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An Understanding of Thai SMEs : Factor Analysis, Path Analysis and their implications

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Abstract

In this research paper, the quantification of characteristic features of SMEs and effects of government policies on SMEs are illustrated. First, the essence of "industrial policy" is examined. Then, the details of Factor Analysis and LISREL in the analysis of Thai SMEs are followed. Finally, a personal opinion of the importance of field surveys in the area of SMEs analysis is noted.

Key words: Thai SMEs, factor analysis, path analysis, organization adjuster behavior, vigorous innovation changer

1. Introduction

In the research of SMEs in Thailand, one of the most difficult problems is how to quantify characteristic essence of SMEs and policy effects government toward SMEs. These quantifications are explicitly illustrated in this paper through Factor Analysis and Path Analysis.

Thus, the aim of this report is to introduce the application of Factor Analysis and Path Analysis in SMEs Policy Implication in case of Thailand.

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In Section 2, the essence of "industrial policy" is implicated firstly.

In Section 3, the utilization of Factor Analysis and Lisrels in the analysis of Thai SMEs state of being through questionnaires survey is clearly implicated.

In Section 4, the evaluation of the implication of the utilization of Factor Analysis and Path Analysis in the analysis of Thai SMEs is summarized.

In Section 5 (Final Section) my personal opinion of the importance of field Surveys in the area of SMEs analysis is denoted.

2. The Essence of "Industrial Policy" in Thailand

The "SMEs Policy" or in the broader sense "Industrial Policy" posesses next essence. These policies are designed in order to compensate the areas which the functions of market could not cover. In the place like Thailand, the market mechanisms must be complemented by the Industrial policy. Next, the field Surveys are necessary in order to catch the real needs of SMEs toward industrial policy. In fact, it is better to catch the real needs of SMEs by scrutinizing sector by sector (like machinery industry, automobile industry, jewelry industry, etc.), Otherwise the measurement will be cleared out in each other.

3. The Utilization of Factor Analysis and Path Analysis in the Analysis of Thai SMEs[1]

In this section, the results from the industrial surveys of the Thai SMEs in the machinery and automobile parts industry are discussed and compared. Information was collected using both a mailed questionnaires surveys and through interviews with SME in the machinery sector.

The analysis and comparison of these two industries is designed to throw some lights onto the foundation of important Thai base industries.

[1] This is summarized from "Survey on Roles and Adaptation of Thai SMEs Caused by The Changing Industrial Structure", paper presented to Symposium on New Roles of Small and Medium Enterprises, New Delhi India, April 2001.

3.1 Questionnaire Results

3.1.1. Company General Profile

580 questionnaires were mailed, and we received 26 completed questionnaires(see Appendix1) from automobile parts SMEs and 50 from machinery SMEs answers (Mainly in Bangkok).

3.1.2. Assessment of Changing Environment and Business Strengths

The items in the second part of the questionair make an assessment of the changing environment, business strengths, the extent business was affected by the global business environment and the Asian Financial Crisis. Questions were also asked about advances in production technology, international quality management standards, changing consumer behavior and domestic over–capacity/reduced demand (See <Table 1>).

<Table 2> illustrates the comparison of effects from the global business environment between SMEs in the automobile parts and machinery industries.

<Table 1> Statistics of Extent Business Being Affected from Good Business Environment. (according to sequence of quantity of mean)

Global business environment	N	Mean	S.D.
V2.1.5 Asian financial crisis	74	2.74	.50
V2.1.1 Advances in production technology	73	2.42	.55
V2.1.8 International quality management standards.	62	2.27	.77
V2.1.7 Changing consumer behavior	69	2.19	.73
V2.1.4 Over-Capacity/reduced/demand	65	2.11	.79
V2.1.6 Trade liberalization	65	2.08	.80
V2.1.9 International environmental management standards.	62	1.90	.72
V2.1.2 Information technology	67	1.85	.66
V2.1.3 Global over-capacity/reduced demand	61	1.64	.68

Note 3 = very much affect, 2 = somewhat affected, 1 = not affected

<Table 2> The Comparison of Affects from Global Business Environment between Automobile Parts and Machinery Industry.

Global business environment	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V2.1.1 Advances in production technology	Automobile parts	26	2.35	.56	-.12	-.905	.369
	Machinery	47	2.47	.55			
V2.1.2 Information technology	Automobile parts	22	1.77	.61	-.12	-.677	.501
	Machinery	45	1.89	.68			
V2.1.3 Global over-capacity/reduced demand	Automobile parts	22	1.68	.78	.006	.362	.719
	Machinery	39	1.62	.63			
V2.1.4 Domestic over-capacity/reduced demand	Automobile parts	20	2.10	.79	-.001	-.052	.959
	Machinery	45	2.11	.80			
V2.1.5 Asian financial crisis	Automobile parts	26	2.69	.55	-.007	-.645	.521
	Machinery	48	2.77	.47			
V2.1.6 Trade liberalization	Automobile parts	24	2.04	.75	-.005	-.271	.787
	Machinery	41	2.10	.83			
V2.1.7 Changing consumer behavior	Automobile parts	25	2.24	.72	.008	.438	.663
	Machinery	44	2.16	.75			
V2.1.8 International quality management standards	Automobile parts	20	2.35	.75	.11	.531	.598
	Machinery	42	2.24	.79			
V2.1.9 International environmental mgmt standards	Automobile parts	19	1.89	.74	-.002	-.061	.951
	Machinery	43	1.91	.72			

Note ** P < .01 * P < .05

<Table 3> Statistics of Seriousness of Various Problems during the Part 2 Years (accessing to sequence of quantity of mean)

Various problems during the part 2 years	N	Mean	S.D.
V2.2.6 Increased overall production costs	74	2.57	.58
V2.2.7 Increased costs of materials & parts	74	2.55	.62
V2.2.1 Contraction in market demand	74	2.50	.62
V2.2.4 High cost of funds / High interest rates	74	2.41	.74
V2.2.8 Availability of skilled workers	74	2.11	.67
V2.2.2 Competition from other domestic producers	73	2.03	.74
V2.2.5 Difficulty in obtaining financing	73	2.03	.85
V2.2.3 Competition from foreign producers/imported products	73	1.78	.75
V2.2.10 Labor relations/Union actions	73	1.49	.63
V2.2.9 Availability of unskilled labor	73	1.41	.55

Note 3 = severe, 2 = moderate, 1 = slight or none

<Table 4> The Comparison of Seriousness of Various Problems during the Past 2 years between Automobile Parts and Machinery Industry.

