

**DEVELOPMENT OF IMPLEMENTATION MODELS FOR HOSPITAL
INFORMATION SYSTEM (HIS) IN MALAYSIAN PUBLIC HOSPITALS**

NURUL IZZATTY BINTI ISMAIL

**A thesis submitted in
fulfilment of the requirement for the award of the
Doctor of Philosophy in Technology Management by Research**

**Faculty of Technology Management and Business
Universiti Tun Hussein Onn Malaysia**

SEPTEMBER 2016

DEDICATION

I dedicated my work to my beloved husband, Wazli..

My beloved mother, Norrisah..

My beloved grandmother, Hajah Fatimah..

My brother, Faizul, and all my families,

Without them, I would not go this far.

Thanks for your love, caring, understanding and huge support.

I love you all till '*Jannah*'.



PTTA UTHM
PERPUSTAKAAN TUN AMINAH

ACKNOWLEDGEMENT

All praises is only for ALLAH the Most Merciful and the Highest, thank you, ALLAH. I am grateful to my supervisor who guides me sincerely through this entire doctoral journey, Ass. Prof. Dr. Nor Hazana Abdullah for her endless support, guidance and motivation. I also would like to express my grateful to my co-supervisor who guides me to this journey, Ass. Prof. Dr. Alina Shamsuddin. I would like to appreciate Dr. Nor Aziaty and Dr. Roshartini for their helps in my research. Thank you for all of you.

I would like to thank you to organizations and persons participated throughout this research, Hospital Sultan Ismail, Hospital Keningau, Hospital Tuanku Ja'afar, Hospital Tuanku Zahirah, Hospital Lahad Datu and Hospital Kepala Batas. Thank you for the cooperation. I also shows my grateful to Ministry of Health Malaysia who approved my research to be done in public hospitals.

I would also like to thankful to my colleagues, Bari'ah, Nor Fazira , Noor Juliana, Emrozio, Farhana and Farhaini who have shared their knowledge throughout this journey. Not to be forgotten, to those who have helped me directly and indirectly in this journey, especially my whole families; grandmother, uncles and aunties for their support to go this far. I know, without them, I might lost my way and helpless.

ABSTRACT

Studies have shown that Hospital Information System (HIS) implementation improve hospital's management and activities in terms of cost and time reductions. However, there are only 15.2% out of 138 Malaysian Public Hospitals implemented HIS. Literatures have further highlighted various issues and challenges with regards to its implementation. Therefore, this study aimed to explore the implementation of THIS, IHIS and BHIS's hospitals as well as factors affecting them. This study employed a mixed methods approach to answer the research objectives. In the first phase of this study, semi-structured interviews were conducted with nine participants consisted of the hospital directors, Information Technology officers and HIS users. It is found that THIS's hospital implementation phases differed from IHIS and BHIS's hospitals, while IHIS and BHIS's hospitals have similar phases based on Business Interaction Phases of Business Action Theory. Human context was discovered to play important roles in the HIS implementation. A survey was conducted in the second phase of this study among HIS users at different categories of HIS's hospitals. Two hundred and twenty-nine questionnaires were returned to yield a response rate of 45.8%. Based on ANOVA findings, factors affecting THIS implementation were significantly different from those in IHIS and BHIS's hospitals. There was no significance different between IHIS and BHIS's hospitals. There are three major contributions of this study: 1) Distinctive implementation phases for THIS hospital and IHIS-BHIS hospital were discovered for HIS implementation. 2) New models of HIS implementation which highlight the Human context were proposed, and 3) Different factors were found to affect HIS implementation at different types of HIS's hospitals.

ABSTRAK

Kajian menunjukkan bahawa pelaksanaan Hospital Information System (HIS) telah meningkatkan mutu pengurusan dan aktiviti hospital khususnya di dalam perbelanjaan dan pengurangan masa. Walau bagaimanapun, hanya 15.2% daripada 138 buah Hospital Awam di Malaysia melaksanakan HIS. Kajian literatur menekankan pelbagai isu dan cabaran berhubung pelaksanaannya. Oleh itu, kajian ini bertujuan untuk meneroka pelaksanaan hospital THIS, IHIS dan BHIS serta faktor-faktor yang mempengaruhinya. Kajian ini menggunakan *mixed method* untuk menjawab objektif kajian. Dalam fasa pertama kajian ini, temuramah separa berstruktur telah dijalankan dengan sembilan orang peserta kajian dari kalangan pengarah hospital, pegawai Teknologi Maklumat dan pengguna HIS. Kajian mendapati fasa pelaksanaan hospital THIS berbeza dari hospital IHIS dan BHIS, manakala hospital IHIS dan BHIS mempunyai fasa yang sama. Konteks Kemanusiaan merupakan peranan yang penting dalam pelaksanaan HIS. Tinjauan dari borang kaji selidik telah dijalankan dalam fasa kedua kajian ini melibatkan pengguna HIS di kalangan kategori hospital HIS yang berbeza. Dua ratus dan dua puluh sembilan soal selidik bersamaan dengan 45.8% telah dikembalikan. Berdasarkan dapatan ANOVA, faktor mempengaruhi pelaksanaan THIS perbezaan signifikan dengan hospital IHIS dan BHIS. Tiada perbezaan signifikan di antara hospital IHIS dan BHIS. Terdapat tiga penemuan utama kajian ini: 1) Fasa-fasa pelaksanaan HIS yang berbeza di hospital THIS dan hospital IHIS-BHIS telah ditemui, 2) Model-model baru pelaksanaan HIS yang menekankan konteks Kemanusiaan telah dikemukakan, dan 3) Faktor-faktor yang berbeza menjejaskan pelaksanaan HIS di kategori-kategori hospital HIS yang berbeza.

CONTENT

DEDICATION	vi
ACKNOWLEDGEMENT	vii
ABSTRACT	viii
ABSTRAK	ix
CONTENT	x
LIST OF TABLES	xvii
LIST OF FIGURES	xxi
LIST OF SYMBOLS AND ABBREVIATION	xxiii
LIST OF APPENDICES	xxiv
CHAPTER1 INTRODUCTION	1
1.0 Introduction	1
1.1 Healthcare Background in Malaysia	2
1.2 Problem Statement	2
1.3 Research Questions	4
1.4 Research Objectives	4
1.5 Significance of the Study	5
1.6 Scope of the Study	5
1.7 Operational Definition	6
1.8 Structure of the Thesis	7
CHAPTER 2 LITERATURE REVIEW	9
2.0 Introduction	10
2.1 Healthcare in Malaysia	10
2.1.1 Malaysian Public Hospitals	12
2.2 Healthcare Services and Transformation in Malaysia	15
2.3 Hospital Information System (HIS)	18

2.3.1	Components of Hospital Information System (HIS)	19
2.4	Development of Hospital Information System (HIS)	21
2.5	Hospital Information System (HIS) Implementation Phases	23
2.5.1	Hospital Information System (HIS) Implementation in Malaysia	26
2.6	Benefits of Hospital Information System (HIS) Implementation	28
2.7	Issues and Challenges of Hospital Information System (HIS) Implementation	29
2.8	Models/Theories	33
2.8.1	Theories Related to Implementation Phases	33
2.8.1.1	Business Action Theory (BAT): A Phase Model	33
2.8.1.2	Systems Development Life Cycle (SDLC)	36
2.8.2	Technology Acceptance or Adoption Theories	37
2.8.2.1	Theory of Reasoned Action (TRA)	37
2.8.2.2	Theory of Planned Behaviour (TPB)	40
2.8.2.3	Technology Acceptance Model (TAM)	42
2.8.2.4	Technology, Organisational and Environmental (TOE) Framework	45
2.8.2.5	DeLone and McLean IS Success Model	46
2.8.2.6	Unified Theory of Acceptance and Use of Technology (UTAUT)	48
2.8.2.7	HOT-Fit Model	50
2.8.2.8	Innovation of Diffusion Theory	53
2.8.3	Theory Adopted for HIS Implementation Phases	55
2.8.4	Theories Adopted in HIS Acceptance	56
2.9	Previous Studies in Hospital Information System (HIS) in Malaysia	58
2.10	Theoretical Framework	66
2.11	Chapter Summary	67

CHAPTER 3 METHODOLOGY	69
3.0 Introduction	69
3.1 Research Methodology	69
3.1.1 The Nested Table Approach	70
3.1.2 The Research Onion	71
3.1.2.1 Research Philosophies	72
3.1.2.2 Research Approach	75
3.1.2.3 Research Strategy	75
3.1.2.4 Research Choices	76
3.1.2.5 Time Horizons	77
3.1.2.6 Technique and Procedure	77
3.2 Mixed Methods Approach	79
3.3 MOH Procedures for Research	80
3.4 First Phase: Qualitative Research	81
3.4.1 Research Strategy in Qualitative Study	82
3.4.2 Case Study Protocol	83
3.4.3 Data Collection in Qualitative Study	84
3.4.4 Population and Target Population in Qualitative Study	85
3.4.5 Research Site in Qualitative Study	86
3.4.6 Type of Research Sampling in Qualitative Study	86
3.4.7 Background of Participants	86
3.4.8 Research Sampling in Qualitative Study	87
3.4.9 Qualitative Research Instrument	87
3.4.10 Qualitative Ethics	88
3.4.11 Interview Preparation Stages	88
3.4.12 Interview Phases	90
3.4.13 Data Validity in Qualitative Study	90
3.4.14 Reliability in Qualitative Study	91
3.5 Qualitative Data Analysis	92
3.5.1 Content Analysis	92
3.5.2 Within-Case Analysis	95
3.5.3 Cross-Case Analysis	95
3.6 Phase 2: Quantitative Research	95

3.6.1	Research Strategy in Quantitative Study	96
3.6.2	Data Collection in Quantitative Study	96
3.6.3	Research Instrument in Quantitative Study	96
3.6.4	Research Population in Quantitative Study	99
3.6.5	Research Site in Quantitative Study	99
3.6.6	Type of Research Sampling in Quantitative Study	99
3.6.7	Pre-Test	100
3.6.8	Data Validity in Quantitative Study	100
3.6.9	Reliability in Quantitative Study	101
3.6.10	Survey Preparation Stages	102
3.7	Quantitative Data Analysis	103
3.7.1	Data Cleaning	103
3.7.2	Data Transformation	104
3.7.3	Testing Assumptions	104
	3.7.3.1 Normality Test	104
	3.7.3.2 Levene's Test of Homogeneity Variance	105
	3.7.3.3 Data Analysis Strategy	106
	3.7.3.4 Parametric Test	107
3.8	Conclusion	107
CHAPTER 4 QUALITATIVE FINDINGS		109
4.0	Introduction	109
4.1	Criteria For Participants in Interview	109
4.2	Case Study 1: Hospital A (THIS)	110
	4.2.1 Case Study 1: Hospital A (THIS)	110
	4.2.1 Case Study 1: Hospital A (THIS) Background	110
	4.2.2 Case Study 1: Participants Involved in Hospital A	111
4.3	Within Case Analysis: Hospital A (THIS)	112
	4.3.1 Explore of HIS Implementation Phases at THIS's Hospital (Hospital A)	113
	4.3.2 Explore Factors Affecting HIS Implementation at THIS's Hospitals (Hospital A)	125
4.4	Case Study 2: Hospital B (IHIS)	143

4.4.1	Case Study 2: Hospital B (IHIS) Background	143
4.4.2	Case Study 2: Participants Involved in Hospital B	143
4.5	Within Case Analysis: Hospital B (IHIS)	144
4.5.1	Explore of HIS Implementation at IHIS's Hospital (Hospital B)	145
4.5.2	Explore Factors Affecting HIS Implementation at IHIS's Hospital (Hospital B)	158
4.6	Case Study 3: Hospital C (BHIS)	172
4.6.1	Case Study 3: Hospital C (BHIS) Background	172
4.7	Within Case Analysis: Hospital C (BHIS)	173
4.7.1	Explore of HIS Implementation at BHIS's Hospital (Hospital C)	174
4.7.2	Explore Factors Affecting HIS Implementation at BHIS's Hospital (Hospital C)	184
4.8	Cross-Case Analysis	195
4.8.1	To explore HIS implementation among THIS, IHIS and BHIS's hospitals.	195
4.8.1.1	HIS Prerequisites Phase	197
4.8.1.2	Exposure and Contact Search Phase	198
4.8.1.3	Contact Establishment and Proposal Phase	198
4.8.1.4	Fulfilment Phase	198
4.8.1.5	Completion Phase	202
4.8.2	To explore factors affecting HIS implementation of THIS, IHIS and BHIS's hospitals	206
4.8.2.1	Factors Affecting THIS, IHIS and BHIS's Hospital in Technological Context	208
4.8.2.2	Factors Affecting THIS, IHIS and BHIS's Hospital in Organisational Context	208
4.8.2.3	Factors Affecting THIS, IHIS and BHIS's Hospital in Environmental Context	209
4.8.2.4	Factors Affecting THIS, IHIS and BHIS's Hospital in Human Context	210

