

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
ABSTRACT (ENGLISH)	v
ABSTRACT (THAI)	viii
LIST OF TABLES	xv
LIST OF FIGURES	xvii
LIST OF ABBREVIATIONS	xx
 CHAPTER 1 CONTEXT AND RESEARCH PROBLEM	 1
1.1 Global economic situation and foreign investment	1
1.2 Foreign Direct Investments (FDIs) in Developing Countries	2
1.3 Characteristics of FDIs' movement	4
1.4 Overall climate of doing business in Thailand	7
1.4.1 FDIs in Northern Region Industrial Estate of Thailand	10
1.4.2 Investment climate and competitiveness in an industrial estate region, Lumphun, Thailand	12
1.5 Related research on FDIs decision	16
1.5.1 Influencing factors on FDIs decision	17
1.5.1.1 FDI's characteristics	22
1.5.2 Approach of decision making on FDIs' investment	29
1.6 Comparison of critical factors: A case study in Thailand	31
1.7 Key successful factors and their stakeholders to sustain foreign businesses	40
1.8 Conclusion	42

TABLE OF CONTENTS (continued)

	Page
CHAPTER 2 SUPPLY CHAIN MANAGEMENT AND SIMULATION	
CONTEXT	44
2.1 Introduction	44
2.2 Supply chain management	44
2.2.1 Uncertainties in supply chain management	48
2.2.2 International Issues In Supply Chain Management	51
2.2.2.1 The pattern of international trade	54
2.3 Value chain	62
2.4 Applicable strategies used in a supply chain context	67
2.5 Supply Chain Simulation	71
2.5.1 What is simulation ?	73
2.5.2 Comparing software simulation with supply chain context	76
2.5.2.1 ARENA Software Package	76
2.5.2.2 Automod	77
2.5.2.3 ProModel	77
2.5.2.4 Witness	78
2.5.2.5 ProcessModel	78
2.5.2.6 SIMPROCESS	78
2.5.3 Comparing and selecting software simulation for the case study	80
2.6 Conclusion	82
CHAPTER 3 PROPOSED METHODOLOGY	84
3.1 Introduction	84
3.2 Potential factors and sub factors classification of FDI decision	84
3.3 Components to construct the research framework	88

TABLE OF CONTENTS (continued)

	Page
3.4 Integrated framework on making a decision for FDI	92
3.4.1 Static analysis	93
3.4.1.1 Sub factors and the three main necessities of FDI	94
3.4.1.2 Analysis of Risk Knowledge Matrix decision among three scenarios of relocation, transfer and divestment of plant	102
3.4.2 Dynamic analysis	107
3.4.2.1 Supply chain simulation framework	107
3.4.2.2 Supply chain management cost analysis	112
3.4.2.3 Investment cost analysis	114

**CHAPTER 4 THE APPLICATION OF THE PROPOSED
FRAMEWORK**

	118
4.1 Introduction	118
4.2 Web application architecture	118
4.3 Structure and database design	119
4.3.1 Main function and key component of designed tables	121
4.4 Procedure in knowledge based system	122
4.4.1 Procedure on static analysis	122
4.4.2 Procedure on dynamic analysis	126
4.4.3 Simulation model	132
4.4.3.1 Supply chain simulation model	133
4.4.3.2 Cost simulation	136
4.5 Designed user interface for knowledge based system	137
4.6 Conclusion	140

TABLE OF CONTENTS (continued)

	Page
CHAPTER 5 ELECTRONICS INDUSTRY APPLICATION	141
5.1 Introduction	141
5.2 Background of Northern Region Industrial Estate, Thailand	141
5.3 Case study background	144
5.3.1 Characteristics and company profile of the case study	144
5.3.2 Structure of organization	145
5.3.3 Supply chain characteristics	146
5.4 System validation	147
5.4.1 Static analysis: Risk Knowledge Matrix decision	147
5.4.2 Dynamic analysis: Cost simulation	154
5.5 Conclusion	167
CHAPTER 6 CONCLUSION AND PERSPECTIVES	169
REFERENCES	172
APPENDICES	188
Appendix A Questionnaire	189
Appendix B Structure of design table	195
Appendix C Performance attributes and associated Level 1 and Level 2 metrics (SCC 06)	197
Appendix D Approach used on forecasting inflation and demand (GDP) rate	199
CURRICULUM VITAE	201