Various problems during the past 2 years	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V2.2.1 Contraction in market demand	Automobile parts	26	2.38	.50	-.18	-1.172	.245
	Machinery	48	2.56	.68			
V2.2.2 Competition from other domestic producers	Automobile parts	26	2.00	.75	-.004	-.232	.817
	Machinery	47	2.04	.75			
V2.2.3 Competition from foreign producers/imported products	Automobile parts	26	1.88	.77	.16	.878	.383
	Machinery	47	1.72	.74			
V2.2.4 High cost of funds / High interest rates	Automobile parts	25	2.44	.65	.005	.286	.776
	Machinery	49	2.39	.79			

V2.2.5 Difficulty in obtaining financing	Automobile parts	25	1.84	.80	-.28	-1.369	.175
	Machinery	48	2.13	.87			
V2.2.6 Increased overall production costs	Automobile parts	26	2.62	.50	.007	.524	.602
	Machinery	48	2.54	.62			
V2.2.7 Increased costs of materials & parts	Automobile parts	26	2.58	.58	.004	.231	.818
	Machinery	48	2.54	.65			
V2.2.8 Availability of skilled workers	Automobile parts	26	1.85	.73	-.40	-2.553*	.013
	Machinery	48	2.25	.60			
V2.2.9 Availability of unskilled labor	Automobile parts	26	1.31	.47	-.16	-1.200	.234
	Machinery	47	1.47	.58			
V2.2.10 Labor relations/Union actions	Automobile parts	26	1.46	.65	-.005	-.319	.751
	Machinery	47	1.51	.62			

Note ** P < .01 * P < .05

The items in the questionnaire, related to the extent the business was affected from the global business environment and the items related to the seriousness of various problems during the past 2 years were subjected to a factor solution using "principal component analysis" (See <Table 5>). A six factor solution was achieved and the factors represent the following six broad categories: 1) the globalization effect. 2) increased business costs. 3) financial problems and 4) labor relations problems. 5) global and domestic over–capacity/reduced demand problems 6) Asian financial crisis/contraction in market demand.

<Table 6> illustrates the mean factor scores for the automotive parts and machinery industry from factor analysis of combined global business environment affects and seriousness of various problems during the past 2 years. There was no statistically significant difference between the mean factor scores for these two industries. The mean factor scores of automotive part industry in the fourth factor is –0.3086. This illustrates that the condition of this factor of automotive parts industry is in the opposite direction or that labor relations in the automotive parts industry is beneficial rather than problematic. In the same way, the sixth factor or Asian Financial crisis/contraction in market demand of automotive

parts industry has mean of factor score of –0.1765 which we could interpret that from crisis, the market went opposite way or expanded rather than contraction. So the crisis has been the opportunity of Thai automobile parts industry.

<Table 5>The Factor Analysis of Combined Global Business Environment Affects and Seriousness of Various Problems during the Past 2 Years.

Variables	Factors					
	1	2	3	4	5	6
V2.1.8 International quality management standards	.767					
V2.1.9 International environmental mgmt standards	.690					
V2.1.6 Increased overall production costs	.639					
V2.1.1 Advances in production technology	.611					
V2.2.3 Competition from foreign producers/imported products	.605					
V2.2.2 Competition from other domestic producers	.575					
V2.1.2 Information technology	.548					
V2.1.7 Changing consumer behavior	.427					
V2.1.6 Trade liberalization		.912				
V2.2.7 Increased costs of materials & parts		.883				
V2.2.4 High cost of funds / High interest rates			.837			
V2.2.5 Difficulty in obtaining financing			.824			
V2.2.10 Labor relations/Union actions				.789		
V2.2.8 Availability of skilled workers				.709		
V2.2.9 Availability of unskilled labor				.662		
V2.1.3 Global over-capacity/reduced demand					.834	
V2.1.4 Domestic over-capacity/reduced demand					.759	
V2.1.5 Asian financial crisis						.830
V2.2.1 Contraction in market demand						.734
Eigenvalues	3.204	2.077	1.998	1.869	1.626	1.465
% of Variance	16.864	10.934	10.518	9.839	8.557	7.712

Note the numbers in Table are factor-loading weights.

<Table 6>The Comparison of Mean of Factor Scores of Automotive Parts and Machinery Industry from Factor Analysis of Combined Global Business Environment Affects and Seriousness of Various Problems during the Past 2 Years.

Factor	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
AFFECT1 Globalization effect	Automobile parts	26	.004	1.1178	.006	.232	.817
	Machinery	50	-.002	.9445			
AFFECT2 Increase business cost	Automobile parts	26	.1007	.8096	.1530	.630	.530
	Machinery	50	-.005	1.0900			
AFFECT3 Financial Problems	Automobile parts	26	-.005	.9070	-.009	-.373	.711
	Machinery	50	.003	1.0526			
AFFECT4 relations Problems	Automobile parts	26	-.3086	1.0302	-.4691	-1.977	.052
	Machinery	50	.1605	.9552			
AFFECT5 Global and Domestic over-capacity/reduced demand problems	Automobile parts	26	.1207	1.0334	.1835	.757	.452
	Machinery	50	-.006	.9869			
AFFECT6 Asian financial crisis/contraction in market demand	Automobile parts	26	-.1765	.9775	-.2682	-1.111	.270
	Machinery	50	.009	1.0089			

Note ** P < .01 * P < .05

<Table 7> Statistics of Capability Factors Compared with Competitors (according to sequence of quantity of mean)

Capability Factors	N	Mean	S.D.
V2.3.6 Pricing / Value-for-money	66	2.47	.61
V2.3.2 Product quality	70	2.36	.59
V2.3.5 Product image / Brand image	51	2.33	.74
V2.3.13 Workers' skills	70	2.19	.67
V2.3.3 Product design / development	60	2.18	.70
V2.3.7 Productivity / Unit cost	66	2.14	.74
V2.3.1 Production technology	69	2.01	.68
V2.3.4 Product range / diversity	61	1.98	.74
V2.3.9 Access to domestic markets	57	1.93	.78
V2.3.11 Access to technology	60	1.88	.78
V2.3.12 Access to finance	44	1.84	.71
V2.3.8 Profit margin 100 unit	56	1.84	.71
V2.3.14 Ability to use information technology	51	1.78	.73
V2.3.10 Access to technology	40	1.78	.83

Note : 3 = Better than competitors, 2 = About the same as competitors, 1 = not so good as competitors

The items related to business capability were factor analyzed and a four factor solution resulted (See <Table 9>). The four factors can be categorized as: 1) Technology and market capability (competency capability), 2) Business efficiency, 3) Accessment to resources, and 4) Line of product.

<Table 10> illustrates a comparison of mean factor sectors for automotive parts industry and machinery industry SMEs for the factors relating to their capability as compared with their competitors. This comparison shows that the prominent factors are COMPET3 and assessment to resources, which automobile parts industry has great capability while machinery industry has significantly disadvantage. Other factors had no outstanding effects.

<Table 8> The Comparison of Capability Factors Compared with Competitors between Automotive Parts and Machinery Industry.