4.9	Discussions in Qualitative Findings	212
4.10	Chapter Summary	213

CHAPTER 5 QUANTITATIVE FINDINGS **215**

5.0	Introduction	215
5.1	Demographic Data of Respondents	216
5.1.1	Gender	216
5.1.2	Age	217
5.1.3	Ethnicity	217
5.1.4	Highest Education Level	218
5.1.5	Position	219
5.1.6	Work Experience	221
5.1.7	Department Involved	223
5.1.8	Computer Training	224
5.2	ANOVA	225
5.2.1	Post-Hoc Test	226
5.2.1.1	Technological Contexts	228
5.2.1.2	Organisational Contexts	230
5.2.1.3	Environmental Contexts	231
5.2.1.4	Human Contexts	232
5.2.3	Hypothesis	234
5.2.4	Size Effect	234
5.5	Discussions	235
5.6	Chapter Summary	236

CHAPTER 6 DISCUSSIONS **237**

6.0	Introduction	237
6.1	Objective 1: To Explore the HIS Implementation at THIS, IHIS and BHIS's Hospitals	237
6.1.1	HIS Implementation Phases at THIS, IHIS and BHIS's Hospitals	238
6.1.2	Activities in HIS Implementation Phase at THIS, IHIS and BHIS's Hospitals	239
6.1.3	Important Bodies Involved in HIS Implementation	

	at THIS, IHIS and BHIS's Hospitals	241
6.2	Objective 2: To Explore Factors Affecting HIS Implementation at THIS, IHIS and BHIS Hospitals	242
6.2.1	Importance of Human Context in HIS Implementation at THIS, IHIS and BHIS's Hospitals	246
6.2.2	THIS Implementation Model	248
6.2.3	IHIS/BHIS Implementation Model	252
6.3	Objective 3: To Test the HIS Implementation Models at Different Categories of HIS's Hospitals	255
6.4	Chapter Summary	256
CHAPTER 7 CONCLUSION AND RECOMMENATIONS		258
7.0	Introduction	258
7.1	Research Contributions	258
7.2	Research Implications	259
7.2.1	Implication to Researchers	259
7.2.2	Implication to Ministry of Health (MOH)	260
7.2.3	Implication to Malaysian Public Hospitals	261
7.3	Limitation of the Study	261
7.4	Conclusion	262
7.5	Recommendations	263
REFERENCE		264
APPENDICES		297
VITA		351

LIST OF TABLE

Table 2.1	Total Number of Patient Admissions (Adapted from Health Informatics Centre, MoH, 2013)	10
Table 2.2:	Bed Occupancy Rate (BOR) and Total Patient Days (TOD) (Adapted from Health Informatics Centre, MoH, 2013)	11
Table 2.3:	Categories and Lists of Malaysian Public Hospitals (Adapted from Health Informatics Centre, MoH, 2012)	13
Table 2.4:	Strategic Reform Initiatives (SRIs) and National Key Economic Areas (NKEAs)	16
Table 2.5:	Key Research Areas (KRAs) for Health Sector	18
Table 2.6:	Differences of HIS Components	20
Table 2.7:	The components of HIS in Malaysia	21
Table 2.8:	Categories of HIS in Malaysia	27
Table 2.9:	HIS Benefits and Issues of HIS Implementation	32
Table 2.10:	Business Process (1996) and Business Interaction (1998) (Adapted by Goldkuhl, 1998)	34
Table 2.11:	TRA Variables	38
Table 2.12:	Variables of Theory of Planned Behaviour (TPB)	41
Table 2.13:	Variables of Technology Acceptance Model (TAM)	44
Table 2.14:	Variables of TOE Framework	46
Table 2.15:	Variables of DeLone and McLean IS Success Model	47
Table 2.16	Variable in UTAUT	49
Table 2.17:	Examples of Evaluation Measures of the Proposed HOT-Fit Framework	52
Table 2.18:	Variables of Innovation of Diffusion Theory	55

Table 2.19:	Variables Affecting HIS Implementation Based on Acceptance Theories and Literatures	56
Table 2.20:	Previous Studies on HIS	59
Table 2.21:	Previous Studies of Factors Affecting HIS Implementation	62
Table 2.22:	The Previous Studies Based on the Contexts of Technological, Environmental and Human Contexts	66
Table 3.1:	Procedures and Elements of the Research Onion	72
Table 3.2:	Research Philosophies (adapted from Saunders <i>et al.</i> , 2008)	73
Table 3.3:	Differences of Deduction and Induction (adapted from Saunders <i>et al.</i> , 2009)	75
Table 3.4:	Result of Preliminary Interviews	89
Table 3.5:	Qualitative Codings (adapted from Neuman, 2012)	92
Table 3.6:	Descriptions of Measurements for Quantitative Study	97
Table 3.7:	Measurements of Questionnaires	98
Table 3.8:	Returned Questionnaires in Each Categories of HIS's Hospitals	100
Table 3.9:	Cronbach's Alpha Coefficient for Pilot Test Study (adapted by George and Mallery, 2003)	102
Table 3.10:	Pilot Test: Cronbach's Alpha Result	102
Table 3.11:	Test of Normality	105
Table 3.12:	Test of Homogeneity of Variance	106
Table 4.1:	Participants at Hospital A	112
Table 4.2:	THIS Components and Descriptions	119
Table 4.3:	Participants at Hospital B	145
Table 4.4:	IHIS Components and Descriptions	153
Table 4.5:	Participants at Hospital C	173
Table 4.6:	BHIS Components and Descriptions	180
Table 4.7:	Participants Responded on HIS Implementation Phases	196
Table 4.8:	Vendor for Human Resource, Billing and Imaging in THIS's Hospital	197
Table 4.9:	The HIS Components and Their Percentages of THIS, IHIS and BHIS's Hospitals	200
Table 4.10:	HIS Implementation Phases at THIS, IHIS and BHIS's hospitals	203
Table 4.11:	The Activities in HIS Implementation Phases at THIS Hospital	204

Table 4.12:	The Activities in HIS Implementation Phases at IHIS and BHIS Hospitals	205
Table 4.13:	The Factors Affecting of HIS Implementation among THIS, IHIS and BHIS's Hospitals	207
Table 5.1:	Gender of Respondents Among THIS, IHIS, and BHIS's Hospitals	216
Table 5.2:	Age of Respondents in THIS, IHIS, and BHIS's Hospitals	217
Table 5.3:	Ethnicity of Respondents in THIS, IHIS, and BHIS's Hospitals	218
Table 5.4:	Highest Academic Qualification of Respondents in THIS, IHIS and BHIS's Hospitals	219
Table 5.5:	Working Position of Participants in THIS, IHIS and BHIS's Hospitals	220
Table 5.6:	Working Experience of Respondents in THIS, IHIS and BHIS's Hospitals	221
Table 5.7:	Working Department of Respondents in THIS, IHIS and BHIS's Hospitals	223
Table 5.8:	Computer Training Attended Yearly in THIS, IHIS and BHIS's Hospitals	224
Table 5.9:	Differences of Technological, Organisational, Environmental and Human Contexts	226
Table 5.10:	Differences of THIS, IHIS and BHIS's Hospitals By Technological, Organisational, Environmental and Human Contexts	227
Table 5.11:	Factors Affecting HIS Implementation under Technological Context at Different Categories of HIS's Hospitals	229
Table 5.12:	Factors Affecting HIS Implementation under Organisational Context at Different Categories of HIS's Hospitals	231
Table 5.13:	Factors Affecting HIS Implementation under Environmental Context at Different Categories of HIS's Hospitals	232
Table 5.14:	Factors Affecting HIS Implementation under Human Context at Different Categories of HIS's Hospitals	233
Table 5.15:	User Fulfilment under Human Context at Different Categories of HIS's Hospitals	233

Table 5.16:	Eta-Squared of Technological, Human and Organisational Contexts	235
Table 6.1:	The Activities in HIS Implementation Phases	240
Table 6.2:	The Descriptions of THIS Implementation Model	252
Table 6.3:	The Description of THIS and IHIS Implementation Model	255



LIST OF FIGURE

Figure 2.1:	Four Pillars of National Transformation (Adapted from National Economic Advisory Council, 2010)	15
Figure 2.2:	Strategies to a Quality Healthcare & Active Healthy Lifestyle	17
Figure 2.3:	Components in Hospital Information System (HIS) (adapted from Biomedical Informatics Ltd., 2006)	19
Figure 2.4:	Business Action Theory: A Phase Model (adapted by Goldkuhl, 1998)	35
Figure 2.5:	Theory of Reasoned Action (Fishbein & Ajzen, 1975)	38
Figure 2.6:	Theory of Planned Behaviour (TPB) adapted from Ajzen (1985)	41
Figure 2.7:	Technology Acceptance Model (TAM) adapted from Davis (1986)	43
Figure 2.8	Technological-Organizational-Environmental Framework (TOE) adapted from Tornatzky and Fleischer (1990)	45
Figure 2.9:	DeLone and McLean IS Success Model (DeLone & McLean, 1992)	47
Figure 2.10:	Unified Theory of Acceptance and Use of Technology Model (UTAUT) adapted from Venkatesh et al. (2003)	49
Figure 2.11:	HOT-fit Model (Adapted from Yusuf <i>et al.</i> , 2008)	51
Figure 2.12:	Rogers' Innovation Diffusion Theory Curve (adapted from Rogers, 1995)	53
Figure 2.13:	Diffusion of Innovation Model (adapted from Rogers, 1995)	54
Figure 2.14:	Theoretical Framework of HIS in Malaysian public hospitals	65
Figure 3.1:	The Nested Approach (adapted by Kagioglou et al., 2000)	70

Figure 3.2:	The Research Onion (adapted by Saunders <i>et al.</i> , 2008)	71
Figure 3.3:	Exploratory Sequential Design (Adapted from Creswell, 2012)	79
Figure 3.4:	The Interview Sources Uploaded into the NVivo	93
Figure 3.5:	Nodes created in NVivo	93
Figure 3.6:	Data coded inNvivo	94
Figure 4.1:	Percentage of HIS Components of THIS, IHIS and BHIS's Hospitals	201
Figure 4.2:	The Types of HIS and Affected Factors to HIS Implementation	211
Figure 6.1:	Diagram of THIS and IHIS/BHIS Implementation Phases	238
Figure 6.2:	THIS Implementation Model	251
Figure 6.3:	IHIS Implementation Model	254



LIST OF SYMBOL AND ABBREVIATION

η^2	-Eta-Squared
BCS	-Business Continuity System
HIS	-Hospital Information System
BHIS	-Basic Hospital Information System
IHIS	-Intermediate Hospital Information System
IS	-Information System
MOH	-Ministry of Health
NMRR	-National Medical Research Register
THIS	-Total Hospital Information System
UTHM	-Universiti Tun Hussein Onn Malaysia



LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Interview Guide	297
B	Consent Letter	298
C	Approval Letter	318
D	Interview Data	321
E	SPSS Result-Factor Analysis	332
F	SPSS Result-Normality Data (Graphical)	331
G	Survey Form	343



CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter begins with a general overview on healthcare sector in Malaysia. It includes a problem statement, research questions, research objectives, significance of study, scope of study and operational definitions. The structure of the thesis is also presented at the end of this chapter.

In this study, Hospital Information System (HIS) is seen as an important national agenda in the Malaysian healthcare system. Thus, an implementable model of HIS needs to be developed to ensure that the HIS can be successfully executed in the near future. Accordingly, this study focuses on the development of an implementation model for HIS in Malaysian public hospitals.

1.1 Healthcare Background in Malaysia

Healthcare sector remains a significant indicator of quality of life of a nation. Therefore, each country continuously striving to improve their healthcare sector by enhancing the healthcare management, services and treatments.

