

***A PROCESS REUSE IDENTIFICATION FRAMEWORK USING  
AN ALIGNMENT MODEL***

by

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*Dedicated to my husband Jaco,  
whose generous love and support  
left fond memories  
about this study*

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## ABSTRACT

This thesis explores the potential to unify three *emerging disciplines*: enterprise engineering, enterprise architecture and enterprise ontology. The current fragmentation that exists in literature on enterprise alignment and design constrains the development and growth of the *emerging disciplines*. Enterprises need to use a multi-disciplinary approach when they continuously align, design and re-design the enterprise.

Although enterprises need to be aligned internally (across various enterprise facets), as well as externally (with the environment), most alignment approaches still focus on business-IT alignment, i.e. aligning the business operations with the information and communication technologies and systems of the enterprise. This study focuses on a popular business-IT alignment approach, called the *foundation for execution* approach, and its associated artefact, called the *operating model*. The study acknowledges the theoretical contribution of the *operating model* to establish the required level of business process integration and standardisation at an enterprise in delivering goods and services to customers. Highlighting the practical problems in selecting an *operating model* for an enterprise, and more specifically the practical problems of identifying process reuse potential at an enterprise, a thesis statement is formulated: *The operating model concept, as part of a business-IT alignment approach, can be enhanced with a process reuse identification framework, when a business-IT alignment contextualisation is used.*

The study is divided into two research questions. The first research question addresses the current fragmentation that exists in the literature, which impairs reuse of the existing business-IT alignment knowledge base. An inductive literature review develops the Business-IT Alignment Model to provide a common contextualisation for current business-IT alignment approaches. The second research question addresses the practical problems of the *operating model* regarding the identification of process reuse potential at an enterprise. Applying the newly developed Business-IT Alignment Model as a contextualisation instrument, the study demonstrates the use of design research in developing the Process Reuse Identification Framework.

The conclusion after the investigation of the two research questions is that the thesis statement was confirmed, i.e. the *operating model* concept, as part of a business-IT alignment approach, can be enhanced with a process reuse identification framework, when a business-IT contextualisation is used.

**Key words:** Enterprise engineering, enterprise architecture, enterprise ontology, enterprise design, enterprise alignment, business-IT alignment, operating model, process standardisation, process modelling, reusable process models.

# TABLE OF CONTENTS

TABLE OF CONTENTS .....	VII
LIST OF FIGURES .....	XIII
LIST OF TABLES .....	XVI
<b>PART A: INTRODUCTION AND RESEARCH METHODOLOGY .....</b>	<b>23</b>
<b>1. INTRODUCTION .....</b>	<b>24</b>
1.1 INTRODUCTION .....	24
1.2 THEORETICAL BACKGROUND .....	25
1.2.1 <i>An enterprise</i> .....	26
1.2.2 <i>Business versus organisation</i> .....	27
1.2.3 <i>Business-IT alignment versus enterprise alignment</i> .....	28
1.3 RATIONALE FOR THIS STUDY .....	30
1.4 THE RESEARCH QUESTIONS, OBJECTIVES AND OUTPUTS .....	30
1.5 THE SCOPE AND LIMITATIONS OF THE STUDY .....	32
1.5.1 <i>Scope of the PRIF</i> .....	32
1.5.2 <i>Scope of the BIAM</i> .....	32
1.6 SUMMARY OF SCIENTIFIC CONTRIBUTIONS .....	33
1.7 RESEARCH METHODOLOGY .....	34
1.8 STRUCTURE OF THIS THESIS .....	35
<b>2. RESEARCH METHODOLOGY .....</b>	<b>37</b>
2.1 INTRODUCTION .....	37
2.2 RESEARCH PARADIGMS .....	38
2.3 RESEARCH DESIGNS .....	41
2.3.1 <i>Mixed method designs</i> .....	41
2.3.2 <i>Design research</i> .....	42
2.3.2.1 Design research methodology and outputs .....	43
2.3.2.2 Paradigmatic assumptions of design research .....	45
2.3.3 <i>Exploratory design</i> .....	46
2.4 METHODS FOR DATA COLLECTION .....	47
2.4.1 <i>Literature review</i> .....	47
2.4.2 <i>Questionnaires</i> .....	47
2.4.2.1 Sample size .....	49
2.4.2.2 Representative sample .....	49
2.4.3 <i>Interviews</i> .....	50
2.5 PARADIGM FOR THIS THESIS .....	51
2.6 THESIS RESEARCH DESIGN AND METHODS FOR DATA COLLECTION .....	53
2.6.1 <i>A mixed methods design</i> .....	53
2.6.2 <i>Design research and data collection for building the PRIF</i> .....	54

