APPENDIX C

VERIFICATION OF INDUSTRIAL CASE STUDY

MIYAZU MALAYSIA SDN. BHD

Table C.1: Input of *Manufacturer Environment Perspective* Module for Miyazu

Variables Description	**Data**		
Name of user (the interviewee)	Noresam Mahat		
Post	Head of Department		
Department	Manufacturing		
Organisation	Miyazu Malaysia Sdn. Bhd.		
Address of Organisation	Lot No.17, jalan Jelawai 1, Proton City 4, 35900 Tanjung Malim, Perak		
Annual Sales	> £20 million		
Number of Employees	> 150		
Branch	2		
Position in Automotive Industry	1st-Tier Supplier		
Products	Body panels, metal parts, and stamping components		
Age of Organisation	20 years (1991)		
	Age of Relationship		
	< 5 years	**5 – 10 years**	**> 10 years**
Number of Suppliers	> 20	> 20	> 20
Key Market - Local	All classes	All classes	All classes
Key Market - Global	Asean	Asean	Asean
	(1-5 Years)	**(6-10 Years)**	**> 10 years**
KBLVAM Capabilities:			
Car Body Parts Design	Capable	Capable	Capable
Car Body Parts Manufacturing	Capable	Capable	Capable
Car Body Assembly	Capable	Capable	Capable

Table C.2: Output of *Manufacturer Environment Perspective* Module for Miyazu

Category	**Description**
Size of Organisation	Large
Stage in Business Cycle	Harvest stage
Relationship with Suppliers	Good and Stable
Relationship with Customers	Good and Stable
Strategic improvement	Yes
LVAM activities	Implemented, but not for all activities

Table C.3: Inputs of *Market Analysis* Module for Miyazu

Main Product: **Body panels, metal parts, and stamping components**			
Market Competition	**Mar 31, 2009**	**Mar 31, 2010**	**Mar 31, 2011**
Local	< 5 companies	< 5 companies	< 5 companies
Regional	5-20 companies	5-20 companies	5-20 companies
Global	> 20 companies	> 20 companies	> 20 companies
Market Share	**Mar 31, 2009**	**Mar 31, 2010**	**Mar 31, 2011**
Local	< 10%	< 10%	< 10%
Regional	< 5%	< 5%	< 5%
Global	No information	No information	No information

Table C.4: Output of *Market Analysis* for Miyazu

Aspect	Area	Trend	Remarks
Market Competition	Local	Steady for 3 years	
	Regional	Steady for 3 years	
	Global	Steady for 3 years	
Market Share	Local	Steady for 3 years	
	Regional	Steady for 3 years	
	Global	No information	Need to measure

Table C.5: Summarised GAP Analysis Results of *Resources Perspective* for Miyazu

Level 2: *Resources* Perspective	**No of Questions**	**GAP Analysis**										
		GP	BP	Problem Category (PC)								
				1	2	3	4	5	6	7	8	9
Human Resource												
Development	31	28	3	0	2	0	1	0	0	0	0	0
Culture	14	10	4	3	1	0	0	0	0	0	0	0
Benefits	11	7	4	0	4	0	0	0	0	0	0	0
Sub-total	**56**	**45**	**11**	**3**	**7**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
Technology Resource												
Technology Mgmt	11	8	3	0	3	0	0	0	0	0	0	0
Mfg Technology	15	3	12	0	0	0	0	3	9	9	0	0
ICT	11	9	2	0	1	0	1	0	0	0	0	0
Sub-total	**37**	**20**	**17**	**0**	**4**	**0**	**1**	**3**	**0**	**9**	**0**	**0**
Financial Resource												
Financial for Human	9	3	6	0	0	2	0	4	0	0	0	0
Financial for Tech	9	0	9	0	0	7	0	2	0	0	0	0
Financial for Devmt	12	6	6	0	0	0	3	0	3	0	0	0
Sub-total	**30**	**9**	**21**	**0**	**0**	**9**	**3**	**6**	**3**	**0**	**0**	**0**
Total	**123**	**74**	**49**	**3**	**11**	**9**	**5**	**9**	**3**	**9**	**0**	**0**

Table C.6: AHP Analysis with PV for *Human Resource* module for Miyazu

Human Resource	Development	Culture	Benefits	**Priority Vector**
Development	1	1/5	1/4	0.0964
Culture	5	1	3	**0.6194**
Benefits	4	1/3	1	0.2842

Table C.7: AHP Analysis with PV for *Technology Resource* module for Miyazu

Technology Resource	Technology Management	Mfg Technology	ICT	**Priority Vector**
Technology Management	1	3	3	**0.5889**
Mfg Technology	1/3	1	1/2	0.1592
ICT	1/3	2	1	0.2519