In Malaysia, the healthcare sector is divided into three (3) categories which are public healthcare, Non-Governmental Organisation (NGO) healthcare and private healthcare (Ministry of Health, 2011; Rasiyah, 2011). Under each category, there are hospitals and clinics. Public hospitals and clinics are administered by Malaysian Ministry of Health (MOH) to serve the public, while the NGO hospitals such as Hospital Universiti Kebangsaan Malaysia and Hospital Universiti Sains Malaysia are administered by universities to serve the university students and staff. The private hospitals and clinics, however, are administered by private bodies such as Pantai Holdings Berhad. Evidently, the public healthcare is the most important healthcare category in Malaysia because it has the largest number of hospitals and patients.

Improving national healthcare has been always a priority agenda since 6th Malaysian Plan (MP) but only in the 10th MP, the Malaysian Government launced several initiatives under Ministry of Health (MOH) to enhance Information Technology (IT) applications in public hospitals. Such initiatives are to ensure that public hospital services become faster, manageable and efficient, for example by implementing Hospital Information System (HIS) in Malaysian public hospitals. Therefore, this study focused on issues related to HIS implementation among public HIS's hospitals.

1.2 Problem Statement

Even though the Malaysian Government has played an important role to support the Public Healthcare especially the public hospitals, there are several pressing issues. Most of these issues are about the services provided by the hospitals.

According to Saari (2007) and Wee & Jomo (2007), the government hospital services are slow and inefficient where the patients need to wait for a long time to get their medical treatments. Pillay *et al.* (2011) claimed that the average waiting time from registration to getting the prescription slip is more than two hours in his study at Malaysian public hospitals.

Moreover, according to Ministry of Health (2012), the average negligence cases reported by the medical staffs are between five to eight cases a month and the number of negligence cases which reportedly in public hospitals in year 2000 to 2008 has increased

to 144 cases with 61.9% from the total cases are brought to court (Ministry of Health, 2012). In addition, public hospitals faced with increasing cost of healthcare expense every year in Malaysia (Ahmadi *et al.*, 2015). For example, RM 6,348,632.28 was spent on compensation cost for medical negligence cases from year 2000 to May 2009 (Bernama, 2009). Root cause of these cases often arises from large numbers of patients to be nursed at once and administrative tasks. The implementation of HIS is aimed to reduce these common management problems in public hospitals. Therefore, Malaysian Government has enhanced the healthcare quality and reduce the cost (Lee & Ramayah, 2012).

However, HIS implementation is not encouraging in where level of adoption of HIS is only 60% to 78% worldwide (Hsiao & Hing, 2012, Artmann *et al.*, 2010). This might be caused by different phases of HIS implementation in different categories of Hospital (Houser, 1984; Rossi *et al.*, 2009). According to Malaysian Ministry of Health (2012), only 21 out of 138 or 15.2% of Malaysian Public Hospitals has implemented HIS. From 21 public hospitals that had implemented HIS, 7.8% is categorized as THIS, 1.4% as IHIS and 7.2% as BHIS.

Conversely, several factors have been claimed to influence HIS implementation for example high initial cost (Boonstra & Broekhuis, 2010; Smelcer *et al.*, 2009), high initial physician time (Smelcer *et al.*, 2009; Ganesh & Al-Mujaini, 2009), technology and technical matters (Boonstra & Broekhuis, 2010), lack of skills (Boonstra & Broekhuis, 2010) and ethical issues (Boonstra & Broekhuis, 2010; McKenzie & Kelly, 2002).

Similarly, Ahmadi *et al.* (2015) and Sulaiman & Wickramasighe (2014) found various factors affecting HIS implementation which could be delineated under the contexts of Technology, Organisation and Environment as proposed by TOE Framework (Tornatzky & Fleischer, 1990). Majority of these studies focused on THIS hospitals alone whereby existence of other factors unique to different categories of HIS could not be unearthed. In addition, most of these studies are quantitative in nature.

Moreover, there are limited empirical studies on HIS in Malaysia. Most of these empirical studies only focused on implementation of THIS alone (Abdul Hamid, 2010; Ibrahim, 2007; Ismail *et al.*, 2010; Abdullah, 2012; Mohd. Yusof *et al.*, 2008; Hassan,

2012; Fadhil *et al.*, 2012; Ismail & Ali, 2013; Mohd Amin *et al.*, 2011; Mohamad Yunus *et al.*, 2013), while others focused on Electronic Medical Records (EMR) since it was synonym with the HIS (Mohd & Syed Mohamad, 2005; Syed Mohamad *et al.*, 2008; Nik Ariffin *et al.*, 2010). None has studied the implementation of HIS in different categories of HIS in public hospitals. Lack of such study would limit our understanding on how to encourage HIS implementation in Malaysian Public Hospitals. This is because, most studies discuss HIS for one specific HIS category without integration and combination other categories of HIS.

1.3 Research Questions

The above of problem statements have led to three research questions as follows:

- (i) RQ1: How is HIS being implemented at THIS, IHIS and BHIS's hospitals?
- (ii) RQ2: What are factors affecting the HIS implementation at THIS, IHIS and BHIS's hospitals?
- (iii) RQ3: Is HIS implementation model similar across different categories of HIS's hospitals?

1.4 Research Objectives

Based on the research questions above, three research objectives have been formulated as follows:

- (i) RO1: To explore HIS implementation at THIS, IHIS and BHIS's hospitals.
- (ii) RO2: To explore factors affecting HIS implementation at THIS, IHIS and BHIS's hospitals.
- (iii) RO3: To test HIS implementation model across different categories of HIS's hospitals.

REFERENCE

- Aaronson, J., Murphy-Cullen, C., Chop, W., & Frey, R. (2001). Electronic medical records: the family practice resident perspective. *Family Medicine-Kansas City*, 33(2), 128-132.
- Abdul Hamid, N. (2010). Accessibility Hospital Information System – Malaysian Experience. In *30th International Seminar for Public Health Group (PHG) of the Union of International Architectes (UIA)*.
- Abdullah, Z. (2012). Hospital Information Systems Implementation: Testing a Structural Model. In *8th International Conference of Information Science and Digital Content Technology (ICIDT)*, (74-81).
- Abouzahra, M. (2014) Clinical Decision Support Systems Continuance: Integrating Physicians' Professional Identity with Delone &McLean IS Success Model. In *SIGHCI 2014 Proceedings*, (Paper 7).
- Akca, Y., & Ozer, G. (2014). Diffusion of Innovation Theory and Animplementation on Enterprise Resource Planning Systems. *International Journal of Business and Management*, 9(4), p92.
- Adams, D., Nelson, R., & Todd, P. (1992). Perceived usefulness, ease of use, and usage of information technology: a replication. *MIS Quarterly*, 227-247.
- Agourram, H. & Talet, An. (2006). The Evaluation of Information Systems Success: a new perspective. In *6th Global Conference on Business and Economics*, October 15-17, Gutman Conference Centre, USA.
- Ahmadian, L., Nejad, S. S., & Khajouei, R. (2015). Evaluation methods used on health information systems (HISs) in Iran and the effects of HISs on Iranian healthcare: A systematic review. *International journal of medical informatics*, 84(6), 444-453.
- Ahmadi, H., Ibrahim, O., Thrusamy, R., Mun, W., Mojtaba, A., Jafakarimi, H., & Almaee, A. (2015). Exploring Potential Factors in Total Hospital Information

System Adoption. *Journal Of Soft Computing And Desicion Support Systems*, 2(1), 52-59.

Ahmadi, H., Nilashi, M., & Ibrahim, O. (2015). Organisational decision to adopt hospital information system: An empirical investigation in the case of Malaysian public hospitals. *International Journal Of Medical Informatics*, 84(3), 166-188. doi:10.1016/j.ijmedinf.2014.12.004.

Ahmadi, M., Rezaei, H., & Shahmoradi, L. (2008). Electronic health record: structure, content, and evaluation. *Tehran: Jafari Publication*, 4-8.

Ajzen, I. (1985). *From intentions to actions: A theory of planned behaviour* (pp. 11-39). Springer Berlin Heidelberg.

Ajzen I. (1989) *Attitude structure and behavior*. In *Attitudes Structure and Function*. (Edited by Pratkanis AR, Breckler SJ and Greenwald AG), pp. 241-274. Erlbaum, Hillsdale, New Jersey, USA.

Ajzen, I. (1991). The theory of planned behavior. *Organisational behavior and human decision processes*, 50(2), 179-211.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*, 52, 27-58.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Akbar, F. (2013, October 21). *What affects students acceptance and use of technology?*. Retrieved from Dietrich College Honors Theses.: <http://repository.cmd.edu/hsshonors/179>

Al-Ajam, A. S., & Nor, K. M. (2013). Influencing factors on behavioral intention to adopt Internet banking service. *World Applied Sciences Journal*, 22(11), 1652-1656.

Albarq, A. N., & Alsughayir, A. (2013). Examining theory of reasoned action in internet banking using SEM among Saudi consumers. *International Journal of Marketing Practices*, 1(1), 16-30.

Aldosari, B. (2014). Rates, levels, and determinants of electronic health record system adoption: A study of hospitals in Riyadh, Saudi Arabia. *International journal of medical informatics*, 83(5), 330-342.

- Al-Hakim, L. (2007). IDEF3-based framework for web-based hospital information system. *IRM Press (IGI Global)*.
- Alharbi, S., & Drew, S. (2014). Using the technology acceptance model in understanding academics' behavioural intention to use learning management systems. *learning*, 5(1), 143-155.
- Aliaga, M., & Gunderson, B. (1999). Interactive statistics. *Prentice Hall*.
- Allen, E., & Seaman, C. A. (2007). Likert Scales and Data Analyses. *Quality Progress*, 40, 64-65.
- Alleyne, P., & Broome, T. (2011). Using the theory of planned behaviour and risk propensity to measure investment intentions among future investors. *Journal of Eastern Caribbean Studies*, 36(1), 1-20.
- Al-Qirim, N. (2007). The adoption of eCommerce communications and application technologies in small businesses in New Zealand. *Electronic Commerce Research and Applications*, 6(4), 462-73.
- Alwahaishi, S., & Snásel, V. (2013). Acceptance and Use of Information and Communications Technology: A UTAUT and Flow Based Theoretical Model. *Journal of technology management & innovation*, 8(2), 61-73.
- Al Zefeiti, S. M. B., & Mohamad, N. A. (2015). Methodological Considerations in Studying Transformational Leadership and its Outcomes. *International Journal of Engineering Business Management*, 7.
- Amin, H., Rahim Abdul Rahman, A., & Abdul Razak, D. (2014). Consumer acceptance of Islamic home financing. *International Journal of Housing Markets and Analysis*, 7(3), 307-332.
- Anderson, C. (2010). Presenting and evaluating qualitative research. *American journal of pharmaceutical education*, 74(8), 141.
- Anderson, J. (2007). Social, ethical and legal barriers to e-health. *International Journal Of Medical Informatics*, 76(5), 480-483.
- Anderson, G. F., Frogner, B. K., Johns, R. A., & Reinhardt, U. E. (2006). Health care spending and use of information technology in OECD countries. *Health Affairs*, 25(3), 819-831.

- Andrews, V., Tonkin, E., Lancaster, D., & Kirk, M. (2014). Using the Diffusion of Innovations theory to understand the uptake of genetics in nursing practice: identifying the characteristics of genetic nurse adopters. *Journal of advanced nursing*, 70(4), 878-893.
- Ang, C., Davies, M., & Finlay, P. (2001). An empirical study of the use of information technology to support total quality management. *Total Quality Management*, 12(2), 145--157.
- Angeles, R. (2013). Using the Technology-Organisation-Environment Framework and Zuboff's Concepts for Understanding Environmental Sustainability and RFID: Two Case Studies. *International Journal Of Social, Management, Economics And Business Engineering*, 7(10), 1605- 1614.
- Angeles, R. (2014). Using the Technology-Organization-Environment Framework for Analyzing Nike's "Considered Index" Green Initiative, a Decision Support System-Driven System. *Journal Of Management And Sustainability*, 4(1), 96-113.
- Archibald, M. M., & Clark, A. M. (2014). Twitter and nursing research: how diffusion of innovation theory can help uptake. *Journal of advanced nursing*, 70(3), e3-e5.
- Armitage, C., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal Of Social Psychology*, 40(4), 471--499.
- Artmann, J., Giest, S., & Dumortier, J. (2010). Country Brief: France. *European Commission, DG Information Society and Media, ICT for Health Unit*.
- Ashraf, A. R., Thongpapanl, N., & Auh, S. (2014). The Application of the Technology Acceptance Model Under Different Cultural Contexts: The Case of Online Shopping Adoption. *Journal of International Marketing*, 22(3), 68-93.
- Aversano, N. (2005). Technology rejection of Mobile Telephones. *Unpublished Doctor of Management Program, Case Western Reserve University United States*.
- Ayres, L., Kavanaugh, K., & Knafl, K. A. (2003). Within-case and across-case approaches to qualitative data analysis. *Qualitative health research*, 13(6), 871-883.
- Babbie, E. (1992). *The practice of social research* (1st ed.). Belmont, Calif.: Wadsworth Pub. Co.
- Bagozzi, R. P. (2007). The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift. *Journal of the AIS*, 8(4), 244-254.