Capability Factors	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V2.3.1 Production technology	Automobile parts	24	1.96	.62	-.009	-.502	.617
	Machinery	45	2.04	.71			
V2.3.2 Product quality	Automobile parts	23	2.30	.56	-.008	-.520	.604
	Machinery	47	2.38	.61			
V2.3.3 Product design / development	Automobile parts	21	2.14	.79	-.006	-.326	.746

	Machinery	39	2.21	.66			
V2.3.4 Product range / diversity	Automobile parts	22	2.00	.69	.003	.129	.898
	Machinery	39	1.97	.78			
V2.3.5 Product image / Brand image	Automobile parts	19	2.21	.79	-.20	-.912	.366
	Machinery	32	2.41	.71			
V2.3.6 Pricing / Value-for-money	Automobile parts	25	2.36	.57	-.18	-1.137	.260
	Machinery	41	2.54	.64			
V2.3.7 Productivity / Unit cost	Automobile parts	25	2.00	.58	-.22	-1.169	.247
	Machinery	41	2.22	.82			
V2.3.8 Profit margin 100 unit	Automobile parts	20	1.90	.64	.009	.475	.637
	Machinery	36	1.81	.75			
V2.3.9 Access to domestic markets	Automobile parts	20	2.20	.77	.42	1.983	.052
	Machinery	37	1.78	.75			
V2.3.10 Access to technology	Automobile parts	19	1.84	.83	.13	.481	.634
	Machinery	21	1.71	.85			
V2.3.11 Access to technology	Automobile parts	20	1.85	.75	-.005	-.231	.818
	Machinery	40	1.90	.81			
V2.3.12 Access to finance	Automobile parts	17	2.12	.70	.45	2.123*	.040
	Machinery	27	1.67	.68			
V2.3.13 Workers' skills	Automobile parts	24	2.17	.64	-.003	-.172	.864
	Machinery	46	2.20	.69			
V2.3.14 Ability to use i nformation technology	Automobile parts	19	1.68	.67	-.16	-.752	.456
	Machinery	32	1.84	.77			

Note ** P < .01 * P < .05

<Table 9> The Factor Analysis at Capability Factors Compared with Competitors.

Variables	Factors			
	1	2	3	4
V2.3.11 Access to technology	.838			
V2.3.1 Production technology	.806			
V2.3.2 Product quality	.765			
V2.3.14 Ability to use information technology	.713			
V2.3.3 Product design / development	.647			
V2.3.10 Access to technology	.615			
V2.3.5 Product image / Brand image	.533			
V2.3.13 Workers' skills	.518			
V2.3.8 Profit margin 100 unit		.770		
V2.3.7 Productivity / Unit cost		.644		
V2.3.6 Pricing / Value-for-money		.593		
V2.3.12 Access to finance			.778	
V2.3.9 Access to domestic markets			.601	
V2.3.4 Product range / diversity				.830
Eigenvalues	3.973	1.906	1.528	1.468
% of Variance	28.380	13.614	10.917	10.486

Note the numbers in Table are factor loading weights.

<Table 10> The Comparison at Mean of Factor Scores of Automotive Parts and Machinery Industry from Factor Analysis of Capability Factors Compared with Competitors.

Factors	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
COMPET1 Technolgoy and market capability (Competarsy capabilities)	Automobile parts	26	-.1539	.8895	-.2339	-.967	.337
	Machinery	50	.008	1.0525			
COMPET2 Business efficiency	Automobile parts	26	-.1067	.8769	-.1623	-.669	.506
	Machinery	50	.006	1.0626			
COMPET3 Assessment to resources	Automobile parts	26	.4027	1.0817	.6121	2.629**	.010

COMPET4 Line of products	Machinery	50	-.2094	.8960	.004	.146	.885
	Automobile parts	26	.003	1.0156			
	Machinery	50	-.001	1.0020			

Note ** P < .01 * P < .05

3.1.3. Business Strategy and Results

By comparing business results in 1999 with those in 1997-1998, we found that the automobile parts industry was improving while the machinery industry was still in decline. While total production volume, margin on sales, total sales, export volume and export value of automobile parts industry have increased, but every machinery industry indicators is down. The production capacity of the automobile parts industry is also up while this was not true for the machinery industry until later, in 1999 (See <Tables 11 and 12>)

<Table 11> Statistics of Business Result in 1999 Comparing with 1997-1998 (according to sequence of quantity of mean)

Factors	N	Mean	S.D.
V3.1.1 Total production volume	74	3.18	1.52
V3.1.3 Total sales	73	3.12	1.55
V3.1.4 Export volume	42	2.86	1.37
V3.1.5 Export value	41	2.76	1.37
V3.1.2 Margin on sales	73	2.75	1.42
V3.1.6 Average selling price	70	2.60	1.06

Note 5 = more than 10%, 4 = 5-10% higher, 3 = about the same, 2 = 5-10% lower, 1 = more than 10% lower

<Table 12> The Comparison of Business Results in 1999 with These in 1997-1998 between Automobile Parts and Machinery Industry.

Factors	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V3.1.1 Total production volume	Automobile parts	26	3.73	1.37	.86	2.385*	.020
	Machinery	48	2.88	1.52			
V3.1.2 Margin on sales	Automobile parts	25	3.08	1.47	.50	1.426	.158
	Machinery	48	2.58	1.38			
V3.1.3 Total sales	Automobile parts	25	3.72	1.49	.91	2.464*	.016
	Machinery	48	2.81	1.50			
V3.1.4 Export volume	Automobile parts	15	3.60	1.45	1.16	2.831**	.007
	Machinery	27	2.44	1.15			
V3.1.5 Export value	Automobile parts	15	3.27	1.58	.81	1.862	.070
	Machinery	26	2.46	1.17			
V3.1.6 Average selling price	Automobile parts	25	2.76	1.09	.25	.945	.348
	Machinery	45	2.51	1.04			

Note ** P < .01 * P < .05

The following implementation plans indicate that the situation of these industries is still bad. Venturing into E-commerce, adopting alternative marketing channels, recruiting more technicians and/or engineers, adding new product lines, finding new business alliance, entering new markets and developing & marketing new packing plans will be most likely implemented during the next three years. (See <Tables 12 and 13>)

The results, depicted in Table 3.14, shows no statistically significant differences in terms of the timing of implementation for the above mentioned items.

<Table 13> Statistics of Things Implemented or Will Be Implemented. (accounting to sequences of quantity of mean)

Things implemented or will be implemented	N	Mean	S.D.
V3.3.11 Venturing into E-commerce	48	2.92	.35
V3.3.10 Adopting alternative marketing channels	51	2.76	.47
V3.3.13 Recruiting more technicians and/or engineers	55	2.75	.58
V3.3.3 Adding new product lines	57	2.74	.48
V3.3.16 Finding new business alliance for financing	44	2.73	.54
V3.3.15 Finding new business alliance for technology	55	2.73	.56
V3.3.6 Developing & marketing new products	54	2.72	.56
V3.3.17 Finding new business alliance for marketing	56	2.71	.53
V3.3.8 Entering new market(s)	59	2.71	.53
V3.3.7 Developing & marketing new packaging	45	2.71	.59
V3.3.5 Modernizing machinery & equipment	70	2.60	.65
V3.3.14 Finding new sources / suppliers of materials & parts	62	2.55	.62
V3.3.12 Changing company's financial structure	49	2.49	.74
V3.3.1 Production capacity expansion	67	2.25	.89
V3.3.9 Withdrawing from some market(s)	42	2.05	.70
V3.3.4 Ceasing some product / business lines	50	1.98	.74
V3.3.2 Production capacity reduction	52	1.81	.63

Note 3 = During next 3 years, 2 = During 1998-1999, 1 = During 1995–1997

<Table 14> The Comparison at Things Implemented or Will Be Implemented Between Automobile Parts and Machinery Industry.

