



APPENDICES

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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Appendix A

Questionnaire

Part1: Company profile and general information

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1. Type of industries.

- | | |
|---|--|
| <input type="checkbox"/> Electronics | <input type="checkbox"/> Jewelry and accessories |
| <input type="checkbox"/> Part of machineries, equipment | <input type="checkbox"/> Agricultural product |
| <input type="checkbox"/> Food product | <input type="checkbox"/> Garment |
| <input type="checkbox"/> Wooden product | <input type="checkbox"/> Construction |
| <input type="checkbox"/> Other (Please fill) | |

2. How many employees are working in your company?

- | | | |
|--|---|---|
| <input type="checkbox"/> Less than 50 people | <input type="checkbox"/> 50-100 people | <input type="checkbox"/> 100-500 people |
| <input type="checkbox"/> 500-1,000 people | <input type="checkbox"/> More than 1,000 people | |

3. Shareholding structure

- | | |
|--|--|
| <input type="checkbox"/>% (Thai) | <input type="checkbox"/>%(Nationality) |
| | <input type="checkbox"/>%(Nationality) |

4. How many years has your company operated in the Lumphun industrial estate?

.....

5. What will be on your investment plan in the next 5 years?

- ☐ 5.1 Maintain the existing level of investment

Why
.....

- ☐ 5.2 Expand or transfer part or product to

☐ Thailand ☐ Other country (please fill)

How
.....

Why
.....

- ☐ 5.3 Reduce the investment

How
.....

Why
.....

- ☐ 5.4 Withdraw the investment

How
.....

Why
.....

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Part 2: Factor(risk) consequence on investment decisions lead to offshoring, transferring and divestment of manufacturing's situation

Please describe impact level (consequence) on the following factors that affect three investment decisions (Please give a score of 1-5)

(กรุณาให้ระดับความรุนแรง (ระหว่าง 1 ถึง 5) ของผลกระทบเนื่องจากปัจจัยดังต่อไปนี้ ซึ่งส่งผลให้เกิดการตัดสินใจด้านการลงทุนทั้ง 3 เหตุการณ์ (ให้คะแนน 1-5)

Definitions: Three investment decisions					
Offshoring plant	The move of manufacturing process to low-cost labor-abundant locations by a combination of an investment abroad and subcontracting.				
	Moving production facilities to low-wage countries				
Transferring plant	Remain high technology process and expand processes that need laboring in other countries such as China, Vietnam , India etc.				
Divestment plant	Withdraw the investment, a plant closure or downsizing				
Score of consequence					
Consequence	1	2	3	4	5
	Insignificant	Minor	Moderate	Major	Catastrophic
	Interruption does not impact	With minimal interruption	Some interruptions impact	Major impact	Significant effect

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Main issues

Aspect	Explanation	Offshoring	Transferring	Divestment
1. Labor workers	Negative attitude and work ethic, lack of ability to work of workers in companies	<input type="text"/>	<input type="text"/>	<input type="text"/>
2. Economic situation	Unstable market demand, competition, policy environment, domestic inflation rates.	<input type="text"/>	<input type="text"/>	<input type="text"/>
3. Infrastructure	Insufficient and ineffective of overall structure of transportation, public utilities, and telecommunication services.	<input type="text"/>	<input type="text"/>	<input type="text"/>
4. Supply chain	Lack of ability or insufficient on collaboration among supplier, manufacturer and customer	<input type="text"/>	<input type="text"/>	<input type="text"/>
5. Others	Please fill.....	<input type="text"/>	<input type="text"/>	<input type="text"/>

Sub issues

	Issue	Offshoring	Transferring	Divestment
1	Financial problems such as the strong exchange rate of Thai baht, market risk, uncertainty on monetary policies, inflation and interest rates	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	Unstable of thai political situation	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	Inefficient collaboration among company with supplier and/or customer such as supplier unreliability, delay of delivery to customer, inaccurate sales forecast of demand variation.	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	Difficulties related to internal operations such as operational and technical problem effecting product quality.	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	Unwelcome on facilities, infrastructure and supporting environment, such as public utilities.	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	Inconvenient or unattractive regulations for company.	<input type="text"/>	<input type="text"/>	<input type="text"/>
7	Inefficient internal collaboration, such as over inventory, production cost, information breakdown, problem effected due to product quality.	<input type="text"/>	<input type="text"/>	<input type="text"/>
8	Inconvenient logistics such as transportation channels for raw material and finished good delivery	<input type="text"/>	<input type="text"/>	<input type="text"/>
9	Inefficient employees and lack of skill and performance requirement	<input type="text"/>	<input type="text"/>	<input type="text"/>