- Bailey, P. H. (2007). Using Narrative in Social Science Research, Qualitative and Quantitative Approaches. *Journal of Advanced Nursing*, 58(1), 101-101.
- Bakker, A., & Mol, J. (1983). Hospital information systems. *Effective Health Care*, 1(4), 215--223.
- Baraka, H. A., Baraka, H. A., & EL-Gamily, I. H. (2013). Assessing call centers' success: A validation of the DeLone and McLean model for information system. *Egyptian Informatics Journal*, 14(2), 99-108.
- Barber, B., Garwood, D., & Skerman, P. (1995). Security in hospital information systems. *International Journal Of Bio-Medical Computing*, 39(1), 133--138.
- Barnes-Holmes, D., Regan, D., Barnes-Holmes, Y., Commins, S., Walsh, D., & Stewart, I. et al. (2005). Relating Derived Reactions as a Model of Analogical Reasoning: Reaction Times and Event-Related Potentials. *Journal Of The Experimental Analysis Of Behavior*, 84(3), 435--451.
- Barrett, H. (2007). *Development as the target of evolution: A computational approach to developmental systems. The Evolution of Mind: Fundamental Questions and Controversies* (1st ed., pp. 186-192). New York: Guilford.
- Barron, W. (2004). Improving the Quality and Safety of Care at Loyola University Health System. *Virtual Mentor*, 6(3).
- Barros-Bailey, M., & Saunders, J. (2010). Ethics and the Use of Technology in Rehabilitation Counseling. *Rehabilitation Counseling Bulletin*, 53(4), 255-259. doi:10.1177/0034355210368867
- Bates, D., Gaw, & e, A. (2003). Improving safety with information technology. *New England Journal Of Medicine*, 348(25), 2526--2534.
- Bazeley, P. (2007). *Qualitative data analysis with NVivo* (1st ed.). Los Angeles: SAGE.
- Benbasat, I., & Barki, H. (2007). Quo vadis TAM?. *Journal of the association for information systems*, 8(4), 211-218.
- Berg, B. (2007). *Qualitative Research Methods for the Social Sciences* (6th ed.). San Francisco: Pearson Education, Inc.

- Bergman, J., & Setterqvist, V. (2013). *The Implementation of Reverse Mortgage in Sweden - A Financial Institution Perspective* (Degree project). Umeå Universitet Sweden.
- Bernama (2009, 24 July). Kerajaan Bayar Pampasan RM7 Juta Untuk Kes Kecuaian Perubatan. Retrieved March, 12, 2011, at http://www.bernama.com/bernama/v3/bm/news_lite.php?id=375694
- Bishop, R. O., Patrick, J., & Besiso, A. (2015). Efficiency Achievements From a User-Developed Real-Time Modifiable Clinical Information System. *Annals of emergency medicine*, 65(2), 133-142.
- Biomedical Informatics Ltd., (2006). *Hospital Information System*. Retrieved 23 May 2014, from <http://www.biohealthmatics.com/technologies/intsys.aspx>
- Blaikie, N. (2003). *Analyzing Quantitative Data: From Description to Explanation*. California: SAGE Publications Inc.
- Blum, B. (1986). Clinical information systems—a review. *Western Journal Of Medicine*, 145(6), 791.
- Bogdan, R., & Biklen, S. (1998). *Qualitative research for education* (1st ed.). Boston: Allyn and Bacon.
- Boonstra, A., Broekhuis, M., & a., (2010). Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. *BMC Health Services Research*, 10(1), 231.
- Borst, F., Appel, R., Baud, R., Ligier, Y., & Scherrer, J. (1999). Happy birthday DIOGENE: a hospital information system born 20 years ago. *International Journal Of Medical Informatics*, 54(3), 157-167.
- Bossen, C., Jensen, L. G., & Udsen, F. W. (2013). Evaluation of a comprehensive EHR based on the DeLone and McLean model for IS success: approach, results, and success factors. *International journal of medical informatics*, 82(10), 940-953.
- Brannen, J. (1992). Combining qualitative and quantitative approaches: an overview. In Julia Brannen (Ed.), *Mixing methods: qualitative and quantitative research* (pp.3-37). Brookfield: Avebury.

- Breant, C. M., Borst, F., Campi, D., Griesser, V., Huy, S. L., Junod, J. (2000). Expanding DIOGENE with a clinical information system based on a new hospital-wide clinical findings dictionary. *I. J. Medical Informatics* 58,167-177.
- Brooks, R., & Grotz, C. (2010). Implementation of electronic medical records: How healthcare providers are managing the challenges of going digital. *Journal of Business & Economics Research (JBER)*, 8(6), 73-84.
- Brown, S. A., & Venkatesh, V. (2005). Model of adoption of technology in households: A baseline model test and extension incorporating household life cycle. *MIS quarterly*, 399-426.
- Brown, J.D. (2008). Effect size and eta squared. Shiken: JALT Testing & Evaluation. *SIG Newsletter*. 12 (2), 38 – 43.
- Bryman, A. (2004). *Social research methods* (2nd ed.). New York: Oxford University Press.
- Bulgiba, A. M. (2004). Information technology in health care-what the future holds. *Asia-Pacific Journal of Public Health*, 16(1), 64-71.
- Buerkle, T., Kuch, R., Prokosch, H., & Dudeck, J. (1999). Stepwise evaluation of information systems in an university hospital. *Methods Of Information In Medicine*, 38, 9-15.
- Burns, T. E. & Stalker, G. M. (1994). *The Management of Innovation*. Oxford: Oxford University Press.
- Burt, C.W. and Sisk, J.E. (2005). Which Physicians and Practices are Using Electronic Medical Records?: Survey Data Show Limited Use of These Information Tools. *Health Affairs*. 24(5): p.p 1334-1345.
- Cacace, F., Cinque, M., Crudele, M., Iannello, G. & Venditti, M.: (2004). *The Impact of Innovation in Medical and Nursing Training: a Hospital Information System for Students Accessible through Mobile Devices*. Proceedings of MLEARN, 5-6 July 2004, Italy.
- Cameron, L, SL Wise, and SM Lottridge. 2007. The Development and Validation of the Information Literacy Test. *College and research libraries* 68 (3):229.
- Cao, Q., Jones, D. R., & Sheng, H. (2014). Contained nomadic information environments: Technology, Organisation, and environment influences on adoption of hospital RFID patient tracking. *Information & Management*, 51(2), 225-239.

- Chang, M.K. (1998). Predicting Unethical Behavior: A Comparison of The Theory of Reasoned Action on the Theory of Planned Behavior, *Journal of Business Ethics*, 17(16), 1828-1834.
- Chau, P., & Tam, K. (1997). Factors Affecting the Adoption of Open Systems: An Exploratory Study. *Mis Quarterly*, 21(1).
- Chismar, W. G., & Wiley-Patton, S. (2003, January). Does the extended technology acceptance model apply to physicians. In *System Sciences, 2003. Proceedings of the 36th Annual Hawaii International Conference on* (pp. 8-pp). IEEE.
- Chung, K., Choi, Y., & Moon, S. (2003). Toward efficient medication error reduction: Error-reducing information management systems. *Journal Of Medical Systems*, 27(6), 553--560.
- Chwelos, P., Benbasat, I., & Dexter, A. (2001). Research report: empirical test of an EDI adoption model. *Information Systems Research*, 12(3), 304--321.
- Clark, L., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7(3), 309.
- Clayton, P., Narus, S., Bowes III, W., Madsen, T., Wilcox, A., & Orsmond, G. et al. (2005). Physician use of electronic medical records: issues and successes with direct data entry and physician productivity, 2005, 141.
- Cohen, J. (1988). *Statistical Power Analysis For The Behavioral Sciences*, (2nd edition), Hillsdale, NJ: Lawrence Erlbaum.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education*. London: Routledge/ Falmer.
- Cooper, R. B., & Zmud, R. W. (1990). Information technology implementation research: a technological diffusion approach. *Management science*, 36(2), 123-139.
- Corbellini, A. M., Giest, S., Artmann, J., & Heywood, J. D. (2010). Country Brief: Spain. *European Commission, DG Information Society and Media, ICT for Health Unit*.
- Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches*. Sage.
- Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, Calif.: SAGE Publications.

- Creswell, J. (2003). *Research design* (1st ed.). Thousand Oaks, Calif.: Sage Publications.
- Creswell, J. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: SAGE Publications.
- Cronbach LJ (1951). Coefficient alpha and the internal structure of tests. *Psychometrika* 16 (3): 297–334.
- Damanpour, F. (1996). Organisational complexity and innovation: developing and testing multiple contingency models. *Management science*, 42(5), 693-716.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of applied social psychology*, 22(14), 1111-1132.
- Davis, F. D., Bagozzi, R. P., Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models, *Management Science*, 35(8), 982-1003.
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and End User Acceptance of Information Technology, *MIS Quarterly*, 13, 318-339.
- Delbert, H., & Meyer, D. (2011). Electronic Medical Records-A Perspective: How Long Does It Take to Read a 243-page EMR?. *Journal Of American Physicians And Surgeons*, 15(3), 78-79.
- DeLone, W., & McLean, E. (1992). Information systems success: the quest for the dependent variable. *Information Systems Research*, 3(1), 60-95.
- Delone, W. H., & Mclean, E. R. (2004). Measuring e-commerce success: Applying the DeLone & McLean information systems success model. *International Journal of Electronic Commerce*, 9(1), 31-47.
- Delone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of management information systems*, 19(4), 9-30.
- Department of Statistics Malaysia (2015). Malaysia Population Clock. Retrieved March, 7, 2015, at http://www.statistics.gov.my/portal/index.php?option=com_content&view=article&id=213&lang=en.

- Denzin, N., & Lincoln, Y. (2000). *Handbook of qualitative research* (1st ed.). Thousand Oaks, Calif.: Sage Publications.
- Detmer, D. E. (2000). Information technology for quality health care: a summary of United Kingdom and United States experiences. *Quality in Health Care*, 9(3), 181-189.
- Donati, A., Gabbanelli, V., Pantanetti, S., Carletti, P., Principi, T., & Marini, B. et al. (2008). The impact of a clinical information system in an intensive care unit. *Journal Of Clinical Monitoring And Computing*, 22(1), 31-36.
- Dong, Y. & Peng, C.J. (2013). Principled missing data methods for researchers. *Springerplus*, 2, 222.
- Easterby-Smith, M., & Antonacopoulou, E. (2006). Organisational learning, knowledge and dynamic capabilities. *Oxford University Press*.
- Edmunds, R., Thorpe, M., & Conole, G. (2012). Student attitudes towards and use of ICT in course study, work and social activity: A technology acceptance model approach. *British journal of educational technology*, 43(1), 71-84.
- Enders C.K. (2003). Using the expectation maximization algorithm to estimate coefficient alpha for scales with item-level missing data. *Psychol Methods*, 8(3), 322-37.
- Erstad, T.L. (2003). Analyzing Computer Based PatientRecords: A Review of Literature. *Journal of Healthcare Information Management*, 17(4): p.p 51- 57.
- Fadhil, N., Jusop, M., & Abdullah, A. (2012). Hospital Information System (HIS) in a Public Hospitals: A case study from Malaysia. *Far East Journal Of Psychology & Business*, 8(3), 1-11.
- Fang, M., Zhang, Y., Zhao, H., Wu, N., & Yu, J. (2007). Integration of hospital information systems in china. *New Mathematics And Natural Computation*, 3(01), 135-151.
- Fasshauer, K. (2012). *Chinese Direct Investment in Europe* (Masters Thesis). Copenhagen Business School.
- Fielding, N., & Fielding, J. (2014). *Linking data: The articulation of qualitative and quantitative methods in social research* (1st ed.). Beverly Hill, CA: Sage.

- Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley
- Fiumara, K. (2008). *Chapter 7: Case Study on the Use of Health Care Technology to Improve Medication Safety,? Medication Use: A Systems Approach to Reducing Errors* (1st ed., pp. 103-114). USA: Joint Commission resources.
- Flick, U. (2009). *An Introduction to Qualitative Research* (3rd ed.). London: Sage Publication.
- Fraser, H., Biondich, P., Moodley, D., Choi, S., Mamlin, B., & Szolovits, P. (2005). Implementing electronic medical record systems in developing countries. *Informatics In Primary Care, 13*(2), 83--96.
- Frisse, M. E., Johnson, K. B., Nian, H., Davison, C. L., Gadd, C. S., Unertl, K. M. & Chen, Q. (2012). The financial impact of health information exchange on emergency department care. *Journal of the American Medical Informatics Association, 19*(3), 328-333.
- Gahtani, S.S., Hubona, G.S., & Wang, J.(2007). Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT. *Information & Management, 44*, 681-691.
- Ganesh, A., & Al-Mujaini, A. (2009). Electronic Medical Record System: Have we Bitten off More Than we Can Chew?. *Oman Medical Journal, 24*(1), 1.
- Gardner, R.M. and Lundsgaarde, H.P. (1994). Evaluation of User Acceptance of a Clinical Expert System, *JAMIA, 1*, 428-438
- Garrido, T., Raymond, B., Jamieson, L., Liang, L., & Wiesenthal, A. (2004). Making the business case for hospital information systems—a Kaiser Permanente investment decision. *Journal Of Health Care Finance, 31*(2), 16-25.
- Garson, D. (2012). *Testing statistical assumptions* (1st ed.). South Carolina State University: G. David Garson and Statistical Associates Publishing.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step* (1st ed.). Boston: Allyn and Bacon.
- Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal, 204*(6), 291--295.

- Glaser, J., Drazen, E., & Cohen, L. (1986). Maximizing the benefits of health care information systems. *Journal Of Medical Systems*, 10(1), 51-56.
- Goldberg, A. (1988). *A History of Personal Workstations*. Addison-Wesley Publishing Co. Massachusetts.
- Goldkuhl, G. (1998, June). The six phases of business processes-business communication and the exchange of value. In *12th biennial ITS conference. Beyond convergence (ITS 98), Stockholm*.
- Goo, J., Huang, C. D., & Koo, C. (2015). Learning for healthy outcomes: Exploration and exploitation with electronic medical records. *Information & Management*, 52, 550–562.
- Gopi, M. & Ramayah, T. (2007). Applicability of Theory of Planned Behavior in Predicting Intention to Trade Online: Some Evidence from a Developing Country. *International Journal of Emerging Markets*, 2(4), pp. 348-360.
- Greene, J., Caracelli, V., & Graham, W. (1989). Toward a Conceptual Framework for Mixed-Method Evaluation Designs. *Educational Evaluation And Policy Analysis*, 11(3), 255. doi:10.2307/1163620
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, 2, 163-194.
- Gummesson, E. (2000). *Qualitative methods in management research* (1st ed.). Thousand Oaks, Calif.: Sage.
- Gürsel, G., Zayim, N., Gülkesen, K. H., Arifoglu, A., & Osman, S. A. K. A. (2014). A new approach in the evaluation of hospital information systems. *Turkish Journal of Electrical Engineering & Computer Sciences* 2014, 22, 214-222.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. & Tatham, R.L. (2006). *Multivariate data analysis* (6th ed.), Upper Saddle River: Pearson/Prentice-Hall.
- Hashem, D. (2014). *Understanding change in disability sport in the UAE* (Doctoral dissertation). Brunel University.
- Haskins, M. (2002). Legible charts! Experiences in converting to electronic medical records. *Canadian Family Physician*, vol. 48: p.p 769-771

- Hayani, P., Rahman, M., & Hidayanto, A. (2013). Information Technology Assessment on Hospital Information System Implementation: Case Study A Teaching Hospital. *International Journal Of Engineering & Technology (0975-4024)*, 5(2).
- Hammar, T., Ohlson, M., Hanson, E., & Petersson, G. (2015). Implementation of information systems at pharmacies—A case study from the re-regulated pharmacy market in Sweden. *Research in Social and Administrative Pharmacy*, 11(2), e85-e99.
- Hammersley, M. (2009). Why critical realism fails to justify critical social research. *Methodological Innovations Online*, 4(2), 1--11.
- Hassan, R. (2012). Implementation of Total Hospital Information System (THIS) In Malaysian Public Hospitals: Challenges and Future Prospects. *International Journal Of Business And Social Research*, 2(2), 33-41.
- Hatcher, L. (2013). *Advanced statistics in research* (1st ed.). Saginaw, MI: ShadowFinch Media, LLC.
- Hennink, M., Hutter, I., & Bailey, A. (2011). *Qualitative research methods* (1st ed.). London: SAGE.
- Hidayanto, A., Hartana, D., Hapsari, I., & ra., (2012). Strategi Manajemen Perubahan Untuk Mendukung Implementasi Sistem Informasi Rumah Sakit Studi Kasus: RSUD RAA Soewondo Pati. *Jurnal Sistem Informasi*, 6(2), 108-116.
- Hillestad, R., Bigelow, J., Bower, A., Giroi, F., Meili, R., Scoville, R., & Taylor, R. (2005). Can electronic medical record systems transform health care? Potential health benefits, savings, and costs. *Health Affairs*, 24(5), 1103--1117.
- Ho, R. (2006). *Handbook of univariate and multivariate data analysis and interpretation with SPSS* (1st ed.). Boca Raton: Chapman & Hall/CRC.
- Houser, M., Barlow, J., Tedeschi, R., Spicer, M., Shields, D., & Diamond, L. (1984). The Implementation of Hospital Information Systems—Change, Challenge, and Commitment, 221.
- Hsiao, C. J., & Hing, E. (2012). *Use and Characteristics of Electronic Health Record Systems Among Office-based Physician Practices, United States, 2001-2012* (pp. 1-8). US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.

- Hung, S. Y., Hung, W. H., Tsai, C. A., & Jiang, S. C. (2010). Critical factors of hospital adoption on CRM system: Organisational and information system perspectives. *Decision support systems*, 48(4), 592-603.
- Hunsinger, J. (2005). Toward a transdisciplinary internet research. *The Information Society*, 21(4), 277-279.
- Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of management information systems*, 91-112.
- Ibrahim, S. (2007). Clinical Leadership in Implementation of THIS in a Hospital HIMSS. In *AsiaPac07 Conference & Exhibition* (pp. 1-19).
- Ifinedo, P. (2012). Factors influencing e-government maturity in transition economies and developing countries: a longitudinal perspective. *ACM SIGMIS Database*, 42(4), 98-116.
- Ingram, K. L., Cope, J. G., Harju, B. L., & Wuensch, K. L. (2000). Applying to graduate school: A test of the theory of planned behavior. *Journal of Social Behavior & Personality*, 15, 215-226.
- Innan, R., & Moustaghfir, K. (2012). Predicting Employees' Behavior: An Application of the Theory of Planned Behavior; The Case of the Moroccan Forestry Department (HCEFLCD). In *Knowledge and Learning: Global Empowerment; Proceedings of the Management, Knowledge and Learning International Conference 2012* (pp. 333-348). International School for Social and Business Studies, Celje, Slovenia.
- Inokuchi, R., Sato, H., Nakamura, K., Aoki, Y., Shinohara, K., Gunshin, M., ... & Nakajima, S. (2014). Motivations and barriers to implementing electronic health records and ED information systems in Japan. *The American journal of emergency medicine*, 32(7), 725-730.
- Ismail A., Jamil, A.T., A Rahman, A.F., Abu Bakar, J.M., Mohd Saad, N. & Saadi, H. (2010). The Implementation of Hospital of Hospital System (HIS) in Tertiary Hospitals in Malaysia: A Qualitative Study, *Malaysian Journal of Public Health Medicine 2010*, vol. 10, no. 2, pp. 16-24, 2010.
- Ismail, N. I., Abdullah, N. H., Shamsudin, A., & Ariffin, N. A. N. (2013). Implementation differences of hospital information system (HIS) in Malaysian public hospitals. *International Journal of Social Science and Huminity*, 3(2), 115-120.

- Ismail, N. I., Abdullah, N. H., & Shamsuddin, A. (2015). Adoption of Hospital Information System (HIS) in Malaysian Public Hospitals. *Procedia-Social and Behavioral Sciences*, 172, 336-343.
- Ismail, W., & Ali, A. (2013). Conceptual Model for Examining the Factors that Influence the Likelihood of Computerised Accounting Information System (CAIS) Adoption Among Malaysian SME. *International Journal of Information Technology and Business Management*, 15(1), 122-151.
- Jha, A. K., Doolan, D., Grandt, D., Scott, T., & Bates, D. W. (2008). The use of health information technology in seven nations. *International journal of medical informatics*, 77(12), 848-854.
- Jhun, H., Cho, S., & Park, J. (2004). Changes in job stress, musculoskeletal symptoms, and complaints of unfavorable working conditions among nurses after the adoption of a computerized order communication system. *International Archives Of Occupational And Environmental Health*, 77(5), 363--367.
- Johnson, B., & Christensen, L. (2008). *Educational research* (1st ed.). Los Angeles: Sage Publications.
- Johnson, R., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14--26.
- Johnson, R., Onwuegbuzie, A., & Turner, L. (2007). Toward a definition of mixed methods research. *Journal Of Mixed Methods Research*, 1(2), 112--133.
- Kagioglou, M., Cooper, R., Aouad, G., & Sexton, M. (2000). Rethinking construction: the generic design and construction process protocol. *Engineering Construction And Architectural Management*, 7(2), 141--153.
- Kahouei, M., Zadeh, J. M., & Roghani, P. S. (2015). The evaluation of the compatibility of electronic patient record (EPR) system with nurses' management needs in a developing country. *International journal of medical informatics*, 84(4), 263-270.
- Karahana, E. & Straub, D.W (1999). The Psychological origins of Perceived Usefulness and Ease of Use, *Information & Management*, 35, 237-250.
- Kamau, L. M. (2014). Applying Rogers' Diffusion of Innovations Theory to Investigate Technology Training for Secondary Mathematics Teachers in Kenya. *Journal of Education and Practice*, 5(17), 19-30.

- Karimi, F., Poo, D. C., & Tan, Y. M. (2015). Clinical information systems end user satisfaction: The expectations and needs congruencies effects. *Journal of biomedical informatics*, 53, 342-354.
- Kasi, P. (2009). *Research* (1st ed.). Bloomington, IN: AuthorHouse.
- Kaushal, R., Bates, D., Jenter, C., Mills, S., Volk, L., & Burdick, E. et al. (2009). Imminent adopters of electronic health records in ambulatory care. *Informatics In Primary Care*, 17(1).
- Khan, A., & Woosley, J. M. (2011). Comparison of Contemporary Technology Acceptance Models and Evaluation of the Best Fit for Health Industry Organisations. *The International Journal of Computer Science & Emerging Technologies*, 1(11), 709-717.
- Khan, S., & VanWynsberghe, R. (2008). Cultivating the Under-Mined: Cross-Case Analysis as Knowledge Mobilization., 9(1).
- Khorasani, R. (2001). Computerized Physician Order Entry and Decision Support: Improving the Quality of Care. ? *Radio Graphics The Journal Of Continuing Medical Education In Radiology*, 21, 1015-1018.
- King, N., & Horrocks, C. (2010). *Interviews in qualitative research* (1st ed.). Los Angeles: SAGE.
- Knox, K. (2004). A researcher's dilemma-philosophical and methodological pluralism. *Electronic journal of business research methods*, 2(2), 119-128.
- Kohlbacher, Florian (2005). The Use of Qualitative Content Analysis in Case Study Research *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 7(1), 21.
- Kok, G., de Vries, H., Mudde, A., & Strecher, V. (1991). Planned health education and the role of self-efficacy: Dutch research. *Health Education Research*, 6(2), 231--238.
- Krippendorff, Klaus (2004). *Content analysis: An introduction to its methodology* (2nd ed.). Thousand Oaks: Sage.
- Kuan, K.K.Y. and Chau, P.Y.K. (2001). A Perception-Based Model for EDI Adoption in Small Business Using a Technology-Organisation-Environment Framework. *Information & Management* 38(8), 507-512.