Table C.8: AHP Analysis with PV for *Financial Resource* module for Miyazu

Financial Resource	Financial for Human	Financial for Technology	Financial for Implementation	**Priority Vector**
Financial for Human	1	1/3	2	0.2395
Financial for Technology	3	1	4	**0.6232**
Financial for Implementation	1/2	1/4	1	0.1373

Table C.9: AHP Analysis with PV for Level 2: *Resources* Perspective for Miyazu

Aspect	**Human**	**Technology**	**Financial**	**Priority Vector**
Human	1	2	1/2	0.3119
Technology	1/2	1	1/2	0.1976
Financial	2	2	1	**0.4905**

Table C.10: Summary of AHP Results for Level 2: *Resources* Perspective for Miyazu

Level 2: *LVAM Manufacturer Resources* Perspective			
Module	**Priority Vector**	**Sub-module**	**Priority Vector**
Human Resource	0.3119	Development	0.0964
		Culture	**0.6194**
		Benefits	0.2842
Technology Resource	0.1976	Technology Management	**0.5889**
		Manufacturing Technology	0.1592
		ICT	0.2519
Financial Resource	**0.4905**	Financial for Human	0.2395
		Financial for Technology	**0.6232**
		Financial for Development	0.1373

Table C.11: Summarised GAP Analysis Results of Level 3: *Car Body Parts Manufacturing* Perspective for Miyazu

Level 3: *Car Body Parts Manufacturing* Perspective	**No of Questions**	**GAP Analysis**										
		GP	BP	Problem Category (PC)								
				1	2	3	4	5	6	7	8	9
Car Body Design Development												
Design Concept	57	10	47	4	0	0	1	14	0	12	14	2
Design Analysis	19	9	10	10	0	0	0	0	0	0	0	0
Design Assessment	20	20	0	0	0	0	0	0	0	0	0	0
Sub-total	**96**	**39**	**57**	**14**	**0**	**0**	**1**	**14**	**0**	**12**	**14**	**2**
Car Body Parts Mfg Process												
Design of Dies & CF	31	28	3	3	0	0	0	0	0	0	0	0
Design of Mfg Proc	18	17	1	1	0	0	0	0	0	0	0	0
Sub-total	**49**	**45**	**4**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Car Body Assembly Process												
Design of Assy Tools	26	25	1	0	0	1	0	0	0	0	0	0
Design of Mfg Proc	18	16	2	0	1	0	1	0	0	0	0	0
Sub-total	**44**	**41**	**3**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**0**
Total	**189**	**125**	**64**	**18**	**1**	**1**	**2**	**14**	**0**	**12**	**14**	**2**

Table C.12: AHP Analysis for Miyazu's *Car Body Design Development*

Aspect	**Design Concept**	**Design Analysis**	**Design Assessment**	**Priority Vector**
Design Concept	1	1/9	3	0.1395
Design Analysis	9	1	9	**0.7938**
Design Assessment	1/3	1/9	1	0.0667

Table C.13: AHP Analysis for Miyazu's *Car Body Parts Manufacturing Process* module

Aspect	**Design of Dies & CF**	**Design of Mfg Process**	**Priority Vector**
Design of Dies & CF	1	2	**0.6667**
Design of Mfg Process	1/2	1	0.3333

Table C.14: AHP Analysis for Miyazu's *Car Body Assembly Process* module

Aspect	**Design of Assembly Tools**	**Design of Mfg Process**	**Priority Vector**
Design of Assembly Tools	1	1/2	0.3333
Design of Mfg Process	2	1	**0.6667**

Table C.155: AHP Analysis for Miyazu's Level 3: *Car Body Parts Manufacturing* Perspective

Aspect	Car Body Design Development	Car Body Parts Mfg Process	Car Body Assy Process	Priority Vector
Car Body Design Development	1	3	4	**0.6232**
Car Body Parts Mfg Process	1/3	1	2	0.2395
Car Body Assy Process	1/4	1/2	1	0.1373

Table C.16: Summary of AHP Results for Level 3: *Car Body Parts Manufacturing* Perspective for Miyazu

Level 3: LVAM Manufacturer Capability Car Body Parts Manufacturing Perspective			
Module	**Priority Vector**	**Sub-module**	**Priority Vector**
Car Body Design Development	**0.6232**	Car Body Design Concept	0.1395
		Conceptual Design Analysis	**0.7938**
		Car Body Design Development Assessment	0.0667
Car Body Parts Manufacturing Process	0.2395	Design of Dies & Checking Fixtures	**0.6667**
		Design of Manufacturing Process	0.3333
Car Body Assembly Process	0.1373	Design of Assembly Tools	0.3333
		Design of Assembly Process	**0.6667**

Table C.17: Summarised GAP Analysis Results of Level 4: *Competitive Priorities* Perspective for Miyazu

