Faculty of Information and Communication Technology

A LAYERED BEHAVIOUR MODEL FOR ELECTRONIC INFORMATION SHARING IN IRAQ INTELLIGENCE NETWORKS

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A LAYERED BEHAVIOUR MODEL FOR ELECTRONIC INFORMATION SHARING IN IRAQ INTELLIGENCE NETWOKS

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DECLARATION

I declare that this thesis entitled "A Layered Behaviour Model for Electronic Information Sharing in Iraq Intelligence Networks" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Name : Thamer J. Abbas .

Date : ……..……

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in term of scope and quality for the award of Doctor of Philosophy.

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ABSTRACT

The weakness of information sharing has appeared clearly with the events of 11th of Sep 2001 that did not prevent the terrorist attacks. Recently, a prevalent relationship between information sharing and intelligence in the context of counter-terrorism. A few studies have been conducted in this domain by Western countries whilst, none studies done with countries which have effected directly with terrorist attacks especially the Middle East. Issues with information sharing in intelligence domain are still significant challenges. Nevertheless, literature showed there is no single model combined with the technology, information sharing and human factors with an empirical gap in this field, to determine what the intelligence need to develop non-failure intelligence product. This study aims to analysis the technology gap that focuses on fully supporting the common requirements of information sharing in Iraqi intelligence through propose an electronic information sharing model adopted based on Layered Behavioral Model. The fourteen factors are employed in five layers included, Policies and Political Constraints as an Environmental Layer, Compatibility, Information Quality, and Common Data Repository as an Organisation Layer, Cost, Expected Benefits, and Expected Risk as an Information Fusion Center Layer, Technology Capability, Top Management Support, and Coordination as a Readiness Layer, and the last factor in Individual Layer are Trust, Information Stewardship, and Information Security. A quantitative method employed to achieve a broader background of the phenomenon under investigation and to address a broader range of attitude and behavioural issues. This method was a statistical approach in testing the proposed research hypotheses for the factors. From the empirical testing point, found that Policies, Compatibility, Common Data Repository, Cost, Expected Benefits, Expected Risk, Technology Capability, Top Management Support, Trust, Information Stewardship, and Information Security had a significant influence on the degree of electronic information sharing. Whereas, Political Constraints, Information Quality, and Coordination had no significant influence on the degree of electronic information sharing. Several contributions of this study are, create a new theoretical model for the electronic information sharing within intelligence domain. Enhances existing literature by expanding upon layers and factors that are affecting in two dimensions are, electronic information sharing and intelligence. Add new vision to develop information fusion center in the context of electronic information sharing. Reduce the gap of the empirical study in intelligence sectors. And provide a formal strategy and creation a series of the guidelines for Iraqi intelligence authorities to govern E-information sharing activities