- Kuperman, G. J., Gardner, R. M., & Pryor, T. A. (2013). *HELP: a dynamic hospital information system*. Springer Science & Business Media.
- Kuhn, K., Giuse, D., & others,. (2001). From hospital information systems to health information systems. Problems, challenges, perspectives. *Methods Inf Med*, 40(4), 275--87.
- Kumar, S., Krupinski, E. & Abdullah, B.J.J. (2008). Impact of Teleradiology in Clinical Practice: A Malaysian Perspective. In *Teleradiology* (pp. 203-215). Springer Berlin Heidelberg.
- Kushniruk, A., Borycki, E., & Kuo, M. H. (2010). Advances in electronic health records in Denmark: From national strategy to effective healthcare system implementation. *Acta Informatica Medica*, 18(2), 96.
- Kushniruk, A., Kaipio, J., Nieminen, M., Hyppönen, H., Lääveri, T., Nohr, C. & Borycki, E. (2014). Human Factors in the Large: Experiences from Denmark, Finland and Canada in Moving Towards Regional and National Evaluations of Health Information System Usability: Contribution of the IMIA Human Factors Working Group. *Yearbook of medical informatics*, 9(1), 67.
- Kvale, S., & Brinkmann, S. (2009). *InterViews* (1st ed.). Los Angeles: Sage Publications.
- Kvale, S. (1996). *Interviews* (1st ed.). Thousand Oaks, Calif.: Sage Publications.
- Kwon, T. H., and Zmud, R. W. (1987). Unifying the Fragmented Models of Information Systems Implementation. In R. J. Boland and R. A. Hirschheim (eds.), *Critical Issues in Information Systems Research*, Chichester: John Wiley and Sons, 88-97.
- Law, P. K. (2010). A theory of reasoned action model of accounting students' career choice in public accounting practices in the post-Enron. *Journal of Applied Accounting Research*, 11(1), 58-73.
- Lawshe, C.H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28, 563-575.
- Le, X., Lee, S., Lee, Y., Lee, H., Khalid, M., & Sankar, R. (2010). Activity-oriented access control to ubiquitous hospital information and services. *Information Sciences*, 180(16), 2979--2990.
- Lee, H. W., Ramayah, T., & Zakaria, N. (2012). External factors in hospital information system (HIS) adoption model: a case on malaysia. *Journal of medical systems*, 36(4), 2129-2140.

- Lee, J. (2009). Interview with Lawrence Weed, MD—The Father of the Problem-Oriented Medical Record Looks Ahead. *The Permanente Journal* 13 (3):84–89.
- Lee, J. (1994). Odds Ratio or Relative Risk for Cross-Sectional Data?. *International Journal of Epidemiology* 23 (1): 201–3.
- Leidner, D. E., Preston, D., & Chen, D. (2010). An examination of the antecedents and consequences of Organisational IT innovation in hospitals. *The Journal of Strategic Information Systems*, 19(3), 154-170.
- Levine and Pauls. (1998). *Theory Of Reasoned Action/Theory Of Planned Behavior*. Retrieved from http://hsc.usf.edu/~kmbrown/TRA_TPB.htm
- Levine, T., & Hullett, C. (2002). Eta squared, partial eta squared, and misreporting of effect size in communication research. *Human Communication Research*, 28(4), 612--625.
- Levine, T., & Hullett, C. (2002). Eta squared, partial eta squared, and misreporting of effect size in communication research. *Human Communication Research*, 28(4), 612--625.
- Lian, J. W., Yen, D. C., & Wang, Y. T. (2014). An exploratory study to understand the critical factors affecting the decision to adopt cloud computing in Taiwan hospital. *International Journal of Information Management*, 34(1), 28-36
- Li, J. (2010). *Bulding a healthy Malaysia*. *FutureGov*. Retrieved 10 July 2015, from <http://futuregov.asia/articles/2010/jan/07/building-healthy-malaysia/>
- Li, Y. C. J., Yen, J. C., Chiu, W. T., Jian, W. S., Syed-Abdul, S., & Hsu, M. H. (2015). Building a National Electronic Medical Record Exchange System—Experiences in Taiwan. *Computer methods and programs in biomedicine*, 121(1), 14-20.
- Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry* (1st ed.). Beverly Hills, Calif.: Sage Publications.
- Liu, C. T., Yang, P. T., Yeh, Y. T., & Wang, B. L. (2006). The impacts of smart cards on hospital information systems—An investigation of the first phase of the national health insurance smart card project in Taiwan. *International Journal of Medical Informatics*, 75(2), 173-181.

- Liu, L., Miguel Cruz, A., Rios Rincon, A., Buttar, V., Ranson, Q., & Goertzen, D. (2014). What factors determine therapists' acceptance of new technologies for rehabilitation-a study using the Unified Theory of Acceptance and Use of Technology (UTAUT). *Disability & Rehabilitation*, 37(5), 447-455.
- Li, Y. C. J., Yen, J. C., Chiu, W. T., Jian, W. S., Syed-Abdul, S., & Hsu, M. H. (2015). Building a National Electronic Medical Record Exchange System—Experiences in Taiwan. *Computer methods and programs in biomedicine*, 121, 12-20.
- Lorence, D., Sivaramakrishnan, A. and Richards, M. (2009, 20 March). Transaction-Neutral Implanted Data Collection Interface as EMR Driver: A Model for Emerging Distributed Medical Technologies. *Journal of Medical Systems*, 34(4), 609-617. DOI: 10.1007/s10916-009-9274-9
- Lucas, H., & Spitler, V. (1999). Technology Use and Performance: A Field Study of Broker Workstations. *Decision Sciences*, 30(2), 291-311.
- Ludwick, D.A. & Doucette, J. (2007). *Case Study: The Effect of Information and Computing Technology on Health Care: The Implications of Operational Processes*. Presented at the itSMF Canadian National Conference, Calgary, AB, Canada.
- Ludwick, D.A. & Doucette, J. (2008). Primary Care Physicians' Experience with Electronic Medical Records: Barriers to Implementation in a Fee-For-Service Environment, *International Journal of Telemedicine and Applications*,:853524. Epub 2008 Dec 4.
- Ludwick D.A. & Doucette, J. (2009). Adopting electronic medical records in primary care: lessons learned from health information systems implementation experience in seven countries. *Int J Med Inform.*, 78(1):22-31.
- Luethi, M., & Knolmayer, G. (2009). Security in health information systems: an exploratory comparison of US and swiss hospitals, 1-10.
- Lumsdon K. (1993). HELP (health evaluation through logical processing) on the way. Clinical system lays framework for CPR. *PubMed*, 67(4), 32.
- Manstead, A., & Parker, D. (1995). Evaluating and extending the theory of planned behaviour. *European Review Of Social Psychology*, 6(1), 69-95.
- Marshall, C., & Rossman, G. (2011). *Designing qualitative research* (1st ed.). Los Angeles: Sage.

- Martins, C., Oliveira, T., & Popovič, A. (2014). Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, 34(1), 1-13.
- Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, 2(3), 173-191.
- Matković, P., & Tumbas, P. (2010). A Comparative Overview of the Evolution of Software Development Models. *International Journal of Industrial Engineering and Management (IJIEM)*, 1(4), 163-172.
- Matveev, A. V. (2002). The advantages of employing quantitative and qualitative methods in intercultural research: Practical implications from the study of the perceptions of intercultural communication competence by American and Russian managers. *Bulletin of Russian Communication Association Theory of Communication and Applied Communication*, 1, 59-67.
- Mbananga, N., & Becker, P. (2002). Use of technology in reproductive health information designed for communities in South Africa. *Health Education Research*, 17(2), 195--209.
- McGill, T. J., Klobas, J. E., & Hobbs, V. J. (2004). Perceptions, user satisfaction and success: Testing the DeLone and McLean model in the user developed application domain. *Advanced Topics in Information Resources Management*, 3, 87-116.
- Menachemi, N. & Collum, T.H. (2011) Benefits and drawbacks of electronic health record systems. *Risk Manag Healthc Policy*, 4:47-55
- Kelly, G., & McKenzie, B. (2002). Security, privacy, and confidentiality issues on the Internet. *Journal of Medical Internet Research*, 4(2), e12.
- Meinert, D., & Peterson, D. (2009). Perceived importance of EMR functions and physician characteristics. *Journal Of Systems And Information Technology*, 11(1), 57--70.
- Menke, J., Broner, C., Campbell, D., McKissick, M., & Edwards-Beckett, J. (2001). Computerized clinical documentation system in the pediatric intensive care unit. *BMC Medical Informatics And Decision Making*, 1(1), 3.
- Merriam, S. (1998). *Qualitative research and case study applications in education* (1st ed.). San Francisco: Jossey-bass.

- Merriam, S. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions For Adult And Continuing Education*, 2001(89), 3--14.
- Merriam, S. (2001). *The new update on adult learning theory* (1st ed.). San Francisco: Jossey-Bass.
- Merriam, S. (2009). *Qualitative Research: A Guide to Design and Implementation*. United States of America: Jossey-Bass.
- Meyer, A. D., & Goes, J. B. (1988). Organisational assimilation of innovations: A multilevel contextual analysis. *Academy of management journal*, 31(4), 897-923.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.
- Miller, R., & Sim, I. (2004). Physicians' use of electronic medical records: barriers and solutions. *Health Affairs*, 23(2), 116-126.
- Mills, T. R., Vavroch, J., Bahensky, J. A., & Ward, M. M. (2010). Electronic medical record systems in critical access hospitals: leadership perspectives on anticipated and realized benefits. *Perspectives in health information management/AHIMA, American Health Information Management Association*, 7(Spring).
- Ministry of Health Malaysia (2012). *Annual Report 2012*. Putrajaya, Malaysia: MOH
- Ministry of Health Malaysia (2011). *Country Plan*. Putrajaya, Malaysia: MOH.
- Ministry of Health Malaysia (2014). *Health Indicators*. Putrajaya, Malaysia: MOH.
- Ministry of Health Malaysia (2015). *Health Indicators*. Putrajaya, Malaysia: MOH.
- Mohamadali, N. A. K., & Garibaldi, J. M. (2010). A Novel Evaluation Model of user Acceptance of Software Technology in Healthcare Sector. In *Healthinf* (pp. 392-397).
- Mohamad Yunus, N., Ab Latiff, D., Abdul Mulud, Z., & Ma'on, S. (2013). Acceptance of Total Hospital Information System (THIS). *International Journal Of Future Computer And Communication*, 2(3), 160-163.

- Mohammad Chuttur, Y. (2009). Overview of the technology acceptance model: Origins, developments and future directions. *Working Papers on Information Systems*, 9(37), 9-37.
- Mohan, J., & Yaacob, R. R. R. (2004). The Malaysian Telehealth Flagship Application: a national approach to health data protection and utilisation and consumer rights. *International Journal of Medical Informatics*, 73(3), 217-227.
- Mohd Amin, I., Hussein, S., & Wan Mohd Isa, W. (2011). Assessing User Satisfaction of using Hospital Information System (HIS) in Malaysia. In *International Conference on Social Science and Humanity* (pp. 201-2013). Singapore.
- Mohd., H., & Syed Mohamad, S. (2005). Acceptance model of electronic medical record. *Journal Of Advancing Information And Management Studies*, 2(1), 75--92.
- Mohd Razali, N. & Yap, W. B. (2011). Power comparisons of shapiro-wilk, kolmogorov-smirnov, lilliefors and anderson-darling tests. *Journal of Statistical Modeling and Analytics*, 2(1), 21-33.
- Mohd. Yusof, M. (2015). A case study evaluation of a Critical Care Information System adoption using the socio-technical and fit approach. *International journal of medical informatics*, 84(7), 486-499.
- Mohd. Yusof, M., Kuljis, J., Papazafeiropoulou, A., & Stergioulas, L. (2008). An evaluation framework for Health Information Systems: human, Organisation and technology-fit factors (HOT-fit). *International Journal Of Medical Informatics*, 77(6), 386--398.
- Mohd. Yusof, M., Papazafeiropoulou, A., Paul, R., & Stergioulas, L. (2008). Investigating evaluation frameworks for health information systems. *International Journal Of Medical Informatics*, 77(6), 377-385.
- Moore, G., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192--222.
- Mullan, B., & Westwood, J. (2010). The application of the theory of reasoned action to school nurses' behaviour. *Journal of Research in Nursing*, 15(3), 261-271.
- Myers, M., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information And Organisation*, 17(1), 2--26.