Things implemented or will be implemented	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V3.3.1 Production capacity expansion	Automobile parts	26	2.27	.92	.002	.112	.911
	Machinery	41	2.24	.89			
V3.3.2 Production capacity reduction	Automobile parts	20	1.70	.66	-.18	-.978	.333
	Machinery	32	1.88	.61			
V3.3.3 Adding new product lines	Automobile parts	23	2.65	.57	-.14	-1.091	.280
	Machinery	34	2.79	.41			
V3.3.4 Ceasing some product / business lines	Automobile parts	19	2.11	.74	.20	.933	.355
	Machinery	31	1.90	.75			
V3.3.5 Modernizing machinery & equipment	Automobile parts	26	2.46	.71	-.22	-1.388	.170
	Machinery	44	2.68	.60			
V3.3.6 Developing & marketing new products	Automobile parts	20	2.65	.49	-.11	-.719	.475
	Machinery	34	2.76	.61			
V3.3.7 Developing & marketing new packaging	Automobile parts	16	2.69	.48	-.004	-.198	.844
	Machinery	29	2.72	.65			
V3.3.8 Entering new market(s)	Automobile parts	21	2.67	.48	-.007	-.487	.628
	Machinery	38	2.74	.55			
V3.3.9 Withdrawing from some market(s)	Automobile parts	13	1.85	.80	-.29	-1.264	.214
	Machinery	29	2.14	.64			
V3.3.10 Adopting alternative marketing channels	Automobile parts	19	2.68	.48	-.13	-.936	.354
	Machinery	32	2.81	.47			
V3.3.11 Venturing into E-commerce	Automobile parts	16	2.94	.25	.003	.291	.772
	Machinery	32	2.91	.39			
V3.3.12 Changing company's financial structure	Automobile parts	16	2.25	.77	-.36	-1.606	.115
	Machinery	33	2.61	.70			
V3.3.13 Recruiting more technicians and/or engineers	Automobile parts	20	2.65	.59	-.15	-.914	.365
	Machinery	35	2.80	.58			
V3.3.14 Finding new sources / suppliers of materials & parts	Automobile parts	22	2.50	.51	-.008	-.454	.652
	Machinery	40	2.58	.68			
V3.3.15 Finding new busin	Automobile	20	2.65	.59	-.12	-.771	.444

ess alliance for technology	parts						
	Machinery	35	2.77	.55			
V3.3.16 Finding new busin	Automobile	13	2.62	.65	-.16	-.881	.383
ess alliance for financing	parts						
	Machinery	31	2.77	.50			
V3.3.17 Finding new busin	Automobile	20	2.65	.59	-.10	-.674	.503
ess alliance for marketing	parts						
	Machinery	36	2.75	.50			

From <Table 15> the most important business strategies that contribute to the survival and success of companies are cost reduction/productivity improvement, H.R. strategy, market strategy, changes in technology/process, equipment, financial strategy, capacity expansion/reduction and business alliance. E-commerce and changes in business/ product lines are not important strategies.

<Table 15> Statistics of The Extent of Various Business Strategies which Attribute the Survival and Success at Company (according to sequence of quantity at mean)

Business Strategies	N	Mean	S.D.
V3.4.4 Cost reduction / productivity improvement	75	3.72	.45
V3.4.8 Personnel / human resource strategy	73	3.41	.70
V3.4.6 Market / marketing strategy	74	3.30	.77
V3.4.3 Changes in technology / process / equipment	72	3.15	.71
V3.4.7 Financial strategy	74	3.11	.85
V3.4.1 Capacity expansion / reduction	74	3.05	.86
V3.4.9 Business alliance	73	2.97	.88
V3.4.2 Changes in business / product lines	73	2.40	1.02
V3.4.5 E-commerce	68	2.18	.90

Note 4 = most important, 3 = Quite important, 2 = not so important, 1 = not relevant 1

<Table 16> shows that e-commerce is more important for the machinery industry than for the automobile parts industry and this difference is statistically significant. Changes in business/product lines' strategy also seems to be more important in the machinery industry than in the automobile parts industry because this difference is almost significant statistically.

<Table 16> The Comparison of the Extent of Various Business Strategies which Attributes the Survival and Success of Company between Automobile Parts and Machinery Industry.

Business Strategies	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V3.4.1 Capacity expansion / reduction	Automobile parts	26	3.12	.86	.009	.450	.654
	Machinery	48	3.02	.86			
V3.4.2 Changes in business / product lines	Automobile parts	26	2.12	1.07	-.44	-1.775	.080
	Machinery	47	2.55	.97			
V3.4.3 Changes in technology / process / equipment	Automobile parts	26	3.08	.74	-.12	-.684	.497
	Machinery	46	3.20	.69			
V3.4.4 Cost reduction / productivity improvement	Automobile parts	26	3.81	.40	.13	1.228	.223
	Machinery	49	3.67	.47			
V3.4.5 E-commerce	Automobile parts	25	1.84	.80	-.53	-2.445 *	.017
	Machinery	43	2.37	.90			
V3.4.6 Market / marketing strategy	Automobile parts	26	3.27	.78	-.004	-.229	.820
	Machinery	48	3.31	.78			
V3.4.7 Financial strategy	Automobile parts	26	3.00	.85	-.17	-.800	.426
	Machinery	48	3.17	.86			
V3.4.8 Personnel / human resource strategy	Automobile parts	26	3.35	.80	-.10	-.582	.562
	Machinery	47	3.45	.65			
V3.4.9 Business alliance	Automobile parts	26	2.88	.91	-.14	-.632	.530
	Machinery	47	3.02	.87			

Note ** P < .01 * P < .05

The items related to the survival and success of the company were factor analyzed, and a two factor solution resulted (See <Table 17>). An examination of these two factors reveals that they can be grouped into two categories:

1) Adjustment factor or organization adjuster behavior
2) Changing factor or vigorous innovation changer behavior

An examination of <Table 18> shows that the second factor or changing factor or vigorous innovation change's factor for automobile parts industry's mean score is -.3151, which means that innovation change is not important or rather pulling-down force for the survival and success of the automobile parts industry while it is pushing-up force (.1639) for the survival and success of the machinery industry.

<Table 17> The Exploratory Factor Analysis of the Extent's of Various Strategies which Attribute to the Survival and Success of the Company.

Variable	Factor	
	1	2
V3.4.7 Financial strategy	.741	
V3.4.1 Capacity expansion / reduction	.736	
V3.4.9 Business alliance	.725	
V3.4.8 Personnel / human resource strategy	.632	
V3.4.4 Cost reduction / productivity improvement	.533	
V3.4.3 Changes in technology / process / equipment		.788
V3.4.5 E-commerce		.675
V3.4.2 Changes in business / product lines		.600
V3.4.6 Market / marketing strategy		.597
Eigenvalues	2.553	1.918
% of Variance	28.367	21.312

Note The numbers in Table are factor loading-weights.

<Table 18> The Comparison of Mean of Factor Scores of Automobile Parts and Machinery Industry from Factor Analysis of the Extents of Various Strategies which Attribute the Survival and Success of Company

Factors	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
SUCCESS1 Adjustment factor or	Automobile parts	26	.001	1.0625	.001	.044	.965
organization adjuster behavior	Machinery	50	-.001	.9771			
SUCCESS2 Changing factor or vigorous	Automobile parts	26	-.3151	.9842	-.4790	-2.021 *	.047
innovation changer behavior	Machinery	50	.1639	.9779			

Note ** P < .01 * P < .05

3.1.4. Assessment of services and Infrastructure

The following services provided by the government are important to business in the following order: general marketing support, export promotion, credit guarantee, equity funding, production technology training, information service and production skill training (See <Table 18>)

For these items there were no statistically significant differences between firms in the automobile parts and machinery industries.