ABSTRAK

Kelemahan dalam perkongsian maklumat perisikan tentang aktiviti-aktiviti keganasan adalah antara punca yang jelas menyebabkan peristiwa 11 September 2001 tidak dapat di elakkan. Walaupun terdapat kajian tentang perkongsian maklumat perisikan dalam konteks memerangi keganasan tetapi ianya terhad kepada negara-negara Barat dan tidak melibatkan negara-negara yang menerima kesan secara langsung dengan serangan pengganas terutamanya negara-negara di Timur Tengah. Isu perkongsian maklumat dalam domain perisikan masih menjadi cabaran besar. Kajian literatur menunjukkan tidak ada satu model pun yang menggabungkan teknologi, perkongsian maklumat dan faktor manusia dalam menentukan keperluan agensi perisikan untuk membangunkan sistem perisikan yang berjaya justeru terdapat jurang empirikal dalam bidang ini. Kajian ini bertujuan untuk menganalisa jurang teknologi yang memberi tumpuan kepada menyokong sepenuhnya keperluan perkongsian maklumat dalam perisikan Iraq melalui cadangan model perkongsian maklumat elektronik berdasarkan Model Kelakuan Berlapis. Empat belas faktor yang di kenalpasti dalam lima lapisan iaitu, Dasar dan Kekangan Politik sebagai lapisan Persekitaran, Keserasian, Kualiti Maklumat, dan Penyimpanan Data Umum sebagai lapisan Organisasi, Kos, Manfaat Dijangka, dan Risiko Dijangka sebagai lapisan Pusat Gabungan Maklumat, Keupayaan Teknologi, Sokongan Pengurusan Tertinggi, dan Penyelarasan sebagai lapisan Kesediaan dan faktor lapisan terakhir adalah individu iaitu Amanah, Pemilik Maklumat dan Keselamatan Maklumat. Kaedah kuantitatif digunakan untuk mencapai latar belakang yang lebih luas daripada fenomena yang sedang dikaji dan bagi menangani pelbagai isu sikap dan isu-isu tingkah laku. Kaedah ini adalah pendekatan statistik dalam menguji hipotesis faktor penyelidikan yang dicadangkan. Dari sudut ujian empirikal, hasil dapatan menunjukkan bahawa Dasar, Keserasian, Repositori Data Awam, Kos, Faedah Dijangka, Risiko Dijangka, Teknologi Keupayaan, Sokongan Pengurusan Tertinggi, Kepercayaan, Maklumat Kepimpinan dan Keselamatan Maklumat mempunyai pengaruh yang besar ke atas tahap perkongsian maklumat elektronik. Manakala, Kekangan Politik, Kualiti Maklumat, dan Penyelarasan tidak mempunyai pengaruh yang besar ke atas tahap perkongsian maklumat elektronik. Beberapa sumbangan kajian ini adalah, mewujudkan satu model teori baru untuk perkongsian maklumat elektronik dalam domain perisikan. Meningkatkan literatur yang sedia ada dengan mengembangkan lapisan-lapisan dan faktor-faktor yang memberi kesan dalam dua dimensi, perkongsian maklumat elektronik dan maklumat perisikan. Menambah wawasan baru untuk membangunkan pusat gabungan maklumat dalam konteks perkongsian maklumat elektronik. Mengurangkan jurang kajian empirikal dalam sektor-sektor perisikan dan menyediakan strategi formal dan penciptaan satu siri garis panduan bagi pihak berkuasa perisikan Iraq untuk mentadbir aktiviti-aktiviti perkongsian maklumat elektronik.

TABLE OF CONTENT

		PAGE
DECLARATION		
APPROVAL		
ACKNOWLEDGEMENTS		
ABSTRACT		**i**
ABSTRAK		**ii**
TABLE OF CONTENT		**iii**
LIST OF TABLES		**vi**
LIST OF FIGURES		**viii**
LIST OF ABBREVIATIONS		**x**
LIST OF APPENDICES		**xii**
LIST OF PUBLICATION		**xiv**
CHAPTER		
1.	**INTRODUCTION**	**1**
1.1	Introduction	1
1.2	Background	1
1.3	Research Problem	3
1.4	Relevant Research Questions	6
1.5	Research Aim and Objectives	7
1.6	Significance and Relevance of This Research	8
1.7	Research Methodology	9
1.7.1	The Link between Research Structures	10
1.8	Organization of Thesis	12
2.	**LITERATURE REVIEW**	**14**
2.1	Introduction	14
2.2	Defining the Concept of Intelligence	14
2.2.1	Information Process in Intelligence	16
2.3	Background of Electronic Information sharing	18
2.4	Information Sharing in Intelligence	23
2.4.1	Information Sharing Environment (ISE)	27
2.4.2	Fusion Centres	30
2.5	Iraqi Intelligence Services	34
2.5.1	Electronic Project in Iraq	37
2.6	Literature Survey on Intelligence Based Information Sharing	39
2.7	Chapter Summary	58
3.	**RESEARCH METHODOLOGY**	**59**
3.1	Introduction	59
3.2	Phase One (Research Design)	60
3.2.1	Process One (Investigations)	60
3.2.2	Process Two (Identifications)	69
3.2.3	Process three (Comparative)	70