- Mykytyn Jr, P., & Harrison, D. (1993). The application of the theory of reasoned action to senior management and strategic information systems. *Information Resources Management Journal (IRMJ)*, 6(2), 15--26.
- Nagi, A. (2014). *How the relationship of technology has changed work & home life; & if this has increased or decreased stress as a consequence?* (Bachelor Degree). University of Derby.
- National Economic Advisory Council (2010). *New Economic Model for Malaysia: Part 1*. Retrieved from http://www.mampu.gov.my/documents/10228/25989/27-07-04-2010-economicmodel_malaysia.pdf/8834e445-db30-4822-9e37-8548499e361c.
- Newman, I. & Benz, C.R. (1998). *Qualitative-Quantitative Research Methodology: Exploring the Interactive Continuum*. Southern Illinois University Press.
- Neuman, L. (2013). *Basics of Social Research: Pearson New International Edition* (1st ed.). Harlow: Pearson.
- Neuman, W. (1997). *Social research methods* (1st ed.). Boston: Allyn and Bacon.
- Nguyen, L., Bellucci, E., & Nguyen, L. T. (2014). Electronic health records implementation: an evaluation of information system impact and contingency factors. *International journal of medical informatics*, 83(11), 779-796.
- Nguyen, T., Vu, H., Webster, J., & Nimunkar, A. (2011). A Web-Based Electronic Medical Records and Hospital Information System for Developing Countries. *Journal Of Health Informatics In Developing Countries*, 5(1).
- Nik Ariffin, N. A., & Mohamed, C. A. R. (2010). Natural radium isotopes in particulate and dissolved phases of seawater and rainwater at the west coast Peninsular Malaysia caused by coal-fired power plant. *Environment Asia*, 3(2), 97-108.
- Norman, P., & Smith, L. (1995). The theory of planned behaviour and exercise: An investigation into the role of prior behaviour, behavioural intentions and attitude variability. *European Journal Of Social Psychology*, 25(4), 403-415.
- Orr M.G., Thrush R., Plaut D.C. (2013). The Theory of Reasoned Action as parallel constraint satisfaction: towards a dynamic computational model of health behavior. *PloS One*. 2013;8(5):e62409.

- Orruño, E., Gagnon, M. P., Asua, J., & Abdeljelil, A. B. (2011). Evaluation of tele dermatology adoption by health-care professionals using a modified Technology Acceptance Model. *Journal of telemedicine and telecare*, 17(6), 303-307.
- Otieno, G. O., Hinako, T., Motohiro, A., Daisuke, K., & Keiko, N. (2008). Measuring effectiveness of electronic medical records systems: towards building a composite index for benchmarking hospitals. *International journal of medical informatics*, 77(10), 657-669.
- Owuor, C. (2001). *Implications of using Likert data in multiple regression analysis* (Doctor of Philosophy). University of British Columbia.
- Park, D., Jung, E., Jeong, B., Moon, B., Kang, H., & Tchah, H. et al. (2012). Smart Information System for Gachon University Gil Hospital. *Healthcare Informatics Research*, 18(1), 74-83.
- Park, E., Baek, S., Ohm, J., & Chang, H. J. (2014). Determinants of player acceptance of mobile social network games: An application of extended technology acceptance model. *Telematics and Informatics*, 31(1), 3-15.
- Park, H. M. (2003). *Comparing Group Means: T-tests and One-way ANOVA Using Stata, SAS, R, and SPSS: Working Paper*. The University Information Technology Services (UITS) Center for Statistical and Mathematical Computing: Indiana University.
- Patton, M. (1990). *Qualitative evaluation and research methods* (1st ed.). Newbury Park, Calif.: Sage Publications.
- Pearce, C., & Bainbridge, M. (2014). A personally controlled electronic health record for Australia. *Journal of the American Medical Informatics Association*, 21(4), 707-713.
- Pennington, D. (2003). *Essential Personality*. Edward Arnold Publishers Ltd. p. 37.
- Peterson, K. (2006). Practice-based primary care research—translating research into practice through advanced technology. *Family Practice*, 23(2), 149--150.
- Petter, S. & Gallivan, M. (2004). Toward a framework for classifying and guiding mixed method research in information systems, 10.

- Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European journal of information systems*, 17(3), 236-263.
- Pillay, M.S., Mohd Ghazali, R.J., Abd Manaf, N.H., Abdullah, H.A., Abu Bakar, A., Salikin, F., Umapathy, M., Ali, R., Bidin, N., & Wan Ismail, W.I. (2011). Hospital waiting time: the forgotten premise of healthcare service delivery?. *International journal of health care quality assurance*, 24(7), 506-522.
- Pitt L.F., Watson R.T. & Kavan C.B. (1995) Service quality: a measure of information systems effectiveness. *MIS Quarterly* 19(2), 173-187.
- Plsek, P. E., & Greenhalgh, T. (2001). Complexity science: The challenge of complexity in health care. *BMJ: British Medical Journal*, 323(7313), 625.
- Powsner, S., Costa, J., & Homer, R. (2000). Clinicians are from Mars and pathologists are from Venus: clinician interpretation of pathology reports. *Archives Of Pathology & Laboratory Medicine*, 124(7), 1040-1046.
- Praveen, K. & Gomes, L. (2006). A study of the hospital information system (HIS) in the medical records department of a tertiary teaching hospital. ? *Journal Of The Academy Of Hospital Administration*, 18(1).
- Prime Minister Office (2010). *Tenth Malaysian Plan*. Retrieved 24 May 2012 from https://www.pmo.gov.my/dokumenattached/RMK/RMK10_Eds.pdf.
- Prime Minister Office (2011). *Economic Transformation Programme: Annual Report 2011*. Retrieved 24 May 2012 from http://etp.pemandu.gov.my/annualreport2011/upload/ENG_Annual_Report.pdf.
- Protti, D., Johansen, I., & Perez-Torres, F. (2009). Comparing the application of Health Information Technology in primary care in Denmark and Andalucía, Spain. *international journal of medical informatics*, 78(4), 270-283.
- Ragunath, P. K., Velmourougan, S., Davachelvan, P., Kayalvizhi, S., & Ravimohan, R. (2010). Evolving a new model (SDLC Model-2010) for software development life cycle (SDLC). *International Journal of Computer Science and Network Security*, 10(1), 112-119.
- Rahman, N. A. A., Mohamad, B., & Rahman, N. A. A. (2014). Factors Influencing the Quality of e-Services on Hospital Information System (HIS) in Malaysia. *Procedia-Social and Behavioral Sciences*, 155, 507-512.

- Rasiah, R. (ed) (2011) *The Malaysian Economy: Unfolding Growth and Social Change*, Kuala Lumpur: Oxford University Press.
- Ramaswamy, M., Wong, A., Lee, J., & Huang, H. (1994). Accessing picture archiving and communication system text and image information through personal computers. *AJR. American Journal Of Roentgenology*, 163(5), 1239-1243.
- Ramayah, T. & Aafaqi, B. (2005). *Intention to shop online amongst MBA students: Applicability of the Theory of Reasoned Action (TRA)*, International conference on E-Commerce 2005 (IcoEC2005), Rechanging for the Challenges Ahead, 10th – 11th January, 2005, Selangor Darul Ehsan.
- Rao, K. (2008). *The White Paper on China's Hospital Information Systems*. China: Hospital Information Management Association (CHIMA) and Accenture, China: CHIMA and Accenture.
- Ratnam, K. A., Dominic, P. D. D., & Ramayah, T. (2014). A structural equation modeling approach for the adoption of cloud computing to enhance the Malaysian healthcare sector. *Journal of medical systems*, 38(8), 1-14.
- Rauniar, R., Rawski, G., Yang, J., & Johnson, B. (2014). Technology acceptance model (TAM) and social media usage: an empirical study on Facebook. *Journal of Enterprise Information Management*, 27(1), 6-30.
- Remenyi, D., Williams, B., Money, A. and Swartz, E. (1998). *Doing Research in Business and Management. An Introduction to Process and Method*, London: Sage.
- Rencher, A. (2002). *Methods of Multivariate Analysis, Second Edition* (1st ed.). Hoboken, NJ: John Wiley & Sons.
- Ribi`ere, V., LaSalle, A., Khorramshahgol, R., & Gousty, Y. (1999). Hospital information systems quality: a customer satisfaction assessment tool. *Proceedings of the 32nd Hawaii International Conference on System Sciences*.
- Robertson A, Cresswell K, Takian A, Petrakaki D, Crowe S, Cornford T. (2010). Implementation and adoption of nationwide electronic health records in secondary care in England: qualitative analysis of interim results from a prospective national evaluation. *BMJ*2010, 341:c4564.
- Robinson, L. (2009). *A summary of diffusion of innovations*. Retrieved 25 December 2013 from http://www.enablingchange.com.au/Summary_Diffusion_Theory.pdf

- Robson, C. (2002). *Real world research: A resource for social scientists and practitioner-researchers* (Vol. 2). Oxford: Blackwell.
- Rogers, E.M. (1995). *Diffusion of Innovation*, 4th. Ed. New York: Free Press.
- Rosen, P., Spalding, S. J., Hannon, M. J., Boudreau, R. M., & Kwoh, C. K. (2011). Parent satisfaction with the electronic medical record in an academic pediatric rheumatology practice. *Journal of medical Internet research*, 13(2), e40.
- Rossi, L., Materia, E., Hourani, A., Yousef, H., Racalbutto, V., Venier, C., & Osman, M. (2009). Design and implementation of a hospital information system for the Palestine Red Crescent Society in Lebanon. *Eastern Mediterranean Health Journal*, 15(3).
- Rouibah, K., Lowry, P. B., & Al-Mutairi, L. (2014). Business to Consumer (B2C) Systems Success Dimensions: Testing a Modified DeLone & McLean IS Success Model in Kuwait in an E-Commerce Context. *Journal of Global Information Management*, 23(3), 41–70.
- Royce, W. W. (1970, August). Managing the development of large software systems. In *proceedings of IEEE WESCON*, 26(8), 328-388).
- Royston, J. (1995). Remark AS R94: A remark on Algorithm AS 181: The W test for normality. *Applied Statistics*, 44, 547-551.
- Rubin, H., & Rubin, I. (1995). *Qualitative interviewing* (1st ed.). Thousand Oaks: Sage Publications.
- Saari, M.D. (2007, 5 December). *Kos Rawatan Mahal: Pilihan di Tangan Pengguna*. Retrieved April, 21, 2011, at <http://www.yadim.com.my/Kesihatan/KesihatanFull.asp?offset=5&Id=175>.
- Sánchez, J. L., Savin, S., & Vasileva, V. (2005). Key success factors in implementing electronic medical records in University Hospital of Rennes. *L'Ecole Nationale de la Santé Publique (National School of Public Health), Rennes, Rennes, France*, 1-59.
- Saunders, M., Lewis, P., & Thornhill, A. (2008). *Research methods for business students* (1st ed.). Harlow, England: Prentice Hall.
- Schacht, S. (2014). Bridging the gap of EHR: a comparative study of primary care physicians in the Netherlands and Germany. 3rd IBA Bachelor Thesis Conference, July 3rd, 2014, Enschede, The Netherlands.

- Schuele, C. M. & Justice, L. M. (2006, August 15). *The Importance of Effect Sizes in the Interpretation of Research* : Primer on Research: Part 3. The ASHA Leader.
- Schwarz, C., & Schwarz, A. (2016). *E-Health and Telemedicine: Concepts, Methodologies, Tools and Applications* (pp. 391-413). USA: Medical Information Science Reference (An Imprint of IGI Global).
- Scupola, A. (2003). The adoption of Internet commerce by SMEs in the south of Italy: An environmental, technological and Organisational perspective. *Journal of Global Information Technology Management*, 6(1), 52-71.
- Seddon, P., & Kiew, M. Y. (1996). A partial test and development of DeLone and McLean's model of IS success. *Australasian Journal of Information Systems*, 4(1), 90-109.
- Sekaran, U. (2006). *Research Methods for Business: A Skill Building Approach* (4th ed.). UK: John Wiley & Sons.
- Sheikh, A., Cornford, T., Barber, N., Avery, A., Takian, A., Lichtner, V. & Cresswell, K. (2011). Implementation and adoption of nationwide electronic health records in secondary care in England: final qualitative results from prospective national evaluation in "early adopter" hospitals. *BMJ*, 343.
- Sheppard, B., Hartwick, J., & Warshaw, P. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal Of Consumer Research*, 325--343.
- Sherer, S. A., Meyerhoefer, C., Sheinberg, M., & Levick, D. (2015). Integrating Commercial Ambulatory Electronic Health Records with Hospital Systems: An Evolutionary Process. *International Journal of Medical Informatics*, 1-11.
- Silverman, D. (2011). *Qualitative Research* (3rd ed.). London: Sage Publication.
- Simon, S., McCarthy, M., Kaushal, R., Jenter, C., Volk, L., & Poon, E. et al. (2008). Electronic health records: which practices have them, and how are clinicians using them?. *Journal Of Evaluation In Clinical Practice*, 14(1), 43-47.
- Smith, J. K. (1983). Quantitative versus qualitative research: An attempt to clarify the issue. *Educational Researcher*, 12, 6-13.

