

Investigating COBIT for Information Technology Audit in the Tasmanian Public Sector

*Dissertation submitted in partial fulfilment of the requirements for the
degree of Bachelor of Information Systems (Honours)*

By

Lynne Gerke, BCom BIS



Submitted to the School of Information Systems, University of Tasmania
October 2005

Statement of Authenticity

To the best of my knowledge and belief, this dissertation contains no material accepted for the award of any degree or diploma in any university, except where stated. All material obtained from previously published or written sources has been referenced in the text of the dissertation.

This dissertation may be made available for loan and limited copying in accordance with the Copyright Act 1968.

Lynne Gerke

October 2005

Abstract

There has been worldwide interest in corporate governance because of the high profile corporate collapses of the early 2000s. The use of control frameworks has been mandated in the United States of America through the Sarbanes Oxley Act of 2002. One of the popular frameworks adopted is the Control Objectives for Information and Related Technologies (COBIT).

Organisations have shown an increasing interest in using COBIT both as an IT governance framework and also for IT audit because of its focus on the alignment of business and IT goals and processes. The COBIT framework is massive, so there is a need for research to determine the most important IT processes in public sector organisations in order to reduce the number of audit areas included in an abbreviated COBIT IT audit instrument while retaining relevance. There is a large body of published work available for COBIT, however, much of this has originated within the domain of the practitioner and is aimed at a similar readership, with little, if any, academic research that has considered the effectiveness of the framework. Prior research has been conducted in the national and international arenas, but it is unclear if this can be extended to the Tasmanian public sector.

This research used a survey methodology to obtain ratings from selected Tasmanian public sector organisations for each of the high level IT control objectives in the COBIT framework. These ratings were compiled to form a ranked list of the most important IT processes for the Tasmanian public sector. Audit measures were selected for the key IT processes, then validated by a senior public sector IT audit professional and the instrument subsequently trialled on a range of Tasmanian public sector organisations. An evaluation of the IT audit process using COBIT was also undertaken.

The instrument developed contained seven IT control objectives and was successfully trialled in nine public sector organisations of all possible levels. The results obtained indicated that Tasmanian public sector organisations perceived ensuring security of their systems to be the most important IT process. Of the seven IT control objectives audited, five were also considered important in national and international studies.

The results obtained suggests that use of the COBIT-derived instrument for public sector IT audit provided a insight into the IT governance and control within these

organisations as well as indicating the degree to which the goals and governance of the organisation and the organisation were aligned, neither of which was available with the use of the previous instrument. The use of COBIT for IT audit in this case was considered to be effective and provides some validation in one public sector context of the extensive use of COBIT by practitioners.

Acknowledgements

The past five years have been a rollercoaster ride of triumphs and crashing disappointments, although fortunately more of the former than the latter. I would like to pay tribute to my inspiration and role model, my mother. Without your encouragement and support I would not have made it this far.

To Gail, thanks for persuading me that IT audit was an appropriate domain for me to research. Thank you for your unending patience, for being there and encouraging me when I didn't think I could continue. I don't think I could have picked a better supervisor, but I think you may have created a monster.

The support received from the Tasmanian Audit Office has been amazing. To Christina, thanks for your insights, for providing documentation, contacts and support; without you much of this project would not have been possible. Also to Kate, thank you for your support, for clarifying terminology and for being an admirable stand in when Christina was not available.

Without the co-operation of the managers who participated in the audit phase I would only have had half a project. Thanks to Jane, Jo, Andrew, Iain, Michael, Richard, Scott, Sean and Sen for taking the time out of their busy schedules.

To my patient and supportive colleagues at Roses Newsagency, thanks for understanding when I had assignments, exams and assorted other emergencies. Special thanks to Margaret for stepping in when disaster struck last year and when the going got hard this year. I must now surely be the most overqualified paper girl in the state.

Finally, I would like to dedicate this work to my father. I spent the first thirty years of my life trying so hard not to be like you. Fortunately I grew up. I know that although you may not have said it, you were proud of my achievements. This is for you.

Copyright Acknowledgement

Includes excerpts from COBIT: *Control Objectives for Information and Related Technology* (3rd Edition). ©1996, 1998, 2000 IT Governance Institute (ITGI). All rights reserved. COBIT is a registered trademark of the Information Systems Audit and Control Association and the IT Governance Institute. Used by permission.