3.3 Phase Two (Modelling) 71
3.3.1 Process One (Defining Case Study) 71
3.3.2 Process Two (Methods) 71
3.3.3 Process three (Adoption) 81
3.4 Phase three (Data Analysis and Synthesis) 82
3.4.1 Process one (Questionnaire Design and Pilot Study) 82
3.4.2 Process Two (Population and Sample Size) 87
3.4.3 Process Three (Data Collection) 89
3.4.4 Process Four (Data Analysis) 91
3.4.5 Process Five (Results Evaluation) 94
3.4.6 Process Six (Research Barriers) 95
3.5 Chapter Summary 95

4. PROPOSED MODEL 97
4.1 Introduction 97
4.2 Design Theoretical Model 97
4.2.1 Theories of Study 102
4.2.2 The Suggest Layers to the Model 106
4.2.3 Formulation of Hypotheses 112
4.3 Chapter Summary 139

5. RESULT AND DISCUSSIONS 140
5.1 Introduction 141
5.2 Data Analysis 141
5.2.1 Profiles of Respondents Analysis 147
5.3 Preliminary Data Analysis 147
5.3.1 Exploratory Data Analysis 160
5.3.2 Correlation Analysis 164
5.4 Results and Discussion 170
5.4.1 Environmental Layer 172
5.4.2 Organisation Layer 176
5.4.3 Information Fusion Centre Layer 178
5.4.4 Readiness Layer 179
5.4.5 Individual Layer 182
5.5 Chapter Summary 186

6. CONCLUSION AND RESEARCH BARRIERS 188
6.1 The Overview of Research 188
6.2 Achieving the Objectives of Study 189
6.3 The Contributions of Study 190
6.3.1 The Contributions of Theory 191

6.3.2 The Contributions of Methodology 192
6.3.3 Contributions to Practice of EIS 193
6.4 Study Recommendations 194
6.5 Research Limitation 200
6.6 Future Research Directions 201
6.7 Study Conclusion 203

REFERENCES 205
APPENDICES 245

LIST OF TABLES

TABLE	TITLE	PAGE
Table 1.1	Link between Research Questions and Objectives	11
Table 2.1	Traditional Information Sharing Vs Electronic Information Sharing.	23
Table 2.2	Overview of Information Sharing Problems in Intelligence by Bharosa (2010).	26
Table 2.3	Critical Review of Intelligence and Counterterrorism Based Information Sharing	40
Table 3.1	Qualitative VS Quantitative Research Methods	72
Table 3.2	Frequency of Factors Based on Previous Study and Most Selected by Experts	77
Table 3.3	Test Reliability of The Pilot Study (Cronbach's Alpha)	85
Table 3.4	Show Reliability Test During Pilot Study and Before Data Analysis	93
Table 4.1	Theoretical Background of Factors Sources	112
Table 5.1	Explain the Respondent Profiles and Demographic Information	143
Table 5.2	Show Relationship between Dependent Variables (DV) and Respondents	145
Table 5.3	Show the Percentage of State EIS between Intelligence Departments and Intelligence Headquarter	145
Table 5.4	The Age Percentage of EIS Among Intelligence Departments and Intelligence Headquarter	146
Table 5.5	Missing Data	149
Table 5.6	Explain outlier's results	150
Table 5.7	Descriptive Statistics of Normality Bbased on Skewness and Kurtosis	153