2.6.2.1	Data collection in defining the research problem.....	58
2.6.2.2	Data collection to evaluate the use of the interaction model .....	58
2.6.2.3	Data collection to evaluate the PRIF method, mechanisms and practices .....	59
2.6.3	<i>Exploratory design and data collection for building the BIAM</i> .....	60
2.6.3.1	Data source 1: Six current alignment approaches .....	60
2.6.3.2	Data source 2: Theoretical foundations of the six alignment approaches.....	61
2.6.3.3	Data source 3: ISO/IEC/IEEE 42010 standard.....	61
2.6.3.4	Data source 4: Lapalme’s 3 schools of thought .....	61
2.7	ETHICAL PROCEDURES .....	62
2.8	CONCLUSION .....	63
<b>PART B: THE BUSINESS-IT ALIGNMENT MODEL (BIAM) .....</b>		<b>65</b>
<b>3.</b>	<b>THEORETICAL BACKGROUND .....</b>	<b>67</b>
3.1	INTRODUCTION .....	67
3.2	ALIGNMENT AND GOVERNANCE.....	68
3.2.1	<i>Systems theory</i> .....	70
3.2.1.1	The constructional system notion .....	72
3.2.1.2	The teleological system notion.....	74
3.2.2	<i>Systems engineering and the basic system design process</i> .....	74
3.2.3	<i>Three schools of thought on aligning the enterprise</i> .....	76
3.2.4	<i>The ISO/IEC/IEEE 42010 standard</i> .....	78
3.3	ALIGNMENT APPROACHES .....	82
3.3.1	<i>The Zachman approach</i> .....	85
3.3.2	<i>The Open Group approach</i> .....	88
3.3.3	<i>The OMB approach</i> .....	93
3.3.4	<i>The Gartner approach</i> .....	94
3.3.5	<i>The foundation for execution approach</i> .....	94
3.3.5.1	The operating model .....	95
3.3.5.2	The core diagram.....	97
3.3.5.3	Four stages of architecture maturity .....	98
3.3.5.4	The IT engagement model.....	98
3.3.6	<i>The essence of operation approach</i> .....	99
3.3.6.1	Coordination acts vs. production acts .....	100
3.3.6.2	The organisation of the enterprise .....	101
3.3.6.3	The ontological aspect models .....	102
3.3.6.4	A methodology for developing the ontological aspect models .....	102
3.4	OTHER ALIGNMENT APPROACHES .....	104
3.4.1	<i>The GERAM approach</i> .....	104
3.4.2	<i>The Schekkerman approach</i> .....	106
3.4.3	<i>The dynamic architecture approach</i> .....	107
3.4.4	<i>The Bernard approach</i> .....	108
3.4.5	<i>The Gharajedaghi approach</i> .....	108
3.4.6	<i>The Capgemini approach</i> .....	110