Table of Contents

CHAPTER 1 - INTRODUCTION	1
1.1 Introduction	1
1.2 Background.....	1
1.2.1 Governance	1
1.2.1.1 <i>The United States Response</i>	1
1.2.1.2 <i>The Australian Response</i>	2
1.2.2 COBIT.....	3
1.3 Information Technology Audit.....	4
1.4 Research Objective.....	4
1.5 Research Significance.....	5
1.5.1 Researchers	5
1.5.2 Practitioners	6
1.6 Thesis Structure.....	6
1.6.1 Chapter 1 - Introduction.....	6
1.6.2 Chapter 2 - Literature Review.....	6
1.6.3 Chapter 3 - Methodology	6
1.6.4 Chapter 4 - Results and Analysis	6
1.6.5 Chapter 5 - Conclusions.....	6
1.6.6 Appendices.....	7
CHAPTER 2 - LITERATURE REVIEW	8
2.1 Introduction	8
2.2 Governance	8
2.2.1 Corporate Governance and IT Governance.....	8
2.2.2 What is Information Technology Governance?	9
2.2.3 IT Governance.....	9
2.2.3.1 <i>IT Strategic Alignment</i>	10
2.2.3.2 <i>IT Value Delivery</i>	11
2.2.3.3 <i>Risk Management</i>	11
2.2.3.4 <i>Performance Measurement</i>	12
2.3 Statutory Requirements.....	12
2.3.1 Australia	12

2.3.2	United States of America	12
2.3.3	IT Frameworks	13
2.3.4	Summary	13
2.4	COBIT	14
2.4.1	Introduction	14
2.4.2	<i>The Framework</i>	14
2.4.3	The Control Objectives	16
2.4.3.1	<i>High Level Control Objectives</i>	16
2.4.3.2	<i>Detailed Control Objectives</i>	19
2.4.4	The Management Guidelines	19
2.4.4.1	<i>Maturity Models</i>	20
2.4.5	The Audit Guidelines	20
2.4.6	Prior Research on COBIT	21
2.4.7	Summary	22
2.5	Information Technology Audit.....	22
2.5.1	Introduction	22
2.5.2	ANAO	23
2.5.3	Tasmanian Audit Office.....	25
2.5.4	EUROSAI Self Assessment Project.....	26
2.5.5	Summary	26
2.6	Summary	26
2.7	The Research Question	27
CHAPTER 3 - METHODOLOGY		28
3.1	Introduction	28
3.2	Ethics	28
3.3	Research Aims	28
3.3.1	Aim 1	28
3.3.2	Aim 2	28
3.4	Research Philosophy	29
3.4.1	Ontology	29
3.4.1.1	<i>Objectivism</i>	29
3.4.1.2	<i>Subjectivism</i>	29
3.4.2	Epistemology	30
3.4.2.1	<i>Audit and accounting</i>	30

3.4.3	Research Philosophy Used.....	31
3.5	Research Methods.....	31
3.5.1	Phase 1.....	32
3.5.1.1	Survey.....	32
3.5.1.2	Survey Scope.....	32
3.5.1.3	Survey Instrument.....	32
3.5.1.4	Pilot testing.....	33
3.5.1.5	Questionnaire distribution.....	33
3.5.1.6	Follow up.....	33
3.5.1.7	Hypothesis Testing.....	34
3.5.2	Phase 2.....	34
3.5.2.1	Audit.....	34
3.5.2.2	Maturity Levels.....	34
3.5.2.3	Scope.....	35
3.6	Reliability and Validity.....	35
3.6.1	Reliability.....	35
3.6.2	Validity.....	35
3.6.2.1	Validity of the study.....	36
3.7	Analysis of Data.....	37
3.7.1	Phase 1.....	37
3.7.1.1	The issue of non-response bias.....	38
3.7.1.2	Determination of a ranked list.....	38
3.7.2	Phase 2.....	38
3.7.2.1	Justification of Choice of Audit Measures.....	39
3.7.2.1.1	Inclusions by agreement between sources.....	39
3.7.2.1.2	Exclusion by designation of originating organisation.....	40
3.7.2.1.3	Exclusion through necessity to look outside the organisation.....	40
3.7.2.1.4	Exclusion through non-applicability.....	41
3.7.2.1.5	Exclusion through potential inappropriateness.....	41
3.7.2.1.6	Exclusion through non-specificity.....	41
3.7.2.1.7	Validation of selected measures.....	42
3.7.2.2	Audit.....	42
3.7.2.3	Documentation.....	42
3.7.3	Processing.....	43
3.8	Evaluation of Use of Instrument.....	45
3.8.1	Duration of audit interview.....	45