- Smelcer, J.B. Miller-Jacobs, H. & Kantrovich, L. (2009). Usability of Electronic Medical Records. *Journal of Usability Studies*, 4(2) pp. 70-84.
- Soini, E. and Tolppanen, E. (1982). COSTAR-Based Outpatient Information System in Helsinki University Central Hospital. *Proc Annu Symp Comput Appl Med Care*, 162-165.
- Sonoda, T. (2011). Evolution of Electronic Medical Record Solutions. *FUJITSU Sci. Tech. J.*, Vol. 47(1), 19-27.
- Stake, R. E. (2000). *Case studies*. In Norman K. Denzin & Yvonna S. Lincoln (Eds.), *Handbook of qualitative research* (pp.435-453). Thousand Oaks: Sage.
- Starfield, B. H., Simborg, D. W., Horn, S. D., & Yourtee, S. A. (1976). Continuity and coordination in primary care: their achievement and utility. *Medical care*, 14(7), 625-636.
- Stienen, J. J., Ottevanger, P. B., Wennekes, L., Dekker, H. M., van der Maazen, R. W., Mandigers, C. M. & Hermens, R. P. (2015). Development and Evaluation of an Educational E-Tool to Help Patients With Non-Hodgkin's Lymphoma Manage Their Personal Care Pathway. *JMIR research protocols*, 4(1), e6.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research* (1st ed.). Thousand Oaks: Sage Publications.
- Sulaiman, H., & Wickramasinghe, N. (2014). Assimilating Healthcare Information Systems in a Malaysian Hospital. *Communications Of The Association For Information Systems*, 34(78), 1291-1318.
- Suleiman, A. (2008). E Health in Health Development in Malaysia. In *HIMSS AsiaPac08 Conference & Exhibition*.
- Sukums, F., Mensah, N., Mpembeni, R., Massawe, S., Duysburgh, E., Williams, A. & Blank, A. (2015). Promising adoption of an electronic clinical decision support system for antenatal and intrapartum care in rural primary healthcare facilities in sub-Saharan Africa: The QUALMAT experience. *International journal of medical informatics*, 1-11.
- Sullivan, G.M. and Feinn, R. (2012). Using Effect Size—or Why the P Value Is Not Enough. *Journal of Graduate Medical Education*, 4(3): 279-282.

- Swarbrick (2012). *Multivariate Data Analysis For Dummies* (1st ed.). England: John Wiley & Sons, Ltd.
- Switz, D. (1976). The problem-oriented medical record: evaluation and management of anemia before and during use. *Archives Of Internal Medicine*, 136(10), 1119-1123.
- Syed Mohamad, S.M., Mohd, H. and Marzuki, Z. (2008). Pre-implementation Framework for Electronic Medical Record Project, *Proceeding of Science, technology and Social Science 2008*, 2, 441-448.
- Tachinardi, U., Gutierrez, M., Moura, L., & Melo, C. (1994). Integrating Hospital Information Systems. The challenges and advantages of (re-) starting now., 84.
- Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology* (1st ed.). Thousand Oaks, Calif.: Sage.
- Tashakkori, A., & Tedlie, C. (2003). Issues and dilemmas in teaching research methods courses in social and behavioral sciences: A US perspective. *International Journal Of Social Research Methodology*, 6(1), 61-77.
- Tabachnick, B., & Fidell, L. (2001). *Using Multivariate Statistics*. 4th ed. California: Thousand Oaks.
- Thong, J.Y.L. (1999). An Integrated Model of Information Systems Adoption in Small Business. *Journal of Management Information Systems*, 15(4), 187-214.
- Tornatzky, Louis G. & Fleischer, M. (1990). *The Processes of Technological Innovation*. Lexington Books.
- Travers, M. (2001). *Qualitative research through case studies*. Sage.
- Vagias, W. M. (2006). Likert-type scale response anchors. *Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management*. Clemson University.
- Vegoda, M., & Dyro, J. (1986). Implementation of an advanced clinical and administrative hospital information system. *International Journal Of Clinical Monitoring And Computing*, 3(4), 259-268.
- Ven, K. & Verelst, J. (2011). An empirical investigation into the assimilation of open source server software. *Communications of the Association for Information Systems*, 28(9), 117-140.

- Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273-315.
- Venkatesh, V., & Davis, F. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision Sciences*, 27(3), 451-481.
- Venkatesh, V., & Davis, F. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 46(2), 186-204.
- Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3).
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 36(1), 157-178.
- Wang, S.J. (2003). A cost-benefit analysis of electronic medical records in primary care. *The American Journal of Medicine*, 114(5), 397-403.
- Webster, J., & Martocchio, J. (1995). The differential effects of software training previews on training outcomes. *Journal Of Management*, 21(4), 757-787.
- Wee, C. H., & Jomo, K. S. (2007). Equity in Malaysian health care: An analysis of public health expenditures and health care facilities'. *Health Care in Malaysia: The Dynamics of Provision, Financing and Access*, Routledge, Hoboken, 102-16.
- Weed, L.L. (1964). Medical Records, Patient Care, and Medical Education. *Ireland Journal of Medical Science*, 271-282.
- Weed, L.L. & Zimny N.J. (1989). Coupling, and Clinical Decision Making The Problem-Oriented System, Problem-Knowledge. *Phys Ther*, 69, 565-568.
- Wendt, T., Haber, A., Brigl, B., & Winter, A. (2004). Modeling hospital information systems (part 2): using the 3LGM2 tool for modeling patient record management. *Methods Of Information In Medicine-Methodik Der Information In Der Medizin*, 43(3), 256--267.
- Winter, A., & Haux, R. (1995). A three-level graph-based model for the management of hospital information systems. *Methods Of Information In Medicine*, 34(4), 378-396.

- Xu, W., Guan, Z., Cao, H., Zhang, H., Lu, M., & Li, T. (2011). Analysis and evaluation of the Electronic Health Record standard in China: A comparison with the American national standard ASTM E 1384. *international journal of medical informatics*, 80(8), 555-561.
- Yang, Z., Kankanhalli, A., Ng, B. Y., & Lim, J. T. Y. (2015). Examining the pre-adoption stages of healthcare IT: A case study of vital signs monitoring systems. *Information & Management*, 52(4), 454-467.
- Yang, Z., Kankanhalli, A., Ng, B. Y., & Lim, J. T. Y. (2013). Analyzing the enabling factors for the Organisational decision to adopt healthcare information systems. *Decision Support Systems*, 55(3), 764-776.
- Yin, R. (2003). *Case study research, design and methods* (3rd ed.). Thousand Oaks, CA: Sage Publication.
- Yin, R. (2010). *Case Study Research: Theory, Methods, Practice* (4th ed.). Woodside, A. G: Emerald Group Publishing.
- Yucel, G., Cebi, S., Hoege, B., & Ozok, A. F. (2012). A fuzzy risk assessment model for hospital information system implementation. *Expert Systems with Applications*, 39(1), 1211-1218.
- Zailani, S., Iranmanesh, M., Nikbin, D., & Beng, J. K. C. (2015). Determinants of RFID adoption in Malaysia's healthcare industry: occupational level as a moderator. *Journal of medical systems*, 39(1), 1-11.
- Zailani, S., Gilani, M. S., Nikbin, D., & Iranmanesh, M. (2014). Determinants of telemedicine acceptance in selected public hospitals in Malaysia: Clinical perspective. *Journal of medical systems*, 38(9), 1-12.
- Zakaria, N., Stanton, J., & Stam, K. (2003). Exploring security and privacy issues in hospital information system: an Information Boundary Theory perspective, 2003, 1059.
- Zhang, P., Aikman, S., & Sun, H. (2008). Two types of attitudes in ICT acceptance and use. *Intl. Journal Of Human--Computer Interaction*, 24(7), 628--648.
- Zhu, K., Kraemer, K.L. and Xu, S. (2003). E-Business Adoption by European Firms: A Cross-Country Assessment of the Facilitators and Inhibitors. *European Journal of Information Systems* 12(4), 251-268.

Zielstorff, R.D. Jette, A.M. Barnett, G.O., Schaumburg, D., Piggins, J., Weidman-Dahl, F., Gross, H. and Webster, S. (1985). A COSTAR System for Hospital-Based Coordination of Long Term Care for the Elderly. *Proc Annu Symp Comput Appl Med Care*, 17–21.

Zikos, D., Liaskos, J., Diomidous, M., & Mantas, J. (2009). Collection and sharing of information on patient safety education and training in Europe., 745-749.



VITA

The author was born in November 8, 1986 in Hospital Muar, Johor Darul Ta'zim. She went to Sekolah Menengah Canossion Convent Segamat for her secondary school. She then continues her study for *Sijil Pelajaran Malaysia (SPM)* in Sekolah Menengah Kebangsaan Seksyen 16, Shah Alam. In 2008, she had pursued her studied at Universiti Teknologi MARA (UiTM) Johor, Malaysia and graduated with Diploma in Information Management, in 2008. Thereafter, she furthered her study at Universiti Teknologi MARA (UiTM) Shah Alam, Malaysia and graduated with Bachelor (Hons) in Information Management (Record Management) in 2010. Mrs. Nurul Izzatty then enrolled at the Universiti Tun Hussein Onn Malaysia to pursue her Doctor of Philosophy Degree in Technology Management on December 2010. Dr. Nor Hazana is appointed to be her supervisor, and P.M. Dr. Alina is appointed as co-supervisor and had supervising her doctoral degree journey through thick and thin. During her study, the author has presented her paper locally and internationally. She had presented her paper in several conferences particularly in Malaysia, Indonesia and Macau. Her journal with her supervisors have been published in the Journal of Social Science and Humanity; discussing about Hospital Information System (HIS) implementation in Malaysia.

PUBLICATION

- Ismail, N., & Abdullah, N. (2011). Developing Electronic Medical Records (EMR) Framework for Malaysia's Public Hospitals. In *IEEE Colloquium on Humanities, Science and Engineering Research (CHUSER 2011)* (pp. 131-136). Penang, Malaysia: IEEE.
- Ismail, N., & Abdullah, N. (2012). An overview of Hospital Information System (HIS) implementation in Malaysia. In *3rd International Conference on Business and Economic Research (3rd ICBER 2012)* (pp. 1176-1182). Bandung, Indonesia: International Conference.
- Ismail, N., Abdullah, N., Shamsudin, A., & Ariffin, N. (2013). Implementation Differences of Hospital Information System (HIS) in Malaysian Public Hospitals. *International Journal of Social Science and Humanity (IJSSH)*, 3(2), 115-120. doi:10.7763/ijssh.2013.v3.208.
- Ismail, N. & Abdullah, N. (2013) *Implementation and Acceptance of Hospital Information System*. In: 1st FPTP Postgraduate Seminar 2013, 23 December 2013, Fakulti Pengurusan Teknologi dan Perniagaan, UTHM.
- Ismail, N., Abdullah, N., & Shamsuddin, A. (2015). Adoption of Hospital Information System (HIS) in Malaysian Public Hospitals. *Elsevier: Procedia - Social And Behavioral Sciences*, 172, 336-343. doi:10.1016/j.sbspro.2015.01.373.
- Watisin, W., Ismail, N. I., & Hashim, M. H. M. (2015). The Problems of Bilateral Relations between Educational Institutions and Industrial Committee towards Work-based Learning in Malaysia. *Elsevier: Procedia - Social and Behavioral Sciences*, 172, 352-358.
- Ismail, N. & Abdullah, N. (2016). Hospital Information System (HIS) Implementation Models in Malaysian Public Hospitals. In *2016 International Conference on Information in Business and Technology Management (I2BM)* (pp. 234-238). Malacca, Malaysia: Special Issues of Information Journal.