3.4.7	<i>The Hoogervorst approach</i> .....	111
3.4.7.1	Governance.....	111
3.4.7.2	Enterprise engineering .....	112
3.4.8	<i>The Giachetti approach</i> .....	112
3.5	CONCLUSION .....	113
<b>4.</b>	<b>THE BUSINESS-IT ALIGNMENT MODEL (BIAM)</b> .....	<b>114</b>
4.1	INTRODUCTION .....	114
4.2	THE BIAM CONSTRUCTION PROCESS.....	114
4.3	THE PROPOSED BUSINESS-IT ALIGNMENT MODEL (BIAM) .....	116
4.3.1	<i>Theoretical foundations supporting the BIAM</i> .....	118
4.3.2	<i>The BIAM components</i> .....	119
4.3.2.1	Component 1: Alignment belief/paradigm of creating value .....	119
4.3.2.2	Component 2: Dimensions .....	121
4.3.2.3	Component 3: The alignment mechanisms and practices .....	125
4.3.2.4	Component 4: Alignment approach classifiers .....	131
4.4	CONCLUSION .....	134
<b>5.</b>	<b>USING THE BUSINESS-IT ALIGNMENT MODEL (BIAM)</b> .....	<b>135</b>
5.1	INTRODUCTION .....	135
5.2	BIAM AND THE ZACHMAN APPROACH .....	135
5.2.1	<i>Component 1: Alignment belief/paradigm for creating value</i> .....	135
5.2.2	<i>Component 2: Dimensions</i> .....	136
5.2.2.1	Design domains and, concerns & constraints .....	136
5.2.2.2	Enterprise scope .....	137
5.2.3	<i>Component 3: Alignment mechanisms and practices</i> .....	137
5.2.4	<i>Component 4: Alignment approach classifiers</i> .....	138
5.2.5	<i>Conclusion: BIAM and Zachman approach</i> .....	138
5.3	BIAM AND THE OPEN GROUP APPROACH .....	138
5.3.1	<i>Component 1: Alignment belief/paradigm for creating value</i> .....	138
5.3.2	<i>Component 2: Dimensions</i> .....	138
5.3.3	<i>Component 3: Alignment mechanisms and practices</i> .....	139
5.3.4	<i>Component 4: Alignment approach classifiers</i> .....	141
5.3.5	<i>Conclusion: BIAM and the Open Group approach</i> .....	141
5.4	CONCLUSION .....	141
	<b>PART C: THE PRIF</b> .....	<b>143</b>
<b>6.</b>	<b>OPERATING MODEL DEFICIENCIES</b> .....	<b>146</b>
6.1	INTRODUCTION .....	146
6.2	FOUNDATION FOR EXECUTION APPROACH RE-VISITED.....	147
6.3	THE RESEARCH PROCESS.....	149
6.3.1	<i>The experimentation process</i> .....	150
6.3.2	<i>The questionnaire</i> .....	150



6.4	RESULTS .....	152
6.4.1	<i>Parameter 1: Participant profile</i> .....	152
6.4.2	<i>Parameter 2: Enterprise profile</i> .....	153
6.4.3	<i>Parameter 3: Current architecture status</i> .....	154
6.4.4	<i>Parameter 4: The perceived practicality of operating models and core diagrams</i> .....	156
6.5	INTERPRETATION AND SUMMARY OF RESULTS.....	157
6.6	PROBLEM-AWARENESS AND SUGGESTION.....	158
6.7	CONCLUSION .....	159
<b>7.</b>	<b>REQUIREMENTS TO IDENTIFY PROCESS REUSE OPPORTUNITIES .....</b>	<b>160</b>
7.1	INTRODUCTION AND PROBLEM DEFINITION .....	160
7.2	A BIAM CONTEXTUALISATION OF THE FOUNDATION FOR EXECUTION APPROACH.....	162
7.2.1	<i>Paradigm of creating value</i> .....	162
7.2.2	<i>The dimensions for alignment</i> .....	163
7.2.3	<i>Alignment mechanisms and practices</i> .....	164
7.2.4	<i>Alignment approach classifiers</i> .....	168
7.3	ADDITIONAL OM DEFICIENCIES .....	169
7.3.1	<i>Method deficiency</i> .....	169
7.3.2	<i>Deficiency in elevating to a fourth level of architecture maturity</i> .....	170
7.4	REQUIREMENTS TO ADDRESS OM DEFICIENCIES.....	171
7.5	CONCLUSION .....	174
<b>8.</b>	<b>INTERACTION MODEL EVALUATION.....</b>	<b>175</b>
8.1	INTRODUCTION AND PROBLEM DEFINITION .....	175
8.2	A BIAM CONTEXTUALISATION OF THE ESSENCE OF OPERATION APPROACH.....	177
8.2.1	<i>Paradigm of creating value</i> .....	177
8.2.2	<i>The dimensions for alignment</i> .....	178
8.2.3	<i>Alignment mechanisms and practices</i> .....	181
8.2.4	<i>Alignment approach classifiers</i> .....	185
8.3	COMPATIBILITY OF TWO ALIGNMENT APPROACHES .....	186
8.3.1	<i>Comparison of two alignment approaches</i> .....	186
8.3.2	<i>A proposed process representation language</i> .....	189
8.4	EVALUATION METHOD.....	191
8.5	INTERACTION MODELS AND EVALUATION RESULTS.....	192
8.5.1	<i>The practitioner's viewpoint</i> .....	194
8.5.2	<i>The business user's viewpoint</i> .....	194
8.6	CONCLUSION .....	195
<b>9.</b>	<b>THE PRIF METHOD, MECHANISMS AND PRACTICES.....</b>	<b>197</b>
9.1	INTRODUCTION AND PROBLEM DEFINITION .....	197
9.2	THE DEVELOPMENT PROCESS .....	199
9.3	RESULTS – NEW METHOD, MECHANISMS AND PRACTICES.....	202