Level 4: *Competitive Priorities* Perspective	**No of Questions**	**GAP Analysis**										
		GP	BP	Problem Category (PC)								
				1	2	3	4	5	6	7	8	9
Quality												
Supply QA	18	10	8	8	0	0	0	0	0	0	0	0
Main Prodn QA	20	19	1	0	1	0	0	0	0	0	0	0
Customer QA	19	11	8	6	1	0	1	0	0	0	0	0
Sub-total	**57**	**40**	**17**	**14**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
Cost												
Supply Cost	17	17	0	0	0	0	0	0	0	0	0	0
Main Prodn Cost	15	13	2	1	1	0	0	0	0	0	0	0
Resource Cost	12	5	7	1	3	1	2	0	0	1	0	0
Sub-total	**44**	**35**	**9**	**2**	**4**	**1**	**2**	**0**	**0**	**0**	**0**	**0**
Delivery												
Supply Timing	11	1	10	4	1	2	2	1	0	0	0	0
Main Prodn Timing	11	1	10	4	0	0	3	3	0	0	0	0
Delivery Timing	11	1	10	7	0	0	0	3	0	0	0	0
Sub-total	**33**	**3**	**30**	**15**	**1**	**2**	**5**	**7**	**0**	**0**	**0**	**0**
Flexibility												
Supply Flexibility	10	2	8	6	2	0	0	0	0	0	0	0
Main Prod Flexibility	15	11	4	2	2	0	0	0	0	0	0	0
Delivery Flexibility	11	11	0	0	0	0	0	0	0	0	0	0
Sub-total	**36**	**24**	**12**	**8**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Supply Chain												
Location	15	9	6	3	0	1	0	2	0	0	0	0
Logistics	17	10	7	3	1	0	0	2	0	0	0	1
Sub-total	**32**	**19**	**13**	**6**	**1**	**1**	**0**	**4**	**0**	**0**	**0**	**1**
Total	**202**	**121**	**81**	**45**	**12**	**4**	**8**	**11**	**0**	**0**	**0**	**1**

Table C.18: AHP Analysis for Miyazu's *Quality* module

Aspect	Supply Quality Audit	Main Production Quality Audit	Customer Quality Audit	Priority Vector
Supply Quality Audit	1	8	3	**0.6366**
Main Production Quality Audit	1/8	1	1/7	0.0609
Customer Quality Audit	1/3	7	1	0.3025

Table C.19: AHP Analysis for Miyazu's *Cost* module

Aspect	Supply Cost	Main Production Cost	Resource Cost	Priority Vector
Supply Cost	1	1/3	1/5	0.1038
Main Production Cost	3	1	1/4	0.2231
Resource Cost	5	4	1	**0.6651**

Table C.20: AHP Analysis for Miyazu's *Delivery* module

Aspect	Supply Timing	Main Prodn Timing	Delivery Timing	Priority Vector
Supply Timing	1	2	1/3	0.2395
Main Prodn Timing	1/2	1	1/4	0.1373
Delivery Timing	3	4	1	**0.6232**

Table C.21: AHP Analysis for Miyazu's *Flexibility* module

Aspect	Supply Flexibility	Main Prod Flexibility	Delivery Flexibility	Priority Vector
Supply Flexibility	1	9	9	**0.7668**
Main Prod Flexibility	1/9	1	5	0.1741
Delivery Flexibility	1/9	1/5	1	0.0591

Table C.22: AHP Analysis for Miyazu's *Supply Chain* module

Aspect	Location	Logistics	Priority Vector
Location	1	1/2	0.3333
Logistics	2	1	**0.6667**

Table C.23: AHP Analysis for Miyazu's Level 4: *Competitive Priorities* Perspective

Aspect	Quality	Cost	Delivery	Flexibility	Supply Chain	Priority Vector
Quality	1	1	1/6	1	2	0.1089
Cost	1	1	1/8	1/4	1/3	0.0596
Delivery	6	8	1	6	7	**0.5960**
Flexibility	1	4	1/6	1	2	0.1442
Supply Chain	1/2	3	1/7	1/2	1	0.0913

Table C.24: Summary of AHP Results for Level 4: *Competitive Priorities* Perspective for Miyazu

Level 4: *LVAM Manufacturer Capability Competitive Priorities* Perspective			
Module	**Priority Vector**	**Sub-module**	**Priority Vector**
Quality	0.0596	Supply Quality Audit	**0.6366**
		Main Production Quality Audit	0.0609
		Customer Quality Audit	0.3025
Cost	0.0641	Supply Cost	0.1038
		Main Production Cost	0.2231
		Resource Cost	**0.6651**
Delivery	**0.5960**	Supply Timing	0.2395
		Main Prodn Timing	0.1373
		Delivery Timing	**0.6232**
Flexibility	0.1442	Supply Flexibility	**0.7668**
		Main Prod Flexibility	0.1741
		Delivery Flexibility	0.0591
Supply Chain	0.0913	Location	0.3333
		Logistics	**0.6667**