10	High turnover rate in human resources	<input type="text"/>	<input type="text"/>	<input type="text"/>
11	Uncompetitive wages	<input type="text"/>	<input type="text"/>	<input type="text"/>
12	Other (Please fill).....	<input type="text"/>	<input type="text"/>	<input type="text"/>
13	Other (Please fill).....	<input type="text"/>	<input type="text"/>	<input type="text"/>
14	Other (Please fill).....	<input type="text"/>	<input type="text"/>	<input type="text"/>
15	Other (Please fill).....	<input type="text"/>	<input type="text"/>	<input type="text"/>
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Part 3: Explain on the probability or likelihood of risk occurrences result in the crises of manufacturing's situation

Please identify the frequencies of adverse occurrences result in the three investment decisions

(กรุณาระบุความน่าจะเป็น(ความถี่) ของเหตุการณ์ดังต่อไปนี้ ที่มีแนวโน้มก่อให้เกิดการตัดสินใจด้านการลงทุนทั้ง 3 เหตุการณ์)

Likelihood assessment-Guidance

Likelihood	1	2	3	4	5
	Rare	Unlikely	Possible	Likely	Almost certain
	Do not believe will ever happen	Do not expect to happen	May occur occasionally	Will probably occur	Will undoubtedly happen, possibly frequently

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	Issue	Likelihood		
		Offshoring	Transferring	Divestment
1. Labor worker	1. A negative attitude on their work and the company	<input type="text"/>	<input type="text"/>	<input type="text"/>
	2. Lack of skill and performance	<input type="text"/>	<input type="text"/>	<input type="text"/>
	3. High turnover rate on human resource	<input type="text"/>	<input type="text"/>	<input type="text"/>
	4. Low educational level for workers who works in companies	<input type="text"/>	<input type="text"/>	<input type="text"/>

		Likelihood		
		Offshoring	Transferring	Divestment
2. Economic situation	5. Instability of economic situation (low market and demand rate, exchange rate, interest rate, inflation rate)	<input type="text"/>	<input type="text"/>	<input type="text"/>
	6. Unstable social situation (democratic system of the country)	<input type="text"/>	<input type="text"/>	<input type="text"/>
	7. Unstable political situation (more transparency in managing country by the government)	<input type="text"/>	<input type="text"/>	<input type="text"/>
	8. Uncompetitive wages of skilled labor	<input type="text"/>	<input type="text"/>	<input type="text"/>
	9. Unattractiveness of laws and regulations	<input type="text"/>	<input type="text"/>	<input type="text"/>
	10. Low market and demand rate	<input type="text"/>	<input type="text"/>	<input type="text"/>
	11. High competition	<input type="text"/>	<input type="text"/>	<input type="text"/>
	12. Continuous high operational cost and loss profits	<input type="text"/>	<input type="text"/>	<input type="text"/>

		Likelihood		
		Offshoring	Transferring	Divestment
3. Infrastructure	10. Ineffective network in communication service	<input type="text"/>	<input type="text"/>	<input type="text"/>
	11. Ineffective networks for transportation and logistics infrastructure (road, rail, seaport, airfreight)	<input type="text"/>	<input type="text"/>	<input type="text"/>
	12. Public utilities support ineffectiveness	<input type="text"/>	<input type="text"/>	<input type="text"/>
	13. Ineffective academic service and technological support (R&D support)	<input type="text"/>	<input type="text"/>	<input type="text"/>
	14. Unsuitability of geographical location and land price and/or land lease	<input type="text"/>	<input type="text"/>	<input type="text"/>

		Likelihood		
		Offshoring	Transferring	Divestment
4. Supply chain	16. Inefficient collaboration among partners	<input type="text"/>	<input type="text"/>	<input type="text"/>
	17. Remote distance from supplier and product market	<input type="text"/>	<input type="text"/>	<input type="text"/>
	18. Internal problem and organizational change	<input type="text"/>	<input type="text"/>	<input type="text"/>

		Likelihood		
		Offshoring	Transferring	Divestment
5. Other	19. Others (Please fill).....	<input type="text"/>	<input type="text"/>	<input type="text"/>
	20. Others (Please fill).....	<input type="text"/>	<input type="text"/>	<input type="text"/>
	21. Others (Please fill).....	<input type="text"/>	<input type="text"/>	<input type="text"/>

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Part 4: Please rate \checkmark your satisfaction level on the following issues