9.3.1	<i>Phase 1: Gain approval</i> .....	202
9.3.2	<i>Phase 2: Provide enterprise scope context</i> .....	203
9.3.3	<i>Phase 3: Identify process standardisation opportunities</i> .....	204
9.4	CONCLUSION.....	206
<b>10.</b>	<b>PROCESS REUSE IDENTIFICATION FRAMEWORK EVALUATION.....</b>	<b>207</b>
10.1	INTRODUCTION.....	207
10.2	EVALUATION METHOD.....	209
10.2.1	<i>The experimentation process</i> .....	209
10.2.2	<i>The questionnaire</i> .....	210
10.3	RESULTS.....	212
10.3.1	<i>Parameter 1: Participant profile</i> .....	212
10.3.2	<i>Parameter 2: Enterprise profile</i> .....	214
10.3.3	<i>Parameter 3: Standard practices for doing process architecture work</i> .....	214
10.3.4	<i>Parameter 4: The perceived usefulness and ease-of-use of the PRIF method, mechanisms and practices</i> .....	215
10.4	INTERPRETATION AND SUMMARY OF RESULTS.....	220
10.5	CONCLUSION.....	223
	<b>PART D: SCIENTIFIC CONTRIBUTION AND CONCLUSION.....</b>	<b>225</b>
<b>11.</b>	<b>CONTRIBUTION.....</b>	<b>226</b>
11.1	INTRODUCTION.....	226
11.2	THE BUSINESS-IT ALIGNMENT MODEL (BIAM) CONTRIBUTIONS (RESEARCH QUESTION 1).....	227
11.2.1	<i>The Business-IT Alignment Model (BIAM) for contextualisation</i> .....	228
11.2.1.1	Method for contextualising a current alignment approach.....	229
11.2.1.2	Prospective users of the BIAM.....	230
11.2.2	<i>The Business-IT Alignment Model (BIAM) for approach comparison</i> .....	230
11.3	THE PROCESS REUSE IDENTIFICATION FRAMEWORK (PRIF) CONTRIBUTIONS (RESEARCH QUESTION 2).....	232
11.3.1	<i>An Alignment Approach Enhancement Method (AAEM), using BIAM</i> .....	232
11.3.1.1	The Alignment Approach Enhancement Method (AAEM).....	232
11.3.1.2	Prospective users of the Alignment Approach Enhancement Method (AAEM).....	234
11.3.2	<i>Requirements for enhancing the OM for process reuse identification</i> .....	234
11.3.3	<i>Method, mechanisms and practices to enhance the OM concept</i> .....	237
11.4	MAIN CONTRIBUTION OF THIS STUDY.....	239
11.5	CONCLUSION.....	240
<b>12.</b>	<b>CONCLUSIONS.....</b>	<b>241</b>
12.1	INTRODUCTION.....	241
12.2	SUMMARY OF FINDINGS.....	241
12.2.1	<i>Summary: Research Question 1</i> .....	242
12.2.2	<i>Summary: Research Question 2</i> .....	243
12.2.2.1	Problem awareness and suggestion.....	243

12.2.2.2	First development increment/sub-cycle .....	244
12.2.2.3	Second development increment/sub-cycle .....	244
12.2.2.4	Third development increment/sub-cycle .....	245
12.2.2.5	Evaluation and conclusion .....	246
12.2.3	<i>Summary: Contributions</i> .....	246
12.3	FURTHER RESEARCH .....	247
12.3.1	<i>Extension of BIAM</i> .....	248
12.3.2	<i>The Alignment Approach Enhancement Method (AAEM) extension</i> .....	249
12.4	REFLECTIONS .....	249
12.4.1	<i>Methodological reflection</i> .....	250
12.4.1.1	Methodological reflection: Research Question 1 .....	252
12.4.1.2	Methodological reflection: Research Question 2 .....	253
12.4.2	<i>Scientific reflection</i> .....	254
12.4.2.1	Contribution summary.....	255
12.4.2.2	Scientific reflection of the BIAM .....	256
12.4.2.3	Scientific reflection of the PRIF.....	256
12.5	CLOSURE .....	258
<b>13.</b>	<b>REFERENCES .....</b>	<b>259</b>