Table 5.8: Guilford's Rule of Thumb 161

Table 5.9: Correlations Between DV and IVs 163

Table 5.10: Details for Dropped Factors 165

Table 5.11: Summary of Factors Supported Participation EIS 166

Table 5.12: Summary of Hypotheses Background and Results 169

Table 6.1: The Barriers and the Recommendation for This Study 197

LIST OF FIGURES

FIGURES	TITLE	PAGE
Figure 2.1:	Intelligence Data Cycle	17
Figure 2.2:	The First Information Sharing Model	20
Figure 2.3:	Expanded Theoretical Model of Interinteragency Information Sharing	22
Figure 2.4:	Show the Connection Between Entities in ISE	30
Figure 3.1:	Research Methodology Process	61
Figure 3.2:	The Systematic Review Process	64
Figure 3.3:	Process to Design Proposed Model by Using Delphi Method	78
Figure 3.4:	Process to Design Questionnaire Form by Using Delphi Method	79
Figure 3.5:	Process to Evaluate The Proposed Model by Using Delphi Method	80
Figure 4.1:	Overview Process to Design Model	98
Figure 4.2:	The Layered Behavioral Model of Software Development by Curtis (1988)	99
Figure 4.3:	The Layered Behavioral Model of Software Development by Fan in 2014	100
Figure 4.4:	Layered Behavior Model for This Study	102
Figure 4.5:	The Proposed Electronic Information Sharing Model for Iraqi Intelligence Networks	138
Figure 5.1:	Chapter Framework	141
Figure 5.2:	Shown there is no homogeneity of variance in data of this study.	156
Figure 5.3:	Show Eigen values for independent variables	160

Figure 5.4: Electronic Information Sharing Model Between Intelligence Departments and Intelligence Headquarter in Iraq Based on Influence Factors 168

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
IIC	Iraqi Intelligence Communities
ICT	Information Communication Technology
II	Iraqi Intelligence
IS	Information sharing
IT	Information Technology
TST	Transportation Systems and Technology
MST	Ministry of Science and Technology
GoI	Government of Iraq
MoI	Ministry of Interior
SBU	Sensitive, but Unclassified
FC	Fusion Centers
CIA	Central Intelligence Agency
FBI	Federal Bureau of Investigation
INS	Iraqi National Intelligence Service
IFC	Information Fusion Center
DW	Data Warehouse
CDR	Command Data Repository
IOS	InterOrganisation Systems

DOI	Diffusion of Innovations
DHS	Department of Homeland Security
NGN	Next Generation Network
UN	United Nations
ISI	Intelligence and Security Informatics
ASAM	Adaptive Safety Analysis and Monitoring
AIS	Assured Information Sharing
SOA	Service Oriented Architecture
DM	Disaster management
LBM	Layered Behavioral Model
SEISP	States of Electronic Information Sharing Practices
IVs	Independent Variables
DVs	Depended Variables
TMS	Top Management Support
EFA	Exploratory Factor Analysis
PCA	Principal Component Analysis
R	Karl Pearson's Coefficient of Correlation

LIST OF APPENDICES

APPENDICES	TITLE	PAGE
Appendix A:	Electronic Information Sharing Models\Framework Background	245
Appendix B:	Measurement Items Sources	247
Appendix C:	Support Letter	250
Appendix D:	Interview Descriptions	253
Appendix E:	Questionnaire Form	259
Appendix F:	Pilot Study	267
Appendix G:	Distributed Methods for Questionnaire Form	270
Appendix H:	Evaluation Knowledge	271
Appendix I:	Respondent Profiles and Demographic Information	272
Appendix J:	Relationship Between Dependent Variables-DV and Respondents	275
Appendix K:	Relationship Between Dependent Variables-DV with Demographic	281
Appendix L:	Missing Data	289
Appendix M:	Data Normality	293
Appendix N:	Data Linearity	302
Appendix O:	Independent Errors	310
Appendix P:	Homogeneity	311
Appendix Q:	Measure of Sampling Adequacy	312
Appendix R:	Eigen Values	313

Appendix S: Factor Loadings 314

Appendix T: Correlation Analysis 319

Appendix U: Single Regression 326

Appendix V: Multi-Regression 331

Appendix W: Systematic Review 332

LIST OF PUBLICATION

Abaas, T. J., Shibghatullah, A. S. and Jaber, M. M. (2014) 'Use Information Sharing Environment Concept to Design Electronic Intelligence Framework for Support E-Government : Iraq as Case Study', Advances in Computing, 4(1), pp. 22–24. doi: 10.5923/j.ac.20140401.06.