ท่านมีความพึงพอใจต่อรายการดังต่อไปนี้ในระดับใด

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	Issue	Strongly Satisfied	Satisfied	Moderate	Dissatisfied	Strongly Dissatisfied
1	The satisfaction with infrastructure and utilities services					
1.1	Transportation					
	• Sea freight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Air freight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Road	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Train	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	Public utilities					
	• Electric power supply system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Drainage system management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Wages and gabages management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Prices of public utilities					
	• Electric power supply system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Drainage system management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Wages and gabages management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Telecommunication and communication service					
	• Leased line	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Satellite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Integrated Service Digital Network (ISDN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Asymmetric Digital Subscriber Line (ADSL)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Wireless LAN (WLAN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Analog service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5	Collaboration between research Institute and industrial sectors.					
	• University or academic institute	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Training center and R&D service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Calibration center service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Suggestions:					
					
2	The satisfaction with labor force and employee					
2.1	Number or adequacy of employee					
	• Labor worker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Technician	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• IT staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Engineer/ product design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Local manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Foreign manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Suggestions:					
					
3	Satisfaction with the services of governemtn agencies					
	• Board of Investment (BOI)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Industrial Estate Authority of Thailand (IEAT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Thai Customs Department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Suggestions:					
					

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Part 5: Explain on the probability or likelihood of risk occurrences result the company.

Please identify the frequencies of adverse occurrences result in your company.

(กรุณาระบุความถี่ ของเหตุการณ์ดังต่อไปนี้ ที่เกิดขึ้นในบริษัทของท่าน)

Likelihood assessment-Guidance

Likelihood	1	2	3	4	5
	Rare	Unlikely	Possible	Likely	Almost certain
	Do not believe will ever happen	Do not expect to happen	May occur occasionally	Will probably occur	Will undoubtedly happen, possibly frequently

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	Issue	Likelihood
1. Labor worker	1. A negative attitude on their work and the company	<input type="text"/>
	2. Lack of skill and performance	<input type="text"/>
	3. High turnover rate on human resource	<input type="text"/>
	4. Low educational level for workers who works in companies	<input type="text"/>

		Likelihood
2. Economic situation	5. Instability of economic situation (low market and demand rate, exchange rate, interest rate, inflation rate)	<input type="text"/>
	6. Unstable social situation(dramocratic system of the country)	<input type="text"/>
	7. Unstable political situation(more transparency in managing country by the government)	<input type="text"/>
	8. Uncompetitive wages of skilled labor	<input type="text"/>
	9. Unattractiveness of laws and regulations	<input type="text"/>
	10. Low market and demand rate	<input type="text"/>
	11. High competition	<input type="text"/>
	12. Continuous high operational cost and loss profits	<input type="text"/>

		Likelihood
3. Infrastructure	10. Ineffective network in communication service	<input type="text"/>
	11. Ineffective networks for transportation and logistics infrastructure (road, rail, seaport, airfreight)	<input type="text"/>
	12. Public utilities support ineffectiveness	<input type="text"/>
	13. Ineffective academic service and technological support (R&D support)	<input type="text"/>
	14. Unsuitability of geographical location and land price and/or land lease	<input type="text"/>

		Likelihood
4. Supply chain	16. Inefficient collaboration among partners	
	17. Remote distance from supplier and product market	
	18. Internal problem and organizational change	

		Likelihood
5. Other	19. Others (Please fill).....	<input type="text"/>
	20. Others (Please fill).....	<input type="text"/>
	21. Others (Please fill).....	<input type="text"/>

Thank you for completing this questionnaire. I very much appreciate your help and time.
Please return by attached file via email to petchee@gmail.com

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Appendix B

Structure of Design table

Table: Company_info

Physical Name	Data Type	Req'd	PK	Notes
Comp_id	INTEGER	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Comp_id identifies Company_info(auto increment)
Typeofcompany	VARCHAR(10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Manufacturing type of company
Noofemploy	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Total number of employee in the company

Table: Cost

Physical Name	Data Type	Req'd	PK	Notes
Country	VARCHAR(10)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Identification of selected country
Labor_cost	DOUBLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minimum standard of Labor cost per day
Water	DOUBLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Standard cost of watering per unit
Electricity	DOUBLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Standard cost of electricity per unit
Land	DOUBLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Standard cost of land per square metre

Table: RiskExplanation

Physical Name	Data Type	Req'd	PK	Notes
Risk	VARCHAR(10)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Risk categories
Subrisk	TEXT(10)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Subrisk categories
Explanation	LONGTEXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Explanation of risk prevention

