاسئلة بتأن وبدقة.
4. تأكد بذلك قد اجبت على جميع الاسئلة ويهون ترك اي سوال بدون اجابة.
5. لا تقوم بعملية اختيار اجابان في السؤال الواحد.

الجزء الاول: الخصائص الديموغرافية

1. ما هو جنسك؟
 ذكر انثى []
2. اختار عمرك،
 اقل من 30 [] بين 30-40 بين 40-50 [] اكثر من 50 []
3. اختار درجة التعليم العالي،
 بكالوريوس ماجستير [] دكتوراة [] اخرى []
4. عدد سنين الخبرة التي تمتلكها في التعليم العالي،
 من 1 الى 5 [] من 6 الى 10 [] من 11 الى 15 اكثر من 15 []
5. نوع المركز الوظيفي،
 ادري [] اداري و اكاديمي
6. ما هو موقعك؟
 مدير اعلى (رئيس جامعة، مساعد رئيس، امين المجلس) [] مدير (مدير مركز، مدير قسم، معاون مدير) [] مسؤول شعبة []
 مهندس تقنية معلومات موظف []
7. ما هو اسم المكتب، المركز او القسم الذي تنتمي اليه؟ اذا كان الاسم غير موجود، يرجى اضافته في اخر صف في الجدول ادناه.



اسم المكتب، المركز او المركز	اختار واحد فقط بوضع علامة (√)
رئيس الجامعة	
البحوث والتطوير	
شؤون الطلبة	
الدراسات والتخطيط والمتابعة	
التعليم المستمر	
التصديقات والوثائق	
العلاقات والملاقات التقنية	
الشؤون المالية	
العلاقات العامة والعلام	
مركز الحاسب الآلي	
الشؤون الهندسية	
الشؤون القانونية	
التنسيق	
الجودة	
الإسالة العامة للمكتبة	
مديرية القسام الداخلية	
الدراسات	
تطوير التدريس والتدريب الجامعي	
التوظيف	
البحوث والتأهيل الجامعي	

الجزء الثاني: حالة تبادل المعلومات الكترونية

1. هل قمت بعملية تبادل معلومات الكترونية عن طريق استخدام الأجهزة الإلكترونية (خط ارضي، موبايل، ايميل، موقع الالكتروني كاميرة ويب والخب) مع موظفي المركز اليمنى لتكنية المعلومات في التعليم العالي yeit-he؟

نعم [] لا []

2. كم مرة تقوم بعملية التبادل المعلومات الكترونيا مع المركز اليمنى لتكنية المعلومات في التعليم العالي (YCIT-HE) عن طريق استخدام الاجهزة الالكترونية؟ اذا كنت تستخدم جهاز اخر، يرجى تسميته في الصف الفارغ.

الاجهزة الالكترونية	ولا مرة	مرة واحدة بالسنة	مرة في الشهر	عدد من المرات في الشهر	عدد من المرات في الاسبوع	عدد من المرات في اليوم
الموبايل الخط الارضي						✓
البريد الالكتروني (الايمل)				✓		
المواقع الالكترونية للمركز						✓
كاميرة الويب (محادثة فيديو)	✓					
فيس بوك	✓					
تويتر	✓					
دروب بوكس	✓					
اجهزة اخرى (رجاء تسميتها)					✓	

3. تقريبا ما هي النسبة المئوية لتبادل المعلومات الكترونيا بين جامعتك و المركز اليمنى لتكنية المعلومات في التعليم العالي yeit-he؟

%0 [] %20-1 [] %40-21 [] %60-41 [] %80-61 [] %100-81 []

4. منذ متى بدأ التبادل الالكتروني للمعلومات بين جامعتك و المركز اليمنى لتكنية المعلومات في التعليم العالي yeit-he؟

%60 [] اقل من سنة [] 1-3 سنين [] 4-6 سنين [] 7-9 سنين [] اكثر من 10 سنين []

5. صف أنواع المعلومات التي تتناقلها من وإلى المركز اليمنى لتكنية المعلومات في التعليم العالي yeit-he. إذا كنت تستخدم نوع آخر من المعلومات يرجى تسميتها في الصف الفارغ.