3.8.2	Independent evaluation	45
3.8.3	Linkage of IT process to business goals.....	45
3.8.4	Relevance of instrument.....	45
3.8.5	Benchmarking	46
3.9	Summary	46
CHAPTER 4 - RESULTS AND ANALYSIS		47
4.1	Introduction	47
4.2	Phase 1 Survey of Tasmanian Audit Office Clients	47
4.2.1	Response Rate	47
4.2.2	Representativeness of the Data	47
4.2.2.1	<i>Organisational type.....</i>	<i>48</i>
4.2.2.2	<i>Respondent's Position</i>	<i>48</i>
4.2.2.3	<i>Familiarity with IT Processes</i>	<i>49</i>
4.2.2.4	<i>Familiarity with Business Objectives.....</i>	<i>50</i>
4.2.2.5	<i>Summary of Demographic Data</i>	<i>50</i>
4.2.3	Control Objective Rating Results.....	50
4.2.4	Comparison with previous studies	52
4.2.4.1	<i>Explanation of Table.....</i>	<i>53</i>
4.2.4.2	<i>Discussion.....</i>	<i>54</i>
4.2.5	Associated detailed control objectives	54
4.2.5.1	<i>Validation of selected measures.....</i>	<i>55</i>
4.3	Phase 2 Audit of Selected Public Sector Organisations	55
4.3.1	DS5 Ensure Systems Security	56
4.3.1.1	<i>Assigned Maturity Ratings for DS5 Ensure Systems Security.....</i>	<i>56</i>
4.3.1.2	<i>Interpretation of Results for DS5 Ensure Systems Security.....</i>	<i>57</i>
4.3.1.3	<i>Further Discussion.....</i>	<i>58</i>
4.3.2	DS4 Ensure Continuous Service	59
4.3.2.1	<i>Assigned Maturity Ratings for DS4 Ensure Continuous Service.....</i>	<i>59</i>
4.3.2.2	<i>Discussion of Results for DS4 Ensure Continuous Service</i>	<i>60</i>
4.3.3	PO1 Define a Strategic Information Technology Plan.....	61
4.3.3.1	<i>Assigned Maturity Ratings for PO1 Define a Strategic Information Technology Plan</i> <i>Plan</i>	<i>61</i>
4.3.3.2	<i>Discussion of Results for PO1 Define a Strategic Information Technology Plan</i> <i>Plan</i>	<i>63</i>
4.3.4	DS11 Manage Data	65

4.3.4.1	Assigned Maturity Ratings.....	65
4.3.4.2	Interpretation of Results.....	66
4.3.5	DS12 Manage Facilities	67
4.3.5.1	Assigned Maturity Ratings for DS12 Manage Facilities.....	67
4.3.5.2	Discussion of Results for DS12 Manage Facilities.....	70
4.3.6	AI6 Manage Changes.....	71
4.3.6.1	Assigned Maturity Ratings.....	71
4.3.6.2	Discussion of Results for AI6 Manage Changes.....	72
4.3.7	PO8 Compliance with External Requirements.....	73
4.3.7.1	Assigned Maturity Ratings.....	73
4.3.7.2	Preliminary Discussion of Results for PO8 Compliance with External Requirements.....	74
4.3.7.3	Elimination of audit measures.....	74
4.3.7.4	Revised Assigned Maturity Ratings.....	75
4.3.7.5	Interpretation of Revised Results for PO8 Ensure Compliance with External Requirements.....	75
4.3.8	Summary of Audit Results.....	77
4.3.9	Comparison with previous studies	78
4.3.9.1	Limitations.....	80
4.3.10	Evaluation of the Instrument.....	81
4.3.10.1	Duration of Audit Interviews.....	81
4.3.10.2	Independent Evaluation of Audit Instrument.....	81
4.3.10.3	Linkage of IT Process and Business Goals	81
4.3.10.4	Base of the Instrument.....	81
4.3.10.5	Benchmarking.....	82
4.3.10.6	Summary.....	82
CHAPTER 5 - CONCLUSION.....		83
5.1	Introduction	83
5.2	Research Objectives	83
5.3	Research Significance.....	84
5.3.1	Practitioners	84
5.3.2	Academics.....	85
5.4	The Research Questions.....	85
REFERENCES.....		88