

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
ABSTRACT (ENGLISH)	iv
ABSTRACT (THAI)	vi
LIST OF TABLES	xv
LIST OF FIGURES	xvii
LIST OF ACRONYMS	xxi
CHAPTER 1: INTRODUCTION	1
1.1 Background and Context: The Growth of the Knowledge Economy and Thailand's Software Development Industry	1
1.2 Software Development: A Knowledge Based Industry	4
1.3 Knowledge Workers in the Software Development Industry	6
1.4 Problem Definition	10
1.5 The Case study: A German software Developer Operating in Thailand	12
1.6 Initial Findings and Research Problems	14
1.7 Research Aim and Objectives	15
1.8 Thesis structure	17
 CHAPTER 2: LITERATURE REVIEW	 21
2.1 Chapter Overview	21
2.2 The Global Knowledge Economy	21
2.2.1 Knowledge as a Driver of Economic Growth	23
2.2.2 Knowledge Industries: Knowledge as a Product vs. Knowledge as a Tool	24
2.3 Thailand's Software Industry: Chiang Mai and Bangkok	27
2.3.1 Government Strategy and Policies	28
2.3.2 Availability of Intellectual Capital (Knowledge workers)	30
2.3.3 Technological Infrastructure	35
2.3.4 Industry Clustering	36

TABLE OF CONTENTS (CONTINUED)

	Page
2.3.5 Wages	37
2.3.6 Work-life Balance (Quality of Life)	37
2.3.7 Attracting FDI (Investment Image)	38
2.3.8 Bangkok's Software Industry	38
2.3.9 Decentralization: Chiang Mai's Software Industry	39
2.4 Software Development: An Intrinsically Knowledge-Based Industry	41
2.4.1 The Global Software Development Industry	42
2.4.2 India's Software Development Industry	43
2.4.3 China's Software Development Industry	44
2.4.4 Brazil's Software Development Industry	45
2.4.5 Contextualizing Thailand's Software Development Industry	46
2.4.6 Germany's Software Development Industry	48
2.5 Human Resources (HR)	49
2.6 Davenport's Working Knowledge: Knowledge Work, and Knowledge Workers	53
2.6.1 Knowledge Workers	55
2.7 Diversity in the Workforce	58
2.8 Recruitment and Selection in Thailand	61
2.9 Managing Knowledge Workers: Knowledge Management (KM)	64
2.10 Change Management and Performance Development	68
2.10.1 Lewin's Theory of Change and Force Field Analysis	71
2.10.2 Total Quality Management (TQM)	74
2.11 Maturity Levels, Software Quality Assurance, and Increasing Software Developers' Performance	76
2.11.1 Capability Maturity Model Integration (CMMI)	77
2.11.2 People Capability Maturity Model (PCMM)	85
2.11.2.1 P- CMM Maturity Level 1: Inconsistent Management	89
2.11.2.2 P- CMM Maturity Level 2: People Management	89

TABLE OF CONTENTS (CONTINUED)

	Page
2.11.2.3 P- CMM Maturity Level 3: Competency Management	89
2.11.2.4 P- CMM Maturity Level 4: Capability Management	89
2.11.2.5 P- CMM Maturity Level 5: Change Management	89
2.11.2.6 Process Area 1: Developing Individual Capability	90
2.11.2.7 Process Area 2: Building Workgroups and Culture	90
2.11.2.8 Process Area 3: Motivating and Managing Performance	91
2.11.2.9 Process Area 4 Shaping the Workforce	91
2.12 Personal Mastery	92
2.13 Critical Theory and Critical Thinking	95
2.14 Chapter Summary and Research Focus	99
 CHAPTER 3: METHODOLOGY	 101
3.1 Chapter Overview	101
3.2 Conceptual/ Theoretical Overview: A Knowledge Management Approach	103
3.2.1 KM's Holistic Approach to Problem Solving	105
3.2.2 Achieving Effective KM in Knowledge Intensive Industry	105
3.2.3 KM to Address the Social and Cultural Fit of Individuals with the Knowledge Approach of the Organisation	106
3.2.4 KM to Solve Wider Issues in Thailand's Knowledge Economy	106
3.3 Personal Mastery	108
3.4 Force Field analysis	111
3.5 CMMI to Understand Domain Specific Work Performance Issues	113
3.6 The Probationary Employment Period	114
3.7 The Case Study: A German Software Development Firm Operating in Northern Thailand	115
3.8 Sample Groups	121

TABLE OF CONTENTS (CONTINUED)