نوع المعلومات	%0	%20-1	%40-21	%60-41	%80-61	%100-81
معلومات الطالب						✓
معلومات الموظفين		✓				
معلومات التدريسيين		✓				
طلبات او اقتراحات						✓
إجازات						✓
البحاث والدراسات						✓
قوانين وتشريعات						✓
توجيهات		✓				

6. ان عملية تبادل المعلومات الكترونيا بين جامعتك والمركز اليمنى لتكتية المعلومات في التعليم العالي ycit-he تساعد على تبادل البيانات، المعلومات، الوثائق، القوانين والتوجيهات بصورة اسهل واسرع؟
 نعم كلا
7. ان عملية تبادل المعلومات الكترونيا بين جامعتك و المركز اليمنى لتكتية المعلومات في التعليم العالي ycit-he تؤدي الى سهولة توفر البيانات، المعلومات، الوثائق، القوانين والتوجيهات في الوقت المناسب؟
 نعم كلا
8. ان توفير كدية البيانات، المعلومات، الوثائق، القوانين والتوجيهات في الوقت المناسب تساعد على توفر خدمات جيدة للجامعت مما يساعد صالحين القرار في جامعتنا على اتخاذ قرارات افضل؟
 نعم كلا
9. في حال تطوير المركز اليمنى لتكتية المعلومات في التعليم العالي ycit-he تكتيات حديثة للاسهام في زيادة تبادل المعلومات الكترونيا بينها وبين جامعتك، هل سوف تقوم باستخدامها؟
 نعم كلا

الجزء الثالث: الخصائص البيئية

الفوائد والتشريعات	لاوافق وبشدة	لاوافق	محايد	اتفق	اتفق وبشدة
ق1: جامعتنا تحتاج الى تشريعات وسياسات لتنظيم تبادل المعلومات الكترونيا مع المركز اليمنى لتكتية المعلومات في التعليم العالي (YCIT-HE) .				<input checked="" type="checkbox"/>	
ق2: التشريعات والوثائق تبني علاقة جيدة بين الموظفين في جامعتنا و المركز اليمنى لتكتية المعلومات في التعليم العالي (YCIT-HE) .			<input checked="" type="checkbox"/>		
ق3: التشريعات والوثائق تقلل من مخاوف وخطورة التبادل الالكتروني للمعلومات.			<input checked="" type="checkbox"/>		
ج1: المركز اليمنى لتكتية المعلومات في التعليم العالي (YCIT-HE) اوصت على ان جامعتنا يجب عليها تبادل المعلومات (الكترونيا معها).			<input checked="" type="checkbox"/>		
ج2: المركز اليمنى لتكتية المعلومات في التعليم العالي (YCIT-HE) طلبت من جامعتنا ان تبادل المعلومات الكترونيا معها.			<input checked="" type="checkbox"/>		
ج3: المركز اليمنى لتكتية المعلومات في التعليم العالي (YCIT-HE) وفرت معلومات عن فوائد ومضار عملية تبادل المعلومات بصورة الكترونية.		<input checked="" type="checkbox"/>			
ج4: وزارة التعليم العالي ليس لها تأثير على قراراتنا في المشاركة او عدم المشاركة في تبادل المعلومات الالكترونيا معهم.			<input checked="" type="checkbox"/>		
ث1: جامعتنا و المركز اليمنى لتكتية المعلومات في التعليم العالي (YCIT-HE) لديهما مستوى عال من الثقة المتبادلة.		<input checked="" type="checkbox"/>			
ث2: جامعتنا يجب ان تحمي وتدعم موظفيها عندما يبادلون معلوماتهم (الكترونيا) كي تزيد من ثقتهم بعملية التبادل الالكتروني.				<input checked="" type="checkbox"/>	
ث3: الثقة في عملية تبادل المعلومات الكترونيا تزيد من المشاركة والتعاون.				<input checked="" type="checkbox"/>	
ث4: الثقة بين موظفين جامعتنا و المركز اليمنى لتكتية المعلومات في التعليم العالي (YCIT-HE) يمكن ان تغطي الطباعا ايجابيا.			<input checked="" type="checkbox"/>		