<Table 19> Statistics of the Usefulness of Government Services to the Business(according to sequence of quantity of mean)

Usefulness of government services to the business	N	Mean	S.D.
V4.1.11 General marketing support	65	2.49	.64
V4.1.12 Export promotion	68	2.46	.72
V4.1.9 Credit guarantee	68	2.31	.80
V4.1.8 Loans	70	2.30	.82
V4.1.2 Production technology training	65	2.29	.70
V4.1.1 Information service Training	57	2.26	.72
V4.1.3 Producing skill training	66	2.26	.73

V4.1.4 Management training	66	2.18	.74
V4.1.5 Design training	65	2.12	.78
V4.1.13 Subcontracting linkage support	62	2.11	.81
V4.1.7 Research & Development Financial support	58	2.10	.81
V4.1.6 Information technology & information management training	61	2.00	.68
V4.1.14 E-commerce support	56	1.96	.79
V4.1.10 Equity funding	64	1.56	.73

Note 3 = very useful, 2 = Quite useful, 1 = not useful

<Table 20> The Comparison of the Usefulness of Government Services to the Business between Automobile Parts and Machinery Industry.

Usefulness of government services to the business	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V4.1.1 Information service Training	Automobile parts	21	2.05	.74	-.34	-1.757	.084
	Machinery	36	2.39	.69			
V4.1.2 Production technology training	Automobile parts	24	2.33	.64	.007	.359	.721
	Machinery	41	2.27	.74			
V4.1.3 Producting skill training	Automobile parts	24	2.29	.69	.005	.285	.777
	Machinery	42	2.24	.76			
V4.1.4 Management training	Automobile parts	24	2.25	.74	.11	.561	.577
	Machinery	42	2.14	.75			
V4.1.5 Design training	Automobile parts	25	2.04	.84	-.13	-.675	.502
	Machinery	40	2.17	.75			
V4.1.6 Information technology & information management training	Automobile parts	23	2.00	.67	.00	.000	1.000
	Machinery	38	2.00	.70			
V4.1.7 Research & Development Financial support	Automobile parts	21	2.14	.79	.006	.277	.783
	Machinery	37	2.08	.83			
V4.1.8 Loans	Automobile parts	25	2.16	.90	-.22	-1.062	.292
	Machinery	45	2.38	.78			
V4.1.9 Credit gurantee	Automobile parts	25	2.24	.83	-.11	-.540	.591
	Machinery	43	2.35	.78			
V4.1.10 Equity funding	Automobile parts	21	1.48	.68	-.13	-.656	.514
	Machinery	43	1.60	.76			
V4.1.11 General marketing support	Automobile parts	22	2.32	.72	-.26	-1.587	.118
	Machinery	43	2.58	.59			
V4.1.12 Export promotion	Automobile parts	24	2.29	.75	-.25	-1.396	.167
	Machinery	44	2.55	.70			
V4.1.13 Subcontracing linkage support	Automobile parts	24	1.92	.83	-.32	-1.529	.132
	Machinery	38	2.24	.79			
V4.1.14 E-commerce support	Automobile parts	19	1.79	.85	-.26	-1.198	.236
	Machinery	37	2.05	.74			

Note ** P < .01 * P < .05

Most firms indicated that they regarded the extent that government services contribute to their improvement as one of a small or minor impact (See <Table 21>).

<Table 21> Statistics of the Extent of Government Services Contributing to the Improvement of Business (accounting to sequence of quantity at mean)

Government Services Contribution	N	Mean	S.D.
V4.2.10 Improvement of plant safety	68	2.97	.86
V4.2.9 Getting certified for international standard(s) (e.g. ISO 9000, HACCP, etc.)	68	2.93	1.03

V4.2.2 Product increase / Cost reduction	70	2.91	1.05
V4.2.8 Entry into new market(s)	69	2.90	.97
V4.2.7 Workers' skill improvement	67	2.90	.89
V4.2.11 Improvement of labor relations / morale	68	2.82	.90
V4.2.3 Product quality improvement	70	2.70	1.05
V4.2.6 Management system improvement	67	2.63	1.01
V4.2.4 New product(s)	69	2.57	1.05
V4.2.1 Modernization of production line	68	2.54	1.04
V4.2.5 Packaging development / improvement	66	2.21	.97

Note 4 = most significantly, 3 = Partly, 2 = very little, 1 = none at all

<Table 22> The Comparison of Extent of Government Services Contributing to the Improvement of Business between Automobile Parts and Machinery Industry.

Government Services Contribution	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V4.2.1 Modernization of production line	Automobile parts	24	2.46	1.10	-.13	-.498	.620
	Machinery	44	2.59	1.02			
V4.2.2 Product increase / Cost reduction	Automobile parts	24	2.88	1.03	-.006	-.225	.822
	Machinery	46	2.93	1.06			
V4.2.3 Product quality improvement	Automobile parts	24	2.58	1.06	-.18	-.666	.508
	Machinery	46	2.76	1.06			
V4.2.4 New product(s)	Automobile parts	24	2.38	1.10	-.29	-1.101	.275
	Machinery	45	2.67	1.02			
V4.2.5 Packaging development / improvement	Automobile parts	23	2.13	1.01	-.13	-.498	.620
	Machinery	43	2.26	.95			
V4.2.6 Management system improvement	Automobile parts	24	2.71	1.12	.13	.489	.626
	Machinery	43	2.58	.96			
V4.2.7 Workers' skill improvement	Automobile parts	24	2.88	.85	-.003	-.140	.889
	Machinery	43	2.91	.92			
V4.2.8 Entry into new market(s)	Automobile parts	24	2.92	.97	.003	.112	.911
	Machinery	45	2.89	.98			
V4.2.9 Getting certified for international standard(s)	Automobile parts	24	3.00	1.06	.11	.433	.666
(e.g. ISO9000, HACCP, etc.)	Machinery	44	2.89	1.02			
V4.2.10 Improvement of plant safety	Automobile parts	24	3.08	.83	.17	.793	.431
	Machinery	44	2.91	.88			
V4.2.11 Improvement of labor relations / morale	Automobile parts	24	2.83	.82	.002	.066	.948
	Machinery	44	2.82	.95			

Note ** P < .01 * P < .05

<Table 23> provided the basis for making an assessment of infrastructural support. The following infrastructure items are viewed as relatively satisfactory, telecommunications, electricity supply, industrial estates, industrial water supply, and road transport. There are no statistically significant differences, on these items, between the two industries (See <Table 24>).

<Table 23> Statistics of Satisfaction Level from Infrastrustural Supports.

Infrastructure	N	Mean	S.D.
V4.3.5 Telecommunications	74	2.38	.54
V4.3.6 Electricity supply	74	2.31	.60
V4.3.8 Industrial estates	64	2.22	.52
V4.3.7 Industrial water supply	74	2.22	.60
V4.3.1 Road transport	73	2.21	.58

V4.3.4 Port facilities	66	1.89	.56
V4.3.3 Warehouse & distribution facilities	61	1.87	.43
V4.3.2 Rail transport	64	1.84	.54
V4.3.9 Effluent collection / treatment facilities	65	1.65	.62

Note 3 = good, 2 = adequate, 1 = partly adequate

<Table 24> The Comparison of Satisfaction Level from Infrastructural Supports between Automotive Parts and Machinery Industry.