	Page
3.8.1 Sample Group One: Locally Recruited Software Developers who Have Passed Probation in Chiang Mai, Thailand	122
3.8.2 Sample Group Two: German Expatriate Manager in Chiang Mai, Thailand	123
3.8.3 Sample Group Three: The German Management Team in Berlin, Germany	123
3.8.4 Sample Group Four: German Software Developers who have Passed Probation in Berlin, Germany	124
3.8.5 The Experimental Group	125
3.9 A Qualitative Case Study Approach: Sample Size Justification	127
3.10 The Methodological Steps	129
3.10.1 Step one: Identification of Organizational Performance and Quality Issues	131
3.10.2 Step Two: Characterizing and Understanding Causality of Work Performance and Quality Issues	132
3.10.2.1 The Triad of Determinants	132
3.10.2.2 Work-Life Balance Determinants	133
3.10.2.3 Cultural Determinants: Hofstede's Cultural Dimensions	134
3.10.2.4 General Day-to-day Work Determinants: Fish Bone Analysis	136
3.10.3 Step Three: Assessing Effects on the Software Development Process: CMMI	138
3.10.4 Step Four: Design, Build and Implement the Critical Incidents Personal Mastery Model (CPM)	140
3.10.5 Step Five: Validation and Evaluation	146
3.11 Chapter Summary	148

TABLE OF CONTENTS (CONTINUED)

CHAPTER 4 : RESULTS AND ANALYSIS	Page
4.1 Chapter Overview	151
4.2 Step One: Identifying Organizational Performance and Quality Issues	151
4.3 Step Two: Characterizing and Understanding Causality of Work	151
Performance Issues: The Triad of Determinants	156
4.3.1 Work-life Balance Determinants	
4.3.2 Cultural Determinants	157
4.3.2.1 Issue 1: The Concept of Work Completion	165
4.3.2.2 Issue 2: Power Distance Relationship	166
4.3.2.3 Issue 3: Differences in Learning Style and Needs	168
4.3.2.4 Issue 4: Feedback Needs Differ	168
4.3.2.5 Issue 5: Time Management	169
4.3.3 General Work Performance Determinants	169
4.4 Step Three: Assessing Effects on the Software Development Process (CMMI)	175
4.4.1 Critical Incident 1: Low Level of Feedback Utilization	
4.4.2 Critical Incident 2: Failed Product Deployment	185
4.4.3 Critical Incident 3: No Capability of Change Management	185
4.4.4 Critical Incident 4: No Creation of a Versioning Plan	185
4.4.5 Critical Incident 5: No Customer Involvement	186
4.4.6 Critical Incident 6: Unable to Identify Current Reality and Forthcomings	187
4.4.7 Critical Incident 7: Poor Initiative and Expression in English Communication	187
4.4.8 Critical Incident 8: Unable to Prioritize Product Backlogs	
4.4.9 Critical Incident 9: Poor Time Management	188
4.4.10 Critical Incident 10: Unable to Develop and Influence Others	189
4.4.11 Critical Incident 11: Poor Technical Performance	189
	190

TABLE OF CONTENTS (CONTINUED)

	Page
4.4.12 Critical Incident 12: Unable to Adapt to Diversity and Organizational Culture	192
4.4.13 Critical Incident 13: Slow Work Preparation Process	193
4.5 Step Four: Design, Build and Implementation of the Critical Incidents Personal Mastery Model (CPM)	208
4.6 The Critical Incidents Personal Mastery Model (CPM)	210
4.7 Pillar One Results: Creating a Personal Vision	211
4.8 Pillar Two Results: Force field Analysis and Creative Tension	215
4.9 Pillar Three Results: Connectedness	222
4.9.1 The Employees Relation to Work-Life in the Organization	224
4.9.2 The Employees Relation to the German-Thai Culture	225
4.9.3 The Employees Relation to Work Engagement	227
4.10 Step Five: Validation/ Evaluation of the CPM	227
4.10.1 Newly Recruited Employees	228
4.10.2 Senior Developers	228
4.10.3 German Managers	229
4.11 The People Capability Maturity Model (P-CMM) Versus the CPM	231
4.12 Chapter Summary	239
 CHAPTER 5: DISCUSSION AND CONCLUSION	 240
5.1 Chapter Overview	240
5.2 Research Summary	240
5.3 The Critical Incident Personal Mastery Model (CPM)	248
5.4 Originality and Contribution to Knowledge	253
5.5 Research Limitations	254
5.5.1 International Software Development Work Setting	255
5.5.2 Cultural Differences Focused on a German-Thai Culture	255
5.5.3 Qualitative Evaluation of the Model	256
5.5.4 Purposive Sampling and Sample Size	256

TABLE OF CONTENTS (CONTINUED)