الجزء الرابع: الخصائص الإدارية

اتفق وبشدة	اتفق	محايد	لا اوافق	لا اوافق وبشدة	
				✓	1: الإدارة العليا تستطيع تحقيق موقفي الجامعة بعمليّة التبادل المعلوماتي الالكتروني مع المركز اليمني لتقنية المعلومات في التعليم العالي ycit-he عن طريق الخوافظ أو المتكافآت والمقويات.
		✓			2: ادارتنا العليا مهتمة بعمليّة التبادل المعلوماتي الالكتروني مع المركز اليمني لتقنية المعلومات في التعليم العالي ycit-he .
		✓			3: ادارتنا العليا تعتبر ان عمليّة تبادل المعلومات بصورة الكترونية مع المركز اليمني لتقنية المعلومات في التعليم العالي ycit-he امر مهم لجامعتنا.
		✓			4: الإدارة العليا في جامعتنا ليس لها دورا في دعم تبادل المعلومات الالكتروني مع المركز اليمني لتقنية المعلومات في التعليم العالي ycit-he .
			✓		ش1: جامعتنا و المركز اليمني لتقنية المعلومات في التعليم العالي ycit-he لديهم مفهوم تعاوني جيد.
		✓			ش2: مستوى مفهوم التعاون بين موقفي جامعتنا جيد.
	✓				ش3: التعاون الجديد بين جامعتنا و المركز اليمني لتقنية المعلومات في التعليم العالي ycit-he يزيد من تبادل المعلومات الالكتروني.
			✓		جامعتنا والمركز اليمني لتقنية المعلومات في التعليم العالي لديهم قوة مالية كافية لتطوير نظام لتبادل المعلومات.
			✓		جامعتنا والمركز اليمني لتقنية المعلومات في التعليم العالي لديهم قوة مالية كافية لصيانة نظام تبادل المعلومات الإلكتروني
			✓		جامعتنا والمركز اليمني لتقنية المعلومات في التعليم العالي لديهم قوة مالية كافية لتمج النظام مع YCIT-HE.
				✓	جامعتنا والمركز اليمني لتقنية المعلومات في التعليم العالي لديهم الدعم المالي الكافي لتدريب موظفينا للمشاركة في تبادل المعلومات.

الجزء الخامس: الخصائص التكنولوجية

اتفق وبشدة	اتفق	محايد	لا اوافق	لا اوافق وبشدة	
✓					ب1: جامعتنا تحتاج الى تطبيقات نظم معلومات ودعم تكني جيد لتسهيل عمليّة تبادل المعلومات .
✓					ب2: جامعتنا تحتاج الى بنية تحتية شبكاتية واتصالية جيدة.
		✓			ب3: موظفينا الإداريين يحتاجون الى معرفة جيدة بالحاسوب.
✓					ب4: تبادل المعلومات بصورة الكترونية يحتاج الى الاجهزة الكترونية، البرامج الحاسوبية وخبراء في مجال الحاسوب.
				✓	ج1: معلوماتنا الحالية لها جودة تكفي من تبادلها مع المركز اليمني لتقنية المعلومات في التعليم

التصنيف	التحقق	مجايز	لاوافقة	لاوافقة بشيء	العالي .
	✓				ج2: جودة المعلومات تزيد من الثقة بين موظفيها وموظفي المركز اليميني لتقنية المعلومات في التعليم العالي .
		✓			ج3: جودة المعلومات تحسن العلاقة بين موظفيها وموظفي المركز اليميني لتقنية المعلومات في التعليم العالي ..
		✓			ج4: جودة المعلومات الجيدة تزيد من جودة الخدمات بين موظفيها وموظفي المركز اليميني لتقنية المعلومات في التعليم العالي .
				✓	1: مستوى الخبرات في المجال التقني والإلكتروني عند موظفيها تختلف عن مستوى خبرات موظفي المركز اليميني لتقنية المعلومات في التعليم العالي.
	✓				ت2: البنية التحتية للاتصالات والشبكات وقواعد البيانات تختلف بين جامعتنا المركز اليميني لتقنية المعلومات في التعليم العالي.
				✓	ت3: تبادل المعلومات الإلكتروني مع المركز اليميني لتقنية المعلومات في التعليم العالي متوافق مع احتياجات جامعتنا.
				✓	إن توجد معلومات جامعتنا المركز اليميني لتقنية المعلومات في التعليم العالي في قاعدة بيانات موحدة يدعم عملية تبادلها.
	✓				لنحتاج لخزن معلومات جامعتنا و المركز اليميني لتقنية المعلومات في التعليم العالي في مستودع موحد للمعلومات كي يسهل من عملية الوصول إليها.
	✓				سهولة الوصول إلى قاعدة بيانات موحدة يسهل من عملية تبادل المعلومات.
				✓	إذا شئى المركز اليميني لتقنية المعلومات في التعليم العالي تكنولوجيا الحوسبة السحابية (cloud computing) يمكن تحسين العلاقة بين الجامعات الحكومية و YCIT_UE ويمكن تحسين خدمات جودة التعليم.
	✓				والحوسبة السحابية تساعد الجامعة و المركز اليميني لتقنية المعلومات في التعليم العالي على التواصل وتبادل المعلومات الخاصة بهم عبر منصة متعددة multiple platform.
	✓				وسائل الاعلام (Social media) تساعد على تبادل الآراء ومشاركة المعلومات بين موظفي الجامعات وموظفي المركز اليميني لتقنية المعلومات في التعليم العالي
	✓				وسائل الاعلام (Social media) قادرة على زيادة تبادل المعلومات بصورة أسرع من الوسائل الأخرى .
				✓	استخدام وسائل الاعلام (Social media) سوف يطور العلاقة بين موظفي الجامعات وموظفي المركز اليميني لتقنية المعلومات في التعليم العالي .