Infra Structure	Business Category	N	Mean	S.D.	Mean Difference	t	Sig. (2-tailed)
V4.3.1 Road transport	Automobile parts	24	2.13	.61	-.12	-.833	.408
	Machinery	49	2.24	.56			
V4.3.2 Rail transport	Automobile parts	21	1.86	.48	.002	.137	.891
	Machinery	43	1.84	.57			
V4.3.3 Warehouse & distribution facilities	Automobile parts	21	1.76	.44	-.16	-1.429	.158
	Machinery	40	1.93	.42			
V4.3.4 Port facilities	Automobile parts	23	1.83	.49	-.10	-.719	.474
	Machinery	43	1.93	.59			
V4.3.5 Telecommunications	Automobile parts	25	2.32	.56	-.008	-.660	.511
	Machinery	49	2.41	.54			
V4.3.6 Electricity supply	Automobile parts	25	2.16	.62	-.23	-1.573	.120
	Machinery	49	2.39	.57			
V4.3.7 Industrial water supply	Automobile parts	25	2.08	.57	-.21	-1.397	.167
	Machinery	49	2.29	.61			
V4.3.8 Industrial estates	Automobile parts	23	2.09	.60	-.21	-1.539	.129
	Machinery	41	2.29	.46			
V4.3.9 Effluent collection / treatment facilities	Automobile parts	23	1.65	.49	.001	.057	.955
	Machinery	42	1.64	.69			

Note ** P < .01 * P < .05

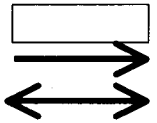
3.1.5. Path Analysis of LIRSEL Model

(1) Technical Result

In this model, the compliance to the empirical data is very good. Because Chi-square equals to 51.48 at degree of freedom equals to 132. The probability is more than .01 (p = 1.00). That is Chi-square is not different from 0 significantly. The hypothesis that model has complied to the empirical data is accepted, above from complying to the CFI = 1.00, AGFI = 1.00 and RMR = 0

The model is illustrated with correlation illustration in <Figure 1> and <Table 25>.

V3.1.3	Total sales in 1999 comparing TV 1997-1998
AFFECT1	Globalization effect
AFFECT2	Increased business costs
AFFECT3	Financial problems
AFFECT4	Labor relation problems
AFFECT5	Global and domestic over-capability reduced demand problems
AFFECT6	Asian financial crisis contraction in market demand
COMPET1	Technology and market capability (competency capability)
COMPET2	Business efficiency
COMPET3	Accessment to resources
COMPET4	Line of products
V4.1.1	The usefulness of information service of government to the business
TRAIN	The usefulness of training support to the business (average of the relateditens)
V4.1.7	The usefulness of R&D to the business
MONEY	The usefulness of financial support (average of the related items)
MARKET	The usefulness of marketing support (average of the related items)
V4.1.14	The usefulness E-commerce support
SUCESS1	Adjustment factor or organization adjuster behavior
SUCESS2	Changing factor or vigorous innovation changer behavior

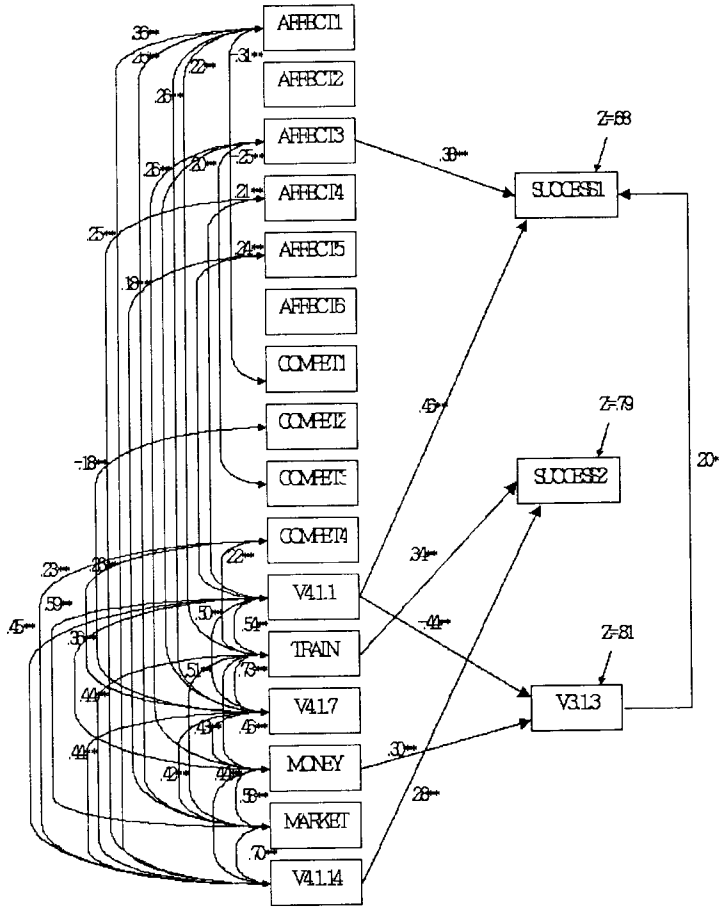


= Variable

= Path coefficient of the variables

= Correlation coefficient between variables

<Figure 1> LISREL Model Result



<Table 25> LISREL Model Statistics

	V3.1.3			SUCCESS1			SUCCESS2		
	TE (SE)	IE (SE)	DE (SE)	TE (SE)	IE (SE)	DE (SE)	TE (SE)	IE (SE)	DE (SE)
AFFECT1	-	-	-	-	-	-	-	-	-
AFFECT2	-	-	-	-	-	-	-	-	-
AFFECT3	-	-	-	.38**	-	.38**	-	-	-
				(.10)		(.10)			
AFFECT4	-	-	-	-	-	-	-	-	-
AFFECT5	-	-	-	-	-	-	-	-	-
AFFECT6	-	-	-	-	-	-	-	-	-
COMPET1	-	-	-	-	-	-	-	-	-
COMPET2	-	-	-	-	-	-	-	-	-
COMPET3	-	-	-	-	-	-	-	-	-
COMPET4	-	-	-	-	-	-	-	-	-
V4.1.1	-.44**	-	-.44**	.37**	-	.46**	-	-	-
	(.13)		(.13)	(.11)	.09(.05)	(.11)			
TRAIN	-	-	-	-	-	-	.34**	-	.34**
							(.12)		(.12)
V4.1.7	-	-	-	-	-	-	-	-	-
MONEY	.30**	-	.30**	.06(.04)	.06(.04)	-	-	-	-
	(.13)		(.13)						
MARKET	-	-	-	-	-	-	-	-	-
V4.1.14	-	-	-	-	-	-	.28**	-	.28**
							(.12)		(.12)
SUCESS1	-	-	-	-	-	-	-	-	-
SUCESS2	-	-	-	-	-	-	-	-	-
V3.1.3	-	-	-	.20*	-	.20*	-	-	-
				(.10)		(.10)			
R-Square	.19			.26			.36		

Goodness of Fit statistics
chi-square = 51.48 df = 132 P = 1.00
CFI = 1.00 AGFI = 1.00 RMR = .00
Note The number in Bracket is standard dispersion

From the model's analysis we see that all the variables in model explain the variance of V3.1.3 of 19% (R-square = .19), SUCCESS1 36% (R-square = .36), SUCCESS2 20% (R-square = .26). These R-squares are not adequate because other explanations are not included in the model.