Abaas, T., Shibghatullah, A. S., Yusof, R. and Alaameri, A. (2014) 'Importance and significance of information sharing in terrorism field', in International Symposium on Research in Innovation and Sustainability 2014. Sci.Int.(Lahore), pp. 1719–1725.

Jaber, M. M., Ghani, M. K. A., Suryana, N., Mohammed, M. A. and Abbas, T. (2015) 'Flexible Data Warehouse Parameters: Toward Building an Integrated Architecture', International Journal of Computer Theory and Engineering, 7(5), pp. 349–353. doi: 10.7763/IJCTE.2015.V7.984.

Abbas, T., Shibghatullah, A. S., Yusof, R. and Jaber, M. M. (2016) 'Effective Environmental Factors to Performance of Electronic Information Sharing in Iraqi Intelligence', Journal of Engineering and Applied Sciences, 11(3), pp. 452–461.

Abbas, T., Shibghatullah, A.S., Yusof, R., et al., 2017. Development of Information Fusion Centre Based on Electronic Information Sharing Concept. International Journal of Control Theory and Applications, Under Review.

Abbas, T., Shibghatullah, A.S. & Yusof, R., 2017. Electronic Information Sharing Model for Intelligence Sector. Information and Management, Under Review.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter presents a general framework for this research. It representative of a research structure by presenting a research background, deep discussion to the stated research problem, conducted the research objectives to achieve the research questions, in addition to explaining research significance and scope, and with details of research methodology. In the end, it provided an outline to the thesis chapters.

1.2 Background

Terrorism is one of the most significant current discussions in global, and it has become a central issue for the whole world. Terrorism refers to the premeditated use of violence against a large audience of people (Gaibulloev & Sandler, 2009). Terrorist attacks have been given the importance by governments, particularly after the attack on September 11, 2001, in the United States (Zimmermann, 2016). As the recent developments in terrorism have heightened the need to enhance counterterrorism tools, the counter-terrorism refers to incorporating the practice, tactics, techniques, and strategies that governments, militaries, police departments and corporations adopt to attack terrorist threats and/or acts, both real and imputed. Counter-terrorism includes both the detection of potential acts and the response to related events (Topor, 2013; Lugna, 2006; Popp et al., 2004).

Recently, intelligence has become one of the most widely used groups of antibacterial agents and has been extensively used for decades to counter-terrorism (Byman, 2014). The Intelligence is an organisation that contains multiple agencies tasked to collect and analyse intelligence for the purpose of promoting national security and informing key government leaders and decision-makers (Montgomery, 2012; Carter & Carter, 2009). Moreover, the issue of terror has been a controversial and much-disputed subject within the field of counterterrorism to find best ways for stop terrorist. One of the most significant current discussions to create a good cooperation and coordination between all the intelligence agencies and the security agencies through information sharing projects (Cocq, 2015). The unless of expectation about the capabilities of the terrorists is quite low (or counterterrorism is relatively ineffective), information sharing of intelligence in general view close to the inefficiencies (Jensen, 2014). Information sharing (IS) refers to the information exchange among employees within or outside an organisation to effective decision making (Dawes, 1996).

Many academic works have been proposed and implemented to improve the quality of intelligence to combat terrorism throughout the world. In western countries established two projects first one is information sharing environment (ISE) refer to share data that have the effect to the national security from any available sources in various sectors. ISE face many challenges with each sector not subject to the authority of intelligence have different orientations, various kinds of information privacy, policy, the deferent level of technologies, and members with different backgrounds, etc. (German & Jay, 2008). The challenges still up to build secure information sharing environment. Especially with the increased need to share data across agencies and security domains; the task of architecting projects that enables sharing capabilities is a significant undertaking that requires an understanding of data systems,

technologies, governance, and cultures with the various area (Farroha et al. 2009; Carter & Rip 2012).