Table: FinancialRisk

Physical Name	Data Type	Req'd	PK	Notes
Comp_id	INTEGER	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Company_id
i1	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk1
L1	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk1
i2	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk2
L2	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk2
i3	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk3
L3	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk3
i4	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk4
L4	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk4
i5	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk5
L5	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk5
L6	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk6
i7	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk7
L7	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk7
i8	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk8
L8	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk8

Table: HumanRisk

Physical Name	Data Type	Req'd	PK	Notes
► Comp_id	INTEGER	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Company id
i1	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk9
l1	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk9
i2	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk10
l2	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk10
i3	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk11
l3	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk11
i4	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk12
l4	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk12

Table: SupplychainRisk

Physical Name	Data Type	Req'd	PK	Notes
► Comp_id	INTEGER	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Company id
i1	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk18
l1	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk18
i2	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk19
l2	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk19
i3	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Impact of subrisk20
l3	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likelihood of subrisk20

Table: Shareholder

Physical Name	Data Type	Req'd	PK	Notes
► Comp_id	INTEGER	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Company id
country1	VARCHAR(10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shareholder of country1
percent1	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Percent of shareholder1
country2	VARCHAR(10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shareholder of country2
percent2	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Percent of shareholder2
country3	VARCHAR(10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shareholder of country3
percent3	INTEGER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Percent of shareholder3

Table: Template

Physical Name	Data Type	Req'd	PK	Notes
► Subrisk	VARCHAR(10)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Subrisk identifies Template
Offshore	DOUBLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Offshore is of Template
Transfer	DOUBLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Transfer is of Template
Divest	DOUBLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Divest is of Template

Appendix C

Performance attributes and associated Level 1 and Level 2 metrics (SCC 06)

Performance attribute	Performance attribute definition	Level 1 metric	Level 2 Metric	Calculation
Reliability	The performance of the sc in delivering: the correct product, to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation, to the correct customer.	Perfect Order Fulfillment	<ul style="list-style-type: none"> - % of order delivered in full - Delivery performance to customer commit date - Document accuracy - Perfect condition 	<ul style="list-style-type: none"> - [Total no. of orders delivered in full]/[Total no. of orders delivered]x100% - [Number of order delivered in perfect condition]/[No. of orders delivered] x 100%
Responsiveness	The speed at which a supply chain provides products to the customer.	Order Fulfillment cycle time	<ul style="list-style-type: none"> - Source cycle time - Make cycle time - Deliver cycle time 	[Sum actual cycle times for all delivered]/[total no. of orders delivered]
Flexibility	The agility of a supply chain in responding to marketplace changes to gain or maintain competitive advantage.	Upside supply chain flexibility, Upside supply chain adaptability, downside supply chain adaptability	<ul style="list-style-type: none"> - Upside Source Flexibility (Upside source adaptability) - Upside Make Flexibility (Upside Make adaptability) - Upside Deliver Flexibility (Upside Deliver adaptability) - Upside Source Return 	Current on-hand inventories (Raw material) Current inventory on hand (WIP) Current manufacturing order cycle time, Current inventory on hand(FG) Current source return volume Current deliver return volume

			Flexibility (Upside source return adaptability) - Upside Deliver Return Flexibility (Upside deliver return adaptability)	
Cost	The costs associated with operating the supply chain	Supply chain management cost, Cost of Goods sold	- Cost to Plan - Cost to Source - Cost to Make - Cost to Deliver - Cost to Return	- source cost = (ordering + holding + transporting cost of material) - COGS = Make cost = (Direct mat cost + Direct labor cost + indirect cost + additional cost) - Deliver cost = (Shipped finished good cost)
Asset management	The effectiveness of an organization in managing assets to support demand satisfaction. This includes the management of all assets: fixed and working capital.	Cash-to-Cash Cycle time, Return on supply chain fixed assets, Return on working capital	- Day sales outstanding - Inventory days of supply - Days payable outstanding	Supply chain revenue, Cost of goods sold, SC management costs, inventory

Appendix D

Approach used on forecasting inflation and demand (GDP) rate

D.1. Inflation rate forecasting

D1.1. Historical data

	Inflation rate (%)		
Year	China	Thailand	Vietnam
2003	-0.8	0.6	3.9
2004	1.2	1.8	3.1
2005	4.1	2.8	9.5
2006	1.8	4.5	8.3
2007	1.5	5.1	7.5
2008	4.8	2.2	8.3
2009	5.9	5.5	24.4

Source: CIA World Factbook (<https://www.cia.gov/about-cia/index.html>)

D1.2. Forecasting value by using moving average technique

	Inflation rate (%)		
Year	China	Thailand	Vietnam
2010	1.5	1.73	5.12
2011	2.37	3.03	6.02
2012	2.47	4.13	7.32
2013	2.70	3.93	11.05
2014	4.07	4.27	11.33