V.4.1.1 and MONEY show the path coefficient to V3.1.3 significantly at .01 by -.44 and +.30

V4.1.1 and AFFECT3 give direct effect at significant level of .01 to the SUCCESS1 by path coefficient of +.46 and +.38. More ever, V3.1.3 gives direct effect at significant level at .05 to the success/by path coefficient of +.20

TRAIN and V4.1.14 give direct effect at significant level of .01 to the success2 by path coefficient at +.34 and +.28

(2) The explanation from Path Analysis of LISREL model

1) The survival or successes of automobile parts industry and machinery industry can be implemented by SUCCESS1 or adjustment factor or organization adjuster behavior and SUCCESS2 or changing factor or vigorous innovation changer behavior.

2) SUCCESS1 can be implemented successfully when there are a) AFFECT3 or financial problems. b) V4.1.1 or usefulness of information service at government the business and c) V3.1.3 or successful total sales.

3) SUCCESS2 or changing factor or vigorous innovation changer behavior can be implemented successfully by TRAIN or the usefulness of R&D to the business and V4.1.14 or the usefulness of E-commerce support.

4) V3.1.3 or successful total sales can be successful when V4.1.1 or the use fullness or necessity of information service of government to the business is low, in another word when conventional way of production prevails which in turn give positive influence to SUCCESS1 or adjustment factor.

Not only the new summarized from Factor Analysis, concepts from the questionaire's were derived, The measurement of these new concepts could be reached for each company.

For example, we could measure the new concept of "globalization effect" for each company.

After that, the relationships or diagram of interaction between each variables and also new concept variables could be reached simply by utilization of Lisrels or Path Analysis.

4. The Implication to the Case of Thai SMEs

From above, we can say that the combination of Factor Analysis and Path Analysis can shed the light on the relationship between firms performance and industrial policy. For example, we can clearly state that organization adjuster behavior can be implimented successfully when there is usefulness of information service of government.

Anyhow, when we use the same analysis to other country expecially the countries which have lower degree of industry specialization than Thailand, we might face difficulty of interpreting factor explanation. That is, we hold the position that it is gravely important to combine field experience on developed countries' industrial sector and lately developed countries' industrial sector together. Ones have to gain broad industrial surveys before we could be able to interpret the factors explanation in country.

5. The Importance of Field Surveys and Conclusion

It is gravely important that The policies science of SMEs in each country is field work study. The SMEs policies in each region and cach industry should be tailor-made. That is, to find the variables that effect the performance of SMEs which inductively invented through factor analysis. The effects of strength between each discovered variable are measured by Path Analysis. From this, the policies can be implicated. More ever, each policy maker should gain intuitive experience for in-depth realization of appropriate policy.

For this aspects, Prof. Kawakita Jiro of Japan had invent KJ Method[2]. The ways of gaining creativity from field experience by processing the small cards each written down one sentence of evidence or thinking. This process for creativity was called "Abduction" above from "Deduction" and "Induction"

I have found that it is gravely important to conduct this kind of Anthropalogy information processing approach.

Surprisingly, there are analogies between Factor Analysis and KJ Method. Both have the purpose of new concept creation, while quantitatively in the case of Factor Analysis and quanlitatively or

[2] KJ Method is the method for processing qualitative data and for idea generating or creativity method and well-knowned in Japan.

intuitively in the case of KJ Method. But both depend on the field experiences. In conclusion, the field experience should be gained by policy-makers before they could tailor-make the SMEs policy.

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Appendix 1

Name of Firm : .....
Name of Respondent : (Dr./Mr./Mrs./Ms.) .....
Position / Job Title of Respondent : .....
Contact Address : .....
.....
City : ..... Postcode : .....
Telephone : ..... Fax : .....
E-mail address : .....

Signed .....
Date.....

Part I. Company Profile

1. Name of Company: .....

2. Year established:.....

3. Type of Ownership:
   π Proprietorship π Partnership
   π Private Limited Company
   π Public Limited Company π Other (Please specify) .....

4. Foreign ownership: Local share.....% Foreign share .....%
   (Please indicate nationality) .....

5. Number of employees:

	Monthly paid	**Daily or hourly paid**
Factory (production-line) workers	....	....
Office workers	....	....

6. Total investment ..... (currency units)
   Investment in machinery & equipment ..... (currency units)
   Investment in factory buildings ..... (currency units)

7. Major products and markets:

Product description	**Average** *Annual product*	*Domestic*	*Export*
.....	..... (units)	π	π
.....	..... (units)	π	π
.....	..... (units)	π	π

8. Total sales:

	Domestic sales	*Export*
1997	.....	.....
1998	.....	.....
1999	.....	.....

9. Major export markets: (Please list destination countries in order of importance)

(1) ..... (3) .....

(2) ..... (4) .....

10. Please indicate what percentage (by value) of your materials and parts are imported. π More than 80% π 50-80% π 30-50% π 10-30% π Less than 10%

11. Do you have your own brandname(s)? π Yes π No

Part II. Assessment of Changing Environment and Business Strengths.

12. To what extent has your business been recently affected, or will be affected, by the following global business environment?

		Very much Affected	*Some what Affected*	*Not Affected*	***Not sure***
(V2.1.1)	Advances in production technology	π	π	π	π
(V2.1.2)	Information technology	π	π	π	π
(V2.1.3)	Global over-capacity/ reduced demand	π	π	π	π
(V2.1.4)	Domestic over-capacity/ reduced demand	π	π	π	π
(V2.1.5)	Asian financial crisis	π	π	π	π
(V2.1.6)	Trade liberalization	π	π	π	π
		Very much Affected	*Some what Affected*	*Not Affected*	***Not sure***
(V2.1.7)	Changing consumer behavior	π	π	π	π
(V2.1.8)	International quality management standards	π	π	π	π
(V2.1.9)	International environmental mgmt standards	π	π	π	π

13. How severe have you found the following problems during the past 2 years?

		Severe	*Moderate*	*Slight or None*
(V2.2.1)	Contraction in market demand	π	π	π
(V2.2.2)	Competition from other domestic producers	π	π	π
(V2.2.3)	Competition from foreign producers/imported products	π	π	π
(V2.2.4)	High cost of funds / High interest rates	π	π	π
(V2.2.5)	Difficulty in obtaining financing	π	π	π
(V2.2.6)	Increased overall production costs	π	π	π
(V2.2.7)	Increased costs of materials & parts	π	π	π
(V2.2.8)	Availability of skilled workers	π	π	π
(V2.2.9)	Availability of unskilled labor	π	π	π
(V2.1.10)	Labor relations/Union actions	π	π	π

Other	(please indicate)			
	.....	π	π	π
	.....			
	.....	π	π	π
	.....			