Table C.25: Summarised GAP Analysis Results of Level 5: *Lean Process Optimisation* Perspective for Miyazu

Level 5: *Lean Process Optimisation* Perspective	**No of Questions**	**GAP Analysis**										
		GP	BP	Problem Category (PC)								
				1	2	3	4	5	6	7	8	9
Employee Involvement												
Benchmark	15	9	6	0	3	1	2	0	0	0	0	0
Assessment	10	4	6	0	0	2	4	0	0	0	0	0
Measurement	12	7	5	0	4	0	1	0	0	0	0	0
Analyse	12	8	4	1	1	2	0	0	0	0	0	0
Action	12	8	4	0	1	0	2	1	0	0	0	0
Sub-total	**61**	**36**	**25**	**1**	**9**	**5**	**9**	**1**	**0**	**0**	**0**	**0**
Waste Elimination												
Benchmark	15	10	5	0	2	0	1	0	1	0	0	1
Assessment	10	4	6	0	0	2	1	3	0	0	0	0
Measurement	12	9	3	1	0	0	1	1	0	0	0	0
Analyse	12	12	0	0	0	0	0	0	0	0	0	0
Action	12	8	4	0	0	1	1	0	1	1	0	0
Sub-total	**61**	**43**	**18**	**1**	**2**	**3**	**4**	**4**	**2**	**1**	**0**	**1**
Kaizen												
Benchmark	15	11	4	0	2	0	0	0	0	1	0	1
Assessment	10	1	9	0	0	2	4	0	0	3	0	0
Measurement	12	9	3	0	3	0	0	0	0	0	0	0
Analyse	12	9	3	0	1	0	2	0	0	0	0	0
Action	12	11	1	0	0	0	1	0	0	0	0	0
Sub-total	**61**	**41**	**20**	**0**	**6**	**2**	**7**	**0**	**0**	**4**	**0**	**1**
Total	**183**	**120**	**63**	**2**	**17**	**10**	**20**	**5**	**2**	**5**	**0**	**2**

Table C.26: AHP Analysis for Miyazu's *Employee Involvement* module

Aspect (Employee Involvement)	Benchmark	Assessment	Measurement	Analyse	Action	Priority Vector
Benchmark	1	1	1/2	1	2	0.1866
Assessment	1	1	1/2	1/2	2	0.1566
Measurement	2	2	1	1/2	3	0.2650
Analyse	1	2	2	1	3	**0.3048**
Action	1/2	1/2	1/3	1/3	1	0.0871

Table C.27: AHP Analysis for Miyazu's *Waste Elimination* module

Aspect (Waste Elimination)	Benchmark	Assessment	Measurement	Analyse	Action	Priority Vector
Benchmark	1	1	1/2	1	2	0.1864
Assessment	1	1	1/2	3	2	0.2264
Measurement	2	2	1	3	2	**0.3394**
Analyse	1	1/3	1/3	1	1/2	0.1070
Action	1/2	1/2	1/2	2	1	0.1408

Table C.28: AHP Analysis for Miyazu's *Kaizen* module

Aspect (*Kaizen*)	Benchmark	Assessment	Measurement	Analyse	Action	Priority Vector
Benchmark	1	1	1/2	1	2	0.1866
Assessment	1	1	2	2	3	**0.3048**
Measurement	2	1/2	1	2	3	0.2650
Analyse	1	1/2	1/2	1	2	0.1566
Action	1/2	1/3	1/3	1/2	1	0.0870

Table C.29: AHP Analysis for Miyazu's Level 5: *Lean Process Optimisation* Perspective

Aspect	Employee Involvement	Waste Elimination	*Kaizen*	Priority Vector
Employee Involvement	1	3	2	**0.5390**
Waste Elimination	1/3	1	1/2	0.1638
Kaizen	1/2	2	1	0.2973

Table C.30: Summary of AHP Results for Level 5: *Lean Process Optimisation* Perspective for Miyazu

Level 5: *LVAM Manufacturer Capability Lean Process Optimisation* Perspective			
Module	**Priority Vector**	**Sub-module**	**Priority Vector**
Employee Involvement	**0.5390**	Benchmarking	0.1866
		Assessment	0.1566
		Measurement	0.2650
		Analyse	**0.3048**
		Action	0.0871
Waste Elimination	0.1638	Benchmarking	0.1864
		Assessment	0.2264
		Measurement	**0.3394**
		Analyse	0.1070
		Action	0.1408
Kaizen	0.2973	Benchmarking	0.1866
		Assessment	**0.3048**
		Measurement	0.2650
		Analyse	0.1566
		Action	0.0870