D.2. Gross Domestic Product (GDP) forecasting

D.2.1. Historical data

	Gross Domestic Product (GDP)	
Year	Thailand	Vietnam
2003	5.20%	6.00%
2004	6.70%	7.20%
2005	6.10%	7.70%
2006	4.50%	8.50%
2007	4.80%	8.20%
2008	4.80%	8.50%
2009	2.60%	6.20%

Source: CIA World Factbook (<https://www.cia.gov/about-cia/index.html>)

D.2.2. Forecasting value by using moving average technique

	Gross Domestic Product (GDP)	
Year	Thailand	Vietnam
2003	5.95%	6.60%
2004	6.40%	7.45%
2005	5.30%	8.10%
2006	4.65%	8.35%
2007	4.80%	8.35%
2008	3.70%	7.35%
2009	5.95%	6.60%

CURRICULUM VITAE

Name Ms. Napaporn Reeveerakul

Date of Birth January 1st, 1977

Education Background

1999 - 2001 (2 years)	Faculty of Engineering (Master Degree) Chulalongkorn University, Bangkok, Thailand Major: Industrial Engineering Title: “Computer Aided Scheduling under Appropriate Constraints in Electronics Manufacturing” Keywords: Scheduling, Production planning and Control.
1995 – 1999 (4 years)	Faculty of Engineering (Bachelor Degree) Chiang Mai University, Chiang Mai, Thailand Major: Industrial Engineering Title : “Inventory Control for Wholesale Warehouse ” Keywords: Inventory Control, Warehouse Management

Professional Position

April'06- present	Chiang Mai University – Lecturer College of Arts, Media and Technology
December 2001 - January 2005(3 yrs)	Schaffner EMC(Thailand) Co.,ltd. – Senior software engineer Nature of Work: Software development and database design system integrated with SQL- server 2000 for automotive parts.

March 2000 Thai Tabuchi Electronic, Bangna, Bangkok.-
 – september Trainee
 2001 (18 Nature of Work: Improving production
 months) planning by using computer aided scheduling
 production plan.

Publications and Conferences

- International Conferences
- C1. N.Reeveerakul, R.Derrouiche, N.Chakpitak, Y.Ouzrout, N.Harnpornchai, A.Bouras, “A Decision Support System for Manufacturing Improvement and Relocation Prevention in Thailand: Supply Chain Perspective”, International conference on Industrial Engineering and Systems Management, pp.9, May 13-15 (2009), Montreal, Canada.
- C2. N.Reeveerakul, N.Chakpitak, Y.Ouzrout, N.Harnpornchai, A.Bouras, “The Knowledge Framework on Decision Making of Plant Entrepreneurial Status: Case study of Northern Region Industrial Estate, Lumphun, Thailand”, International conception et Production Intégrées, pp.7, 19-21 October (2009), Fez, Morocco.
- C3. N.Reeveerakul, Y.Ouzrout, N.Chakpitak, A.Bouras. A. A Risk Matrix Decision on Entrepreneurial Status of Plant in Thailand. International Conference on Concurrent Enterprising

(ICE 2010), pp.64, 21-23 June, 2010

Lugano, Switzerland.

C4. N.Reeveerakul, Y.Ouzrout,

N.Chakpitak, A.Bouras. A Supply Chain Simulation Based on SCOR Model for the Decision on Entrepreneurial of Plant. International Conference on Software, Knowledge, Information Management and Applications (SKIMA 2010), Paro, Phutan, 2010

National
conference

C5. N.Reeveerakul, S.Thongprasert and S.Sornprasit: "Computer Aided Scheduling under Appropriate Constraints in Electronics Manufacturing". IE Network National Conference, pp 579-584, 25-26 October, 2001, Khonkaen, Thailand

Workshop

- Deployment methodology of IS integrating technical and organizational information along the product lifecycle, SIG-PLM Workshop (IFIP WG 5.7), 15th -16th July 2008, Lausanne, Switzerland.
- International Workshop on Manufacturing 3*Efficiency (Ecology+ Economy+ Equity in Manufacturing), within the ICE-2010 International Conference on Concurrent Enterprise, June 22-23, 2010, Lugano, Switzerland.

Lab activities

Septembre 2008

Member of GDR MACS (Modélisation, Analyse et Conduite des Système).

August 2008

Director assistant, Franco-Thai-ICT
Centre-Chiang Mai, Thailand,
www.camt.cmu.ac.th/ftc

October 2009-
August 2010

Member of Erasmus-Mundus Elink
International Program (Year 2008-2010)

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