14. How would you compare your business with those of your competitors?

		Better than *Competitors*	*About the same as Competitors*	*Not so good As competitors*	***Not sure***
(V2.3.1)	Production technology	π	π	π	π
(V2.3.2)	Product quality	π	π	π	π
(V2.3.3)	Product design / development	π	π	π	π
(V2.3.4)	Product range / diversity	π	π	π	π
(V2.3.5)	Product image / Brand image	π	π	π	π
(V2.3.6)	Pricing / Value-for-money	π	π	π	π
(V2.3.7)	Productivity / Unit cost	π	π	π	π
(V2.3.8)	Profit margin 100 unit	π	π	π	π
(V2.3.9)	Access to domestic markets	π	π	π	π
(V2.3.10)	Access to technology	π	π	π	π
(V2.3.11)	Access to technology	π	π	π	π
(V2.3.12)	Access to finance	π	π	π	π
(V2.3.13)	Workers' skills	π	π	π	π
(V2.3.14)	Ability to use information technology	π	π	π	π

Part III. Business Strategy and Results

15. How did your business results in 1999 compare with those in 1997-98?

		More than 10% higher	*5-10% higher*	*About The same*	***5-10% lower***	***More than 10% lower***
(V3.1.1)	Total production volume	π	π	π	π	π
(V3.1.2)	Total sales	π	π	π	π	π
(V3.1.3)	Export volume	π	π	π	π	π
(V3.1.4)	Export value	π	π	π	π	π
(V3.1.5)	Margin on sales	π	π	π	π	π
(V3.1.6)	Average selling price	π	π	π	π	π

16. Please indicate how much of your production capacity was utilized, on average, in each of the previous 3 years

		Less than 30%	*30-50%*	*50-70%*	*70-90%*	*More than 90%*
(V3.1.1)	Total production volume	π	π	π	π	π
(V3.1.2)	Total sales	π	π	π	π	π
(V3.1.3)	Export volume	π	π	π	π	π
(V3.1.4)	Export value	π	π	π	π	π
(V3.1.5)	Margin on sales	π	π	π	π	π
(V3.1.6)	Average selling price	π	π	π	π	π

17. Please indicate whether you implemented, and/or will implement, the following:

		During 1995-97	*During 1998-99*	*During next 3 years*
(V3.3.1)	Production capacity expansion	π	π	π
(V3.3.2)	Production capacity	π	π	π

	reduction			
(V3.3.3)	Adding new product lines	π	π	π
(V3.3.4)	Ceasing some product / business lines	π	π	π
(V3.3.5)	Modernizing machinery & equipment	π	π	π
(V3.3.6)	Developing & marketing new products	π	π	π
(V3.3.7)	Developing & marketing new packaging	π	π	π
(V3.3.8)	Entering new market(s)	π	π	π
(V3.3.9)	Withdrawing from some market(s)	π	π	π
(V3.3.10)	Adopting alternative marketing channels	π	π	π
(V3.3.11)	Venturing into E-commerce	π	π	π
(V3.3.12)	Changing company's financial structure	π	π	π
(V3.3.13)	Recruiting more technicians and/or engineers	π	π	π
		During 1995-97	*During 1998-99*	*During next 3 years*
(V3.3.14)	Finding new sources / suppliers of materials & parts	π	π	π
(V3.3.15)	Finding new business alliance for technology	π	π	π
(V3.3.16)	Finding new business alliance for financing	π	π	π
(V3.3.17)	Finding new business alliance for marketing	π	π	π

18. To what extent would you attribute the survival and success of your company to the various business strategies?

		Most Important	*Quite Important*	*Not so important*	*Not relevant*
(V3.4.1)	Capacity expansion / reduction	π	π	π	π
(V3.4.2)	hanges in business / product lines	π	π	π	π
(V3.4.3)	Changes in technology / process / equipment	π	π	π	π
(V3.4.4)	Cost reduction / productivity improvement	π	π	π	π
(V3.4.5)	E-commerce	π	π	π	π
(V3.4.6)	Market / marketing strategy	π	π	π	π
(V3.4.7)	Financial strategy	π	π	π	π
(V3.4.8)	Personnel / human resource strategy	π	π	π	π
(V3.4.9)	Business alliance	π	π	π	π

19. If your were to identify the SINGLE most important business strategy that has enabled your company to survive and succeed amid recent economic crisis and rapid globalization, what would be your choice? Please describe.

.....
.....
.....

Part IV. Assessment of Service and Infrastructure

20. How useful have the following government services been to your business?

		Very useful	*Quite Useful*	*Not Useful*	*Not available*
(V4.1.1)	Information service Training	π	π	π	π
(V4.1.2)	Production technology training	π	π	π	π
(V4.1.3)	Producing skill training	π	π	π	π
		Very useful	*Quite Useful*	*Not Useful*	*Not available*
(V4.1.4)	Management training	π	π	π	π

(V4.1.5)	Design training	π	π	π	π
(V4.1.6)	Information technology & information management training	π	π	π	π
(V4.1.7)	Research & Development Financial support	π	π	π	π
(V4.1.8)	Loans	π	π	π	π
(V4.1.9)	Credit guarantee	π	π	π	π
(V4.1.10)	Equity funding	π	π	π	π
(V4.1.11)	General marketing support	π	π	π	π
(V4.1.12)	Export promotion	π	π	π	π
(V4.1.13)	Subcontracting linkage support	π	π	π	π
(V4.1.14)	E-commerce support	π	π	π	π

21. To what extent have government services contributed to the improvement of your business?

		Most Significantly	*Partly*	*Very little*	*None at all*
(v4.2.1)	Modernization of production line	π	π	π	π
(V4.2.2)	Product increase / Cost reduction	π	π	π	π
(V4.2.3)	Product quality improvement	π	π	π	π
(V4.2.4)	New product(s)	π	π	π	π
(V4.2.5)	Packaging development / improvement	π	π	π	π
(V4.2.6)	Management system improvement	π	π	π	π
(V4.2.7)	Workers' skill improvement	π	π	π	π
(V4.2.8)	Entry into new market(s)	π	π	π	π
(V4.2.9)	Getting certified for international standard(s) (e.g. ISO9000, HACCP, etc.)	π	π	π	π
(V4.2.10)	Improvement of plant safety	π	π	π	π
(V4.2.11)	Improvement of labor relations / morale	π	π	π	π

22. How satisfactory do you find the following infrastructural support?

		Good	*Adequate*	*Poor*
(V4.3.1)	Road transport	π	π	π
(V4.3.2)	Rail transport	π	π	π
(V4.3.3)	Warehouse & distribution facilities	π	π	π
(V4.3.4)	Port facilities	π	π	π
(V4.3.5)	Telecommunications	π	π	π
(V4.3.6)	Electricity supply	π	π	π
		Good	*Adequate*	*Poor*
(V4.3.7)	Industrial water supply	π	π	π
(V4.3.8)	Industrial estates	π	π	π
(V4.3.9)	Effluent collection / treatment facilities	π	π	π

23. Please suggest how the following services and support should be improved in order to serve your needs better.

Technology training :.....
.....
Management training : .....
.....
Information service : .....
.....
Consultancy service :.....
.....
Research & Development :.....
.....
Financial support : .....
.....
Infrastructure : .....
.....
Other suggestions :.....