الجزء السادس: خصائص الفرد

اتفق ويشدة	اتفق	محايد	لا اوافق	لا اوافق ويشدة	
					ق1: التبادل الإلكتروني للمعلومات أقل تكلفة من التبادل الورقي للمعلومات.
1					ق2: التبادل الإلكتروني للمعلومات يوفر المعلومات بوقت أقل مقارنة بالطرق الورقية.
1					ق3: التبادل الإلكتروني للمعلومات يحسن من الخدمات الجامعية.
1					ق4: تبادل الإلكتروني للمعلومات يجعل عملية الرد أو الإجابة أسرع وأسهل.
	1				ق5: تبادل الإلكتروني للمعلومات تحسن من مستوى التواصل والاتصال مع المركز البحثي لتكثيف المعلومات في التعليم العالي.
		1			ق6: تبادل الإلكتروني للمعلومات يزيد مستوى الثقة بين موظفي جامعتنا وموظفي المركز البحثي لتكثيف المعلومات في التعليم العالي.
			1		ق7: هناك مخاطر من دقة وصحة البيانات المتبادلة إلكترونياً.
				1	ق8: هناك مخاطر من تسريب المعلومات المتبادلة بصوره الكترونياً.
				1	ق9: تيسر الأختصاص للمعلومات يقلل من عملية السيطرة والمتابعة الكاملة لها.
				1	ق10: هناك مخاطر من خسارة المعلومات أثناء تبادلها بصوره الكترونياً.
				1	ق11: تعزيز الجسور التقنية للمعلومات في التطعيم العالي طور ممارسات إدارة البيانات مع الجامعات.
				1	ق12: تعزيز الجسور التقنية مع مؤسسات في التعليم العالي وفر امتية المعلومات لتبنيها وتصحيح أخطاء التعليم.
				1	ق13: تعزيز الجسور التقنية للمعلومات في التعليم العالي وفر إمكانية الوصول إلى المعلومات المناسبة كمرتكز مع في مستوى عالمي.



Universiti Utara Malaysia

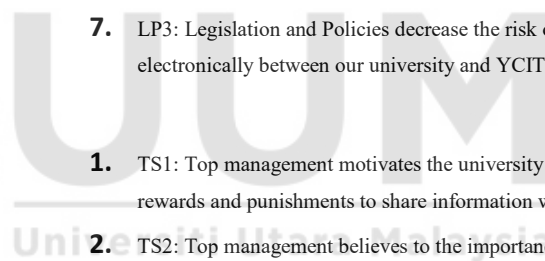
نشكركم على تعاونكم في الانتهاء من هذا الاستبيان، إذا كنتم تفضلون بان هناك أي نقطة ذات أهمية بشأن تبادل المعلومات الإلكتروني بين جامعتكم ووزارة التعليم العالي فإن هذا الدراسة قد نُشرت في نشرها، فلا تتردد في نشرها ويمكنك كتابتها أماناً.

أيه سيطرة السجل العالي على طابعه ككيفية التواصل بين
 المهتمين بالمعلومات VCIIT كونهما استبدالاً للتميز وحرصاً على التعامل مع الأنظمة
 المتعددة على مستوى الأقسام والهيئات من أجل توفير بيئة أكاديمية لإدارة
 وجودها المتنوع والمتنامي بين الجامعات مما يجعلها كلها تلعب دوراً هاماً في تطويرها
 يتبع سياسة حاسوبية واهتماماً ووجهة نظر واضحة فقط -
 ولتعزيز أن يقوم المركز بخدمة طابقتها وفرضها بالأنظمة التي تساهم في
 لأنها تقوم بالسيطرة عليها، ليتمكن من قراراتها وسياساتها بل والربح
 مع وأهم نسبة منه رسوم الطلاب من كل الأنظمة المقدمة للجامعات مع أنها
 بأهم نسبة من رسومها من رسوم محددة مسبقاً وتنفذ عليها
 وهذا يزيد من إيراداتها من العمل وعرف مسار العمل الأكاديمي واستقلاليته