# LIST OF FIGURES

Figure 1: Contributing theories, root disciplines and emerging disciplines in enterprise design and alignment, based on Bernard (2005) and Giachetti (2010) .....	26
Figure 2: Enterprise as a sub-system and composed of sub-systems.....	26
Figure 3: Business-IT alignment vs. enterprise alignment scope .....	28
Figure 4: Business-IT alignment scope of this study .....	33
Figure 5: Thesis contributions .....	34
Figure 6: Supplementary and core component of mixed methods research, based on Morse (2010) .....	35
Figure 7: Structure of the thesis .....	36
Figure 8: Research methodology concepts, based on Creswell & Plano Clark (2006).....	37
Figure 9: Chapter map for Chapter 2 .....	38
Figure 10: Inductive versus deductive reasoning (Trochim, 2006) .....	40
Figure 11: Supplementary and core component of mixed methods research, based on Morse (2010) (duplicate of Figure 6) .....	42
Figure 12: Reasoning in the design cycle, based on Vaishnavi & Kuechler (2004/5).....	44
Figure 13: Components of a mixed methods design for this thesis.....	52
Figure 14: Components and data collection methods for this thesis .....	54
Figure 15: Design research for building and validating the PRIF .....	55
Figure 16: Exploratory design for building and applying the BIAM .....	62
Figure 17: Using IT governance and enterprise governance to enact alignment .....	69
Figure 18: The structure/ontology of a system, based on Dietz (2006).....	73
Figure 19: The basic system design process, based on Dietz (2006) and Hoogervorst (2009) .....	75
Figure 20: Metamodel of an architecture description, based on ISO/IEC JTC 1/SC 7 committee (2011, p. 5) .....	79
Figure 21: Metamodel of an architecture framework, based on ISO/IEC JTC 1/SC 7 committee (2011, p. 10).....	81
Figure 22: Metamodel of an architecture description language, based on ISO/IEC JTC 1/SC 7 committee (2011, p. 11).....	82
Figure 23: Timeline of enterprise architectures, based on Bespoke Systems (2012) .....	84
Figure 24: The Zachman Enterprise Framework, Version 3.0, a direct copy (Zachman, 2012).....	85
Figure 25: Example of vertical integration, based on Locke (2009a) .....	87
Figure 26: Example of horizontal integration, based on Locke (2009a).....	88
Figure 27: TOGAF ADM Cycle, a direct copy (The Open Group, 2009, p. 54) .....	90
Figure 28: Structure of the TOGAF document, a direct copy (The Open Group, 2009, p. 4) .....	91
Figure 29: Relationships between entities in the content metamodel, a direct copy (The Open Group, 2009, p. 379) .....	92
Figure 30: Segments and services, a direct copy (OMB, 2007b, p. 3).....	93
Figure 31: Characteristics of four operating models, based on Ross et al. (2006, p. 29).....	96
Figure 32: Different operating models position enterprises for different types of growth, based on Ross et al. (2006, p. 39) .....	96
Figure 33: Core diagram process and template for a unification OM, based on Ross et al. (2006, p. 54).....	97
Figure 34: The IT engagement model, based on Ross et al. (2006, p. 120) .....	99
Figure 35: Three kinds of communicative acts, based on Dietz (2006) .....	101
Figure 36: The three aspect systems, based on Dietz (2006) .....	102
Figure 37: The ontological aspect models, based on Dietz (2006, p. 140).....	103
Figure 38: GERAM (Generalised Enterprise Reference Architecture and Methodology) framework components, based on GERAM (1999) .....	106
Figure 39: The EA3 Cube Framework, based on Bernard (2005, p. 38).....	108
Figure 40: Interactive Management Model, based on Gharajedaghi (2006, p. 23).....	109
Figure 41: The Integrated Architecture Framework, based on Capgemini (2007, p. 13).....	111
Figure 42: Pillars of enterprise engineering, based on Hoogervorst (2009) .....	112
Figure 43: Enterprise Design Methodology, based on Giachetti (2010, p. 120) .....	113