	Page
5.6 Future Work	258
5.6.1 Expansion Beyond the Probationary Period	258
5.6.2 Expansion to Other Software Developers in Thailand	259
5.6.3 Expansion to Other Knowledge Based Industries in Thailand	259
5.7 Final Perspective and Conclusion	259
REFERENCES	260
APPENDICES	292
APPENDIX A Main Research Aim, and Research Problem and Context	293
APPENDIX B Research Domain and Overall Framework	294
APPENDIX C Main Research Question and Research Methodology Steps	295
APPENDIX D Tools and Techniques Applying in Research Methodology	296
APPENDIX E Tools and Techniques Applying in Research Methodology	298
APPENDIX F Tools and Techniques Applying in Research Methodology	300
APPENDIX G Tools and Techniques Applying in Research Methodology	311
APPENDIX H Tools and Techniques Applying in Research Methodology	315
CURRICULUM VITAE	317

LIST OF TABLES

Table	Page
2.1 Number employed in ICT industries and proportion employed in ICT as a percentage of the total workforce	31
2.2 The number of students graduating in the software based subjects of animation and gaming from 2007-2010	31
2.3 The provision of software-related education across the four regions of Thailand	33
2.4 Traditional employment vs. contemporary trends	51
2.5 Comparative components of human resource management in Thailand and Germany	63
2.6 Major reasons for the resistance to change	69
2.7 The relationship of maturity levels, the focus of work, key process areas and results	84
2.8 The examples of the types of organization utilizing P-CMM to manage people	87
3.1 The differences between a KM and HRM philosophies	104
3.2 The theories, concepts and tools used to respond to the research problem and create the CPM to improve knowledge worker performance	107
3.3 The primary business areas in which the case study firm operates	117
3.4 The three levels of software developer in the case study firm, along with their key characteristics	118
3.5 The work process and associated activities at the case study firm	119
3.6 The four sample groups which acted as knowledge resources	121
3.7 The biodata of Thai software developers (the knowledge resource group) who passed probation	122
3.8 The biodata for the German management team in Berlin, Germany	124
3.9 The biodata for the German software developers who have passed probation	124
3.10 The biodata for the experimental sample group	126
3.11 Summary of Sample Groups and sizes	127

LIST OF TABLES (CONTINUED)

Table	Page
3.12 The components of the CPM along with the rationale and expected practical effects on the newly employed knowledge workers	142
4.1 The four key problems facing German managers when employing Thai employees along with the effects on work performance	152
4.2 The three distinct attitudes to work-life balance as captured by the employee questionnaires, and the meaning of these attitudes exemplified via sample quotations	159
4.3 Decisions on whether to stay or leave the company as captured in the employee questionnaire results and the associated relevant quotations	163
4.4 Differences in the German and Thai national cultures	170
4.5 Summary of German versus Thai cultural characteristics and the effects on work performance as observed in the case study, and collected from literature	173
4.6 The 13 critical incidents, the related CMMI process area and the objectives/reasoning behind the elimination of these critical incidents	180
4.7 The 13 critical incidents along with how they relate to the triad of determinants at the case study firm, and the potential solution in the design of the CPM	195
4.8 Force field analysis and resulting tension for case study 1 (Mr. P)	216
4.9 Force field analysis and resulting tension for case study 2 (Mr. A)	218
4.10 Force field analysis and resulting tension for case study 3 (Mr. B)	219
4.11 Critical Thinking Levels from Working Behaviors and Observation during implementation of the CPM	221
4.12 The suggestion from the three stakeholders about possible future improvements to the CPM	230
4.13 A comparison of the CPM proposed in this thesis versus the key tenets of the P-CMM	236
4.14 The five P-CMM maturity levels and areas where the CPM makes a Contribution	238
5.1 The summary of concepts mentioned in the research	251

LIST OF FIGURES

Figure	Page
1.1 FDI inflow into Thailand's economy from 1990-2011	3
1.2 Level of pay and availability of knowledge workers in the seven ASEAN countries where data is available.	8
1.3 The overall conceptual framework of the thesis	17
1.4 The overview of the research chapters in this thesis	18
2.1 The global state of the knowledge economy based on current strategy and policies in various countries and regions	23
2.2 Thailand's knowledge economy index (KEI) from both 1995 and 2002 compared to other Asian nations.	26
2.3 The Growth of the Thai labour force in millions from 1988-2011	30
2.4 Key features of the Bangkok and Chiang Mai software industries	40
2.5 The four key impacts and associated literature bodies related to the growing software development industry	42
2.6 The Evolution of HR Function	50
2.7 The three types of capital knowledge workers require and the relationship with performance, ideas and communities	57
2.8 The Skandia model and associated importance of human capital	65
2.9 Balanced Scorecard and associated business benefits	67
2.10 Types of knowledge sharing and the interrelationships	68
2.11 Lewin's three stages of change	73
2.12 Process management area of the CMMI	78
2.13 Project management process area of the CMMI	79
2.14 Engineering process area of the CMMI	80
2.15 Support process area of the CMMI	81
2.16 CMMI maturity levels	82
2.17 The five P-CMM maturity levels	88
2.18 The five components of the fifth discipline, of which personal mastery is the foundation	93