Secondly, is information fusion center (IFC) or originally called 'regional intelligence centers' represent focal points for data exchange and were established for the sole purpose of counter-terrorism (Monahan & Palmer 2009; Monahan 2011). Without a measure of the sharing factors, the agencies that constitute fusion centers will not be able to establish a common means of achieving the data sharing aim (Regan & Monahany, 2014). The current literature in IFC suffers from an empirical gap within the arena of contemporary intelligence (Lewandowski & Carter, 2015).

At present, a terrorist attack is one of the open problems for Iraqi government which is still ongoing from 2003 when the US occupied Iraq (Gataa & Muassa 2011; Al-dahash et al. 2014). Despite the US attempts to improve the Iraqi intelligence products (US Department of Defense 2009; US Department of Defense 2010). US efforts to help develop Iraqi Intelligence communities depends on their experiences in this area rather than on the case study that made many failures in this context (Witty, 2015). While this study show in, no formal strategy to govern EIS activities in Iraq. The research contribution is to present a theoretical electronic information sharing model based on intelligence domain, combine the technical, information sharing and human factors in the single model, and to avoid the empirical gap within the arena of intelligence by using the quantitative method. In particularly, provide guidelines for Iraqi intelligence community towards resolving the problem of information sharing and add vision to develop information fusion center.

1.3 Research Problem

Soon after 9/11, it became clear that there had been poor information-sharing within and between all levels and branches of the intelligence community (Regan & Monahany 2014; Kean et al. 2004). The connection between intelligence and information sharing very clear in context fighting terrorism (Zimmermann, 2016). There have been many studies concerning the tracking of intelligence problems in the context of information sharing, but all suffer from several drawbacks. Listed below:

- The weakness of technology adoption in the level of intelligence agencies. Recent developments in terrorist attacks have heightened the need for technology use within intelligence field (Staniforth & Akhgar, 2015). It was painfully evident that current information systems and processes were simply inadequate to deal with threats of this nature (Okewu & Okewu, 2015). Should increase the efforts to study information sharing, analysis, communications, and technology use in the intelligence sector. It plays a critical role in decision making, especially on battlegrounds and in situations where national security is under threat (Boer 2015; Yang & Wing 2007; Carter & Rip 2012).
- Lack of knowledge within information sharing processes in intelligence sector (Cocq, 2015). Should enhance a mechanism of data sharing to keep up with the operation of data collecting by different intelligence agencies (Peled 2014; Gataa & Muassa 2011). There is a pressing need to develop models and techniques based technology into various intelligence products in the context of how information is integrated and shared (Ezell et al. 2012; Al-dahash et al. 2014). Only in that way would the data become meaningful and valuable to agency personnel responsible for making effective use of it.

- The initiatives to increase the sharing of information to fight terrorism are not well coordinated; it lead to a lack of effective integration increases the risk that agencies will overlook, or never even receive, information needed to prevent a terrorist attack (Relyea 2004; Schneider & Hurst 2008; Thuraisingham 2008).
- The information-security context is the problem of intelligence, and it is the main concern for intelligence agencies when to use technologies in sharing information (de Lint et al. 2007; Huang & Nicol 2013; Walsh & Miller 2016).
- The challenges in intelligence are still significant and include technical, policy and human factors. There is currently a published list of intelligence sharing domain baseline products that satisfy some of the desired capabilities and a technology gap and human factors analysis that concentrates on to fully supporting the requirements (Farroha et al. 2009; Tromblay 2015).
- Lack of insufficient of influence academic literature on intelligence domain (Marrin, 2015). Particularly, in the context of information sharing and the empirical gap within the arena of intelligence domain that leads to unsatisfactory solutions (Lewandowski & Carter 2015; Sageman 2014; Salehyan 2015).
- More study of information sharing needed with the context of the geographic region. The geographic region has an influence on information sharing, and information sharing across geographical differences is an initial step for future research to consider. Scholars should focus on studying the influence factors in intelligence fusion centers for future research to address the variations of fusion center models. It would also be beneficial for scholars to examine aspects of