Figure 44: Exploratory design for building and applying the BIAM (duplicate of Figure 16) .....	115
Figure 45: The BIAM (adapted from De Vries, 2010) .....	117
Figure 46: The theoretical foundations of the BIAM .....	118
Figure 47: Relationships between a set of alignment mechanisms and practices, the system design process, and enterprise strategic choices .....	126
Figure 48: The BIAM contextualization of the Zachman approach.....	136
Figure 49: A BIAM contextualization of the Open Group approach .....	139
Figure 50: Design research for building and validating the PRIF (duplicate of Figure 15) .....	145
Figure 51: Design cycle context for Chapter 6 (duplicating part of Figure 50) .....	146
Figure 52: Characteristics of four operating models, based on Ross et al. (2006, p. 29) (duplicate of Figure 31).....	148
Figure 53: Core diagram process and template for a unification OM, based on Ross et al. (2006, p. 54) (duplicate of Figure 33).....	148
Figure 54: Parameters that influence the practicality of defining two key artefacts .....	151
Figure 55: Tertiary qualifications of the participants.....	153
Figure 56: Positions held by the participants .....	153
Figure 57: Number of employees working at the enterprises .....	154
Figure 58: Architecture maturity of enterprises .....	155
Figure 59: Enterprise architecture framework in use .....	156
Figure 60: Design cycle context for Chapter 7 (duplicating part of Figure 15) .....	160
Figure 61: Using the basic system design process (from Dietz (2006)) in constructing a new method.....	161
Figure 62: The foundation for execution approach focusing on ICT system design .....	163
Figure 63: The BIAM contextualisation of the <i>foundation for execution</i> approach.....	164
Figure 64: Characteristics of four operating models, based on Ross et al. (2006, p. 29) (duplicate of Figure 52).....	165
Figure 65: Core diagram template for a unification OM, based on Ross et al. (2006, p. 54) (duplicate of Figure 53).....	166
Figure 66: Architecture maturity stages, based on Ross et al. (2006) .....	168
Figure 67: Deficiencies in defining and using the OM .....	170
Figure 68: Design cycle context for Chapter 8 (duplicating part of Figure 15) .....	175
Figure 69: The essence of operations approach focusing on ICT system design .....	179
Figure 70: The BIAM contextualisation of the <i>essence of operation</i> approach.....	181
Figure 71: The ontological aspect models, based on Dietz (2006, p. 140) (duplicate of Figure 37) .....	182
Figure 72: The OAM diagrams and tables, based on Dietz (2006, p. 141).....	182
Figure 73: Actor transaction diagram for a hypothetical college (constructed using the ABACUS toolset) .....	183
Figure 74: The basic transaction pattern, based on Dietz (2006) .....	184
Figure 75: Alignment intent of the interaction model in terms of the Zachman Framework.....	185
Figure 76: Example of a departmental actor transaction diagram (using the ABACUS software tool).....	193
Figure 77: Design cycle context for Chapter 9 (duplicating part of Figure 15) .....	197
Figure 78: Using the basic system design process (from Dietz (2006)) in constructing a new method, mechanisms and practices.....	198
Figure 79: Phase 1 of the <i>new method, mechanisms and practices</i> .....	202
Figure 80: Phase 2 of the <i>new method, mechanisms and practices</i> .....	204
Figure 81: Phase 3 of the <i>new method, mechanisms and practices</i> .....	205
Figure 82: Design cycle context for Chapter 9 (duplicating part of Figure 15) .....	207
Figure 83: The content of PRIF (duplicating part of Figure 15).....	208
Figure 84: Parameters that influence the usefulness and ease-of-use of the PRIF <i>method, mechanisms and practices</i> .....	211
Figure 85: Tertiary qualifications of the participants.....	213
Figure 86: Positions held by participants.....	213
Figure 87: Number of employees working at the enterprises .....	214