LIST OF FIGURES (CONTINUED)

Figure	Page
2.19 The components of personal mastery	95
2.20 A chronological generalization of critical theory/ thinking and its resulting integration into knowledge management	97
3.1 The conceptual overview of the research	102
3.2 The relationship between the holistic knowledge management perspective in this thesis and the other key theories and tools used in the methodology	108
3.3 The practices, principles and essences of personal mastery	109
3.4 Lewin's force field analysis, including driving (positive) forces for change and restraining (negative) forces for change	112
3.5 Detailed graphical representation of the work process at the case study firm	120
3.6 Range versus depth when deciding on sampling strategies	128
3.7 The five key steps followed in the methodology to create the CPM	130
3.8 The triad of determinants affecting work performance of Thai employees at the case study firm including the associated tools to characterize and understand these determinants	133
3.9 Hofstede's five cultural dimensions	135
3.10 The difference in Hofstede's five cultural dimensions between Thailand and Germany	136
3.11 An example fishbone diagram, also known as a cause and effect diagram or Ishikawa diagram	137
3.12 The five CMMI levels	139
3.13 The process of the CPM design and creation	141
3.14 The experimental period of the CPM implementation including the key steps throughout the probationary period	145
3.15 The process of evaluating the CPM	147
3.16 The key experimental steps to develop, implement and evaluate the CPM presented according to order and timescale	149

LIST OF FIGURES (CONTINUED)

Figure	Page
4.1 The key methodological steps of the research, which are followed in this chapter when presenting the results	151
4.2 The first of the five steps in the results, presented in accordance with the methodological steps outlined in Chapter Three	152
4.3 The second of five steps in the results, presented in accordance with the methodological steps outlined in Chapter 3	156
4.4 The three factors of causality making up the triad of determinants	157
4.5 The three scenarios and perspectives towards work-life balance at the case study firm	161
4.6 Particular cross-cultural aspects between German managers and Thai employees at the case study firm and the resulting cultural discontinuities	166
4.7 Fishbone diagram showing the general determinants of performance issues at the case study firm	176
4.8 The third of five steps in the results, presented in accordance with the methodological steps outlined in Chapter Three	179
4.9 The 13 critical incidents prioritized from low to high, along with the frequency of their occurrence based on management questionnaires	184
4.10 The fourth of five steps in the results, presented in accordance with the methodological steps outlined in Chapter Three	208
4.11 The critical incidents personal mastery model (CPM)	209
4.12 The three month probationary timescale in which the CPM was implemented (for larger and more detailed versions of time scales, see	210
4.13 The process of critical incident reflect and review	215
4.14 Achieving connectedness at the case study: mingling with each other and the firm to become connected rather than remaining as trainees	223
4.15 The fifth and final step in the results, presented in accordance with the methodological steps outlined in Chapter Three	227
4.16 The evaluation of the CPM from the perspective of three stakeholders	228

LIST OF FIGURES (CONTINUED)

Figure	Page
4.17 The three components required to achieve organizational stability and the relationship between P-CMM and CMMI	233
4.18 The five levels of the P-CMM and the associated organizational status of each level	234
5.1 Research limitations and the generation of future research opportunities	258

LIST OF ACRONYMS

(in alphabetical order)

AEC	ASEAN Economic Community
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
ATSI	The Association of Thai Software Industry
BOI	Thailand Board of Investment
CAMT	College of Arts, Media and Technology
CMCC	Chiang Mai Creative City
CMM	Capability Maturity Model
CMMI	Capability Maturity Model Integration
CMU	Chiang Mai University
CPM	Critical Incidents Personal Mastery Model
DoD	The US Department of Defense
ESRC	The Economic and Social Research Council
FDI	Foreign Direct Investment
HR	Human Resources
HRM	Human Resources Management
ICT	Information and Communications Technology
IT	Information Technology
KEI	Knowledge Economy Index
KM	Knowledge Management
LTO	Long-term orientation
MICT	Ministry of Information and Communication Technology
NECTEC	The National Electronics and computer Technology Center
NRI	Network Readiness Index
NSTDA	The National Science and Technology Development Agency

OECD	Organisation for Economic Cooperation and Development
P-CMM	People Capability Maturity Model
SIPA	Software Industry Promotion Agency
SME	Small and Medium Enterprise
TAGGA	The Thai Animation and Computer Graphics Association
SPIN	Thailand Software Process Improvement Network
THB	Thai Baht