LIST OF TABLES

Table	Page
1.1 Situation of investment in Thailand from 2007 to 2009 (Foreign Investor Confidence Survey Report : BOI, Thailand)	9
1.2 Investment situation in Northern Region Industrial Estate, Thailand from Year 2002 to 2010 [Office of Northern Region Industrial Estate, Lumphun, Thailand]	11
1.3 Factors influencing investment decision	19
1.4 The characteristics of international investment for FDIs	22
1.5 The definitions relevant to characteristic of FDI's behavior	25
1.6 Survey of literatures on techniques used for FDI's investment	30
1.7 Rating scale used to indicate the opinion from respondents	35
1.8 Issues to be analyzed of the questionnaire	35
1.9 Ranking the influencing issues among three characteristic of plants	37
2.1 Key supply chain management issues (Simchi-Levi <i>et al.</i> , 03)	49
2.2 Key issues in supply chain from strategic to operational level	50
2.3 Literature Survey – Parallel and distributed supply chain strategy	68
2.4 Simulation tools used for supply chain context	70
2.5 Comparing software simulation with requirement criteria	81
3.1 Classification of factors and lower sub factors from review of literatures	86
3.2 What each stockholder expects from FDI's investment	89
3.3 Components to construct research framework	91
3.4 Indicator mapping risk exposure	97
3.5 Calculated mean of likelihood and impact value of risk	100
3.6 The Risk Knowledge Matrix of FDIs	101
3.7 Process IDs and process names	110
3.8 Parameters and equations used for supply chain cost calculation	113

LIST OF TABLES (continued)

Table		Page
5.1	Results from risk evaluation	151
5.2	The suggested scenario of the case study	152
5.3	Investment cost comparison between Thailand and Vietnam	155
5.4	Parameters used for Source, Make, Deliver and Return on cost simulation	158
5.5	Source cost of Thailand and Vietnam site	162
5.6	Value of Make process for Thailand and Vietnam	162
5.7	Value of Deliver process for Thailand and Vietnam	163
5.8	Value of Return process for Thailand and Vietnam	163
5.9	Net Present Value for 5 year of investment plan, Thailand site	164
5.10	Net Present Value for 5 year of investment plan, Vietnam site	165
5.11	NPV comparison of Thailand and Vietnam	165
5.12	Comparison on SCOR attributes and metrics among two site location	166

LIST OF FIGURES

Figure		Page
1.1	Gradual implementation of a potential relocation to China [Bart and Henk 96]	6
1.2	Most important reason job vacancies (percent of firms)	8
1.3	Electronics product's network for Northern Region Industrial Estate, Lumphun, Thailand	10
1.4	The lowest cost of labor of Lumphun province, Thailand [MOL, Thailand 10]	13
1.5	Frequency of factors influencing investment decision	21
1.6	Percentage of the types of industries responding questionnaires [Northern Region Industrial Estate Office 08]	32
1.7	Percentage of four major aspects of influencing factors on investment decision	33
1.8	Comparison of causes leading to three characteristics of plant	36
1.9	Comparison of causes leading to three characteristics of plant in electronics sector	38
2.1	Evolution of supply chain management	4
2.2	The logistics network [Simchi-Levi <i>et al.</i> , 03]	46
2.3	Strategic level to operational level along the supply chain (Simchi-Levi <i>et al.</i> , 03)	50
2.4	Three stage international product life cycle	55
2.5	(a) : An S – curve response function, and (b) : S – curve of technology	58
2.6	A typical bathtub curve	59
2.7	Experience Curve	60
2.8	Value chain, Michael Porter, (1985)	64
2.9	The Five competitive forces that determine industry competition [Porter 90]	65

LIST OF FIGURES (continued)

Figure		Page
3.1	Proposed framework on making a decision for FDIs	92
3.2	The proposition of risk and sub risk factors	95
3.3	Expression of normal and standard deviation	98
3.4	The analysis on Worker Risk Value (WRV) among relocation, transfer and divestment plant	103
3.5	The analysis on Supply chain Risk Value (SRV) among relocation, transfer and divestment plant	104
3.6	The analysis on Financial Risk Value (FRV) among relocation, transfer and divestment plant	105
3.7	Degree of influencing factors cause to FDI's decision as related to the three scenarios	106
3.8	The three participants of supply chain model	108
3.9	Flowchart of processes and activities of the supply chain model	109
3.10	Sub model hierarchy of manufacturer	111
3.11	Hierarchical metric structure of supply chain management cost (SCOR, SCC 07)	112
4.1	Architecture of the knowledge system on FDIs	119
4.2	Set of entities and their relationships of database design	120
4.3	The procedure for static analysis	123
4.4	Sample calculation of the risk exposure	125
4.5	Sample result from the evaluation of risk	126
4.6	Approach of dynamic analysis	127
4.7	Procedure for dynamic analysis	128
4.8	Sample input of "Source" cost from user interface	129
4.9	Input identified by user	129
4.10	Outcomes from running simulation	130
4.11	Net present value calculation for 5 years of investment plan	131