Figure 88: Process modelling languages used .....	215
Figure 89: Architecting software tools used .....	215
Figure 90: Thesis contributions .....	227
Figure 91: The BIAM (duplicate of Figure 45) .....	228
Figure 92: Alignment approach enhancement process .....	233
Figure 93: Thesis contributions (duplicate of Figure 90) .....	247
Figure 94: The BIAM (duplicate of Figure 45) .....	248
Figure 95: Alignment approach enhancement process (duplicate of Figure 92) .....	249
Figure 96: Using only design research, rather than a mixed methods design .....	252
Figure 97: Thesis contributions (duplicate of Figure 90) .....	255

# LIST OF TABLES

Table 1: Paradigmatic framework.....	39
Table 2: The outputs of design research, based on Vaishnavi & Kuechler (2004/5) .....	44
Table 3: Design-science research guidelines, based on Henver et al. (2004) .....	45
Table 4: Advantages and disadvantages of using questionnaires (Whitten & Bentley, 2007).....	48
Table 5: Advantages and disadvantages of using interviews (Whitten & Bentley, 2007).....	50
Table 6: Paradigmatic framework applied to this thesis .....	52
Table 7: Adherence to the design-science research guidelines of Hevner et al. (2004) .....	56
Table 8: A sub-set of qualifiers for the three schools of thought, based on Lapalme (2011) .....	76
Table 9: Definitions of architecture description, based on ISO/IEC/IEEE 42010 standard, based on ISO/IEC JTC 1/SC 7 committee (2011) .....	79
Table 10: Other alignment approaches .....	104
Table 11: BIAM components related to ISO/IEC/IEEE 42010 architecture description components .....	127
Table 12: Questions related to the four parameters .....	151
Table 13: Established architecture levels .....	155
Table 14: Perceived practicality of OMs and core diagrams.....	157
Table 15: Requirements for addressing deficiencies pertaining to process reuse identification opportunities at enterprises .....	172
Table 16: Comparison between two alignment approaches .....	186
Table 17: Adherence to requirement categories R5 and R6 of Table 15 .....	190
Table 18: Requirements for addressing deficiencies pertaining to process reuse identification opportunities at enterprises (duplicate of Table 15) .....	199
Table 19: Questions related to the four parameters .....	211
Table 20: Questions and results (descriptive statistics) measuring the usefulness.....	216
Table 21: Questions and results (descriptive statistics) measuring the ease-of-use .....	217
Table 22: Summarised comments on the usefulness of the PRIF method, mechanisms and practices .....	221
Table 23: Summarised comments on the ease-of-use of the PRIF method, mechanisms and practices .....	221
Table 24: Alignment approach comparison grid.....	231
Table 25: Requirements for addressing deficiencies pertaining to process reuse identification opportunities at enterprises (duplicate of Table 15) .....	235

## ABBREVIATIONS

AAEM	Alignment Approach Enhancing Method
ABACUS	Architecture Based Analysis of Complex Systems
ACMM	Architecture Capability Maturity Model
ADL	Architecture description language
ADM	Architecture Development Method
ARIS	Architecture of Integrated Information Systems
BIAF	Business-IT Alignment Framework
BIAM	Business-IT Alignment Model
BPMN	Business Process Modelling Notation
BPM	Business Process Management
BPR	Business Process Reengineering
CIMOSA	Computer Integrated Manufacturing Open System Architecture
CIO	Chief information officer
CobiT	Control Objectives for Information and related Technology
CORBA	Common Object Request Broker Architecture
CRUD	Create, read, update, delete
CSIR	Council for Scientific and Industrial Research
DCOM	Distributed Component Object Model
DEMO	Design and Engineering Methodology for Organisations
DODAF	Department of Defence Architecture Framework
DSDM	Dynamic Systems Development Methodology
DYA	Dynamic Architecture
E	Enterprise integrating (as used by Lapalme (2011))
E2AF	Extended Enterprise Architecture Framework
EA	Enterprise architecture