Table 4.3

Constructs in The Conceptual Model

Construct	Survey item
External Environment layer	<ol style="list-style-type: none"> 1. UL1: Ministry of Higher Education requests that our university sahere share information electronically with YCIT-HE. 2. UL2: Ministry of Higher Education recommends that our university sahere share information electronically with YCIT-HE. 3. UL3: Ministry of Higher Education provides information regarding the advantages and disadvantages of sharing information. 4. UL4: Ministry of Higher Education influences our decision to participate/not participate in electronic information sharing with YCIT-HE. 5. LP1:Our university needs to have legislation and policies to organize electronic information sharing with YCIT-HE. 6. LP2:Legislation and policies build good relationships and trust among our staff and YCIT-HE staff. 7. LP3: Legislation and Policies decrease the risk of sharing information electronically between our university and YCIT-HE.
Organizational Layer	<ol style="list-style-type: none"> 1. TS1: Top management motivates the university staff by incentives or rewards and punishments to share information with YCIT-HE. 2. TS2: Top management believes to the importance of to share the university's information electronically with YCIT-HE . 3. TS3:Top manger considers sharing information electronically with YCIT-HE important to our university. 4. TS4: University top manager has no role to support the electronic information sharing with YCIT-HE. 5. Fc1: Our University has enough financial power to develop the information sharing system. 6. Fc2: Our University has enough financial power to integrate the system with YCIT-HE. 7. Fc3: Our university has enough financial power to mintienece the system with YCIT-HE. 8. Fc4: Our university has enough financial support to train our employees for participating in the information sharing. 9. TR1: Our university and YCIT-HE have a high level of mutual trust. 10. TR2: YCIT-HE should protect universities staff when they shared information electronically to increase their trust in sharing. 11. TR3: Trust between the university and YCITT-HE increase the participation and collaboration.



Technological layer

12. TR4: The trust between the university and YCIT-HE staffs give positive impression.
1. IT1: The university needs information systems applications and good technical support.
2. IT2: The university needs good telecommunications infrastructure.
3. IT3: The administrative staff need good computer knowledge and understanding.
4. IT4: The Electronic information sharing project requires understanding of hardware, software and IT skills.
5. IQ1: The information quality increases the trust and collaboration between universities staff and YCIT-HE staff.
6. IQ2: Information quality enhances the relationship among universities staff and YCIT-HE staff.
7. IQ3: Information quality reduces the quality service between university staff and YCIT-HE staff.
8. IQ4: Information in the university has the quality to be shared with YCIT-HE.
9. ITC1: Information sharing with YCIT-HE is compatible with our university existing information systems and/or other electronic applications.
10. ITC2: Our university has the same data standards as YCIT-HE for information sharing.
11. ITC3: Telecommunication infrastructure and database in the university are different than in YCIT-HE.
12. ITC4: Electronic information sharing with YCIT-HE conflicts with our university's needs.
13. CC1: The University need to share information by sharing our databases with YCIT-HE.
14. CC2: Save the university information and the YCIT-HE information in one repository to support the information sharing.
15. CC3: Need to store our university information with YCIT-HE's information in one data repository to be accessible.
16. CC4: Accessibility of access database and information sharing, is complicated and cause conflict.
17. Sm1: Social media help exchange opinions, and sharing information between staff in the university and YCIT-HE.
18. Sm2: Social media provides employees accessibility for information between the university and YCIT-HE.
19. Sm3: Social media enable increased information sharing, at a more rapid pace.

individual layer

1. BE1: Electronic information sharing less cost paper sharing.
 2. BE2: Electronic information sharing provides information timeliness.
 3. BE3: Electronic information sharing improves university services.
-

-
4. BE4: Electronic information sharing makes the answering and responding fast and easier.
 5. BE5: Electronic information sharing improves connection and interaction with YCIT-HE
 6. BE6: Electronic information sharing improves the trust between staffs in University and YCIT-HE.
 7. IS1: YCIT-HE needs improving data management practices with Our University.
 8. IS2: The university is adopting data standards, standard formats and information quality
 9. IS3: YCIT-HE needs to provide accessibility of information suitable with all managerial level
-



