LIST OF FIGURES (continued)

Figure		Page
4.12	The comparison of NPV for two site locations	131
4.13	Comparison of SCOR attribute and measurement among two site location of plant	132
4.14	Supply chain simulation based on SCOR model for supplier and customer	134
4.15	Supply chain simulation based on SCOR model for manufacture	135
4.16	Spreadsheet simulates NPV for existent plant in Thailand	137
4.17	Outcomes from static analysis	138
4.18	User interface on dynamic analysis	139
4.19	Homepage of the KBDSS	140
5.1	Ratio in overall type of industries in Northern Region Industrial Estate, Lumphun province, Thailand	142
5.2	Ratio of workforce on each type of industries in Northern Region Industrial Estate, Lumphun province, Thailand	143
5.3	Location of offices and representatives supporting the case study company	144
5.4	Examples of Printed Circuit Board (PCB) from the case study	145
5.5	Input values of the company profile	148
5.6	Financial risk dashboard	148
5.7	Supply Chain risk dashboard	149
5.8	Infrastructure risk dashboard	149
5.9	Human skill and performance risk dashboard	150
5.10	Suggesting information on critical and high risk value	153
5.11	Comparison between distance from Thailand and Vietnam to China	157
5.12	User interface of supply chain cost	160
5.13	One-year cost of supply chain for site location in Thailand	161

LIST OF ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
AHP	Analytic Hierarchy Process
ATMs	Automated Teller Machines
CoP	Community of Practice
D	Deliver
DBMS	Database Management System
DR1.4	Transfer Defective Product
D2.2	Receive, Configure, Enter & Validate order
D2.9	Pick Product
D2.12	Ship Product
D4	Deliver Retail Products
ETO	Engineer-To-Order
FDIs	Foreign Direct Investments
FRV	Financial Risk Value
GA	Genetic Algorithm
GDP	Gross Domestic Product
GPP	Gross Regional and Provincial Products
GSCF	Global Supply Chain Forum
IEAT	Industrial Estate Authority of Thailand
ILO	International Labor Organization
IPLC	International Product Life Cycle
IT	Information Technology
IRR	Internal Rate of Return
KBDSS	Knowledge Based Decision Support System
L:L	Low potential impact and Low probability of the occurrence

M:H	Medium potential impact and High probability of the occurrence
M:L	Medium potential impact and Low probability of the occurrence
M:M	Medium potential impact and Medium probability of the occurrence
M1	Make-To-Stock
M2	Make-To-Order
M2.1	Schedule Product Activities
M2.2	Issue Product
M2.3	Produce and Test
M2.4	Package
M2.5	Stage Product
M3	Engineer-To-Order
M	Make
MNC	Multinational Corporation
MNE	Multinational Enterprise
MTO	Make-To-Order
MTS	Make-To-Stock
NCF	Net Cash Flow
NPV	Net Present Value
P	Plan
PB	Payback Period
PICS	Productivity and Investment Climate Surveys
PN	Petri Nets
P1	Plan Supply chain
R	Return
R&D	Research and Development
ROI	Return On Investment
S	Source

SCC	Supply Chain Council
SCOR	Supply Chain Operation Reference
SMED	Single Minute Exchange of Die
SRV	Supply chain and Infrastructure Risk Value
SR1.	Return Defective Product
S1	Source Stocked Product
S1.1	Schedule Product Deliveries
S1.2	Receive Product
S1.3	Verify Product
S1.4	Transfer Product
S1.5	Authorize Supplier Payment
S2.1	Schedule Product Deliveries
S2.2	Receive Product
S2.3	Verify Product
S2.4	Transfer Product
UNCTAD	United Nations Conference on Trade and Development
VCOR	Value Chain Operations Reference
WLAN	Wireless Local Area Network
WRV	Worker Risk Value