EAP	Enterprise Architecture Planning
EARF	Enterprise Architecture Research Forum
EBA	Enterprise business architecture
EDM	Enterprise Design Methodology
EE	Enterprise engineering
EEMs	Methodologies for enterprise engineering
EETs	Enterprise engineering tools
EIA	Enterprise information architecture
EiE	Enterprise ecological adaptation (as used by Lapalme (2011))
EIT	Enterprise IT architecting (as used by Lapalme (2011))
EMLs	Enterprise modelling languages
EMs	Enterprise models
EMOs	Enterprise modules
EO	Enterprise ontology
EOS	Operational system of the enterprise
ESA	Enterprise solutions architecture
ETA	Enterprise technical architecture
e-TOM	Enhanced Telecom Operations Model (see <a href="http://www.tmforum.org">www.tmforum.org</a> )
EPCs	Event-driven Process Chains
ERP	Enterprise Resource Planning
FEA	Federal Enterprise Architecture
FEAF	Federal Enterprise Architecture Framework
FEAPMO	FEA Program Management Office
GAO	General Accountability Office
GEAF	Gartner Enterprise Architecture Framework
GERA	Generalised Enterprise Reference Architecture

GERAM	Generalised Enterprise Reference Architecture And Methodology
GIM	GRAI Integrated Methodology, developed by the GRAI laboratory of the University of Bordeaux (France)
HOD	Head of department
IAF	Integrated Architecture Framework
IAM	Interaction model
ICT	Information and communication technologies
IDEF	Integrated Definition Language
IE	Information Engineering
IFAC	International Federation Of Accountants
IFIP	International Federation For Information Processing
III-RM	Reference Model for Integrated Information Infrastructure
IS	Information systems
IT	Information technology
ITIL	IT Infrastructure Library
JAD	Joint Application Development
JTA	Joint Technical Architecture
OAM	Ontological aspect model
OM	Operating model
OMB	Office of Management and Budget
OMG	Object Management Group
PA	Process architecture
PERA	Purdue Enterprise Reference Architecture
PRIF	Process Reuse Identification Framework
QSR	Qualitative systematic review
RACI	Responsible, accountable, concerned, informed

RAD	Rapid Application Development
RUP	Rational Unified Process
SAD	Structured Analysis and Design
SAM	Strategic Alignment Maturity
SIB	Standards Information Base
SOA	Service Oriented Architecture
SCOR	Supply Chain Operations Reference
TOGAF	The Open Group Architecture Framework
TRM	Technical Reference Model
UML	Unified Modelling Language
VCOR	Value Chain Operations Reference
XML	Extensible Markup Language

## PREFACE

Firstly, this thesis applies active voice, rather than passive voice, as advised by Hofstee (2006) in his book, titled: *Constructing a good dissertation*. In addition, abbreviations are only declared using capital letters, if the original authors used the abbreviation as a name. As an example, the *operating model* has not been named as OM by the original authors (Ross, Weill, & Robertson) of the *operating model*. Yet, OM is used as an abbreviation in this thesis due to its frequency of occurrence.

Secondly, it should be noted that this study already produced a number of articles in journals and conference proceedings prior to the final compilation of this thesis. The articles, published in accredited journals include:

- De Vries, M., & Van Rensburg, A. C. (2009). Evaluating and refining the 'Enterprise Architecture as Strategy' approach and artefacts. *South African Journal of Industrial Engineering*, 20(1), 31-43.
- De Vries, M. (2010). A framework for understanding and comparing enterprise architecture models. *Management Dynamics*, 19(2), 17-29.

Articles, published in conference proceedings include:

- De Vries, M., Van der Merwe, A., Gerber, A., & Kotzé, P. (2010). Refining the operating model concept to enable systematic growth in operating maturity. In C. Schutte (Ed.), *Proc. 24th SAIIE Conference* (pp. 32-46). Glenburn Lodge, Gauteng: SAIIE.
- De Vries, M., Van der Merwe, A., Gerber, A., & Kotzé, P. (2011). Using the interaction model to identify replication potential between business units. In C. S. L. Schutte & L. Pretorius (Eds.), *Proc. 1st International Conference on Industrial Engineering, Systems Engineering and Engineering Management for Sustainable Global Development (ISEM)* (pp. 134\_131 - 134\_114). Stellenbosch: ISEM.
- De Vries, M., Van der Merwe, A., Kotzé, P., & Gerber, A. (2011). A method for identifying process reuse opportunities to enhance the operating model. In *IEEE International Conference on Industrial Engineering and Engineering Management (IEEM) 2011* (pp. 1005-1009). Singapore: IEEE.

A compact disk (CD) is included with the thesis that contains the Appendices and the abovementioned articles published during the study.