
APPENDIX A

TABLES

Table 2.1: List of Industries in the Manufacturing Sector Covered in National Innovation Survey

ISIC Code Rev.3	Malaysian Industrial Code	Description
15	311-312	Manufacture of food products and beverages
	313	
16	314	Manufacture of tobacco products
17	321	Manufacture of textiles
18	322	Manufacture of wearing apparel; dressing and dyeing of fur.
19	323	Tanning, dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
	324	
20	331	Manufacturing of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21	341	Manufacture of paper and paper products
22	342	Publishing, printing and reproduction of recorded media
23	354	Manufacture of coke, refines petroleum products and nuclear fuel
24	351	Manufacture of chemicals and chemical products
25	355	Manufacture of rubber and plastic products
	356	
26	369	Manufacture of other non-metallic mineral products
27	371	Manufacture of basic metals
28	381	Manufacture of fabricated metal products, except machinery and equipment
29	382	Manufacture of machinery and equipment
30	383	Manufacture of office, accounting and computing machinery
31	383	Manufacture of electrical machinery and apparatus n.e.c.
32	38321	Manufacture of radio, television, and communication equipment and apparatus
33	385	Manufacture of medical, precision, and optical instruments, watches and clocks
34	384	Manufacture of motor vehicles, trailers and semi-trailers
35	384	Manufacture of other transport equipment
36	332	Manufacture of furniture

Table 2.2: Allocation of Manufacturing Sample

Categories/Size	Max	Round 1	End 1	Cumm 1	Round 2	End 2				
Turnover < RM1 million	1422 2	28	28	28	52	80	90	170	170	1.2%
RM1 million ≤ Turnover < RM5 million	2697	95	95	95	169	264	294	558	558	20.7%
RM5 million ≤ Turnover < RM10 million	1003	105	105	105	186	291	319	610	610	60.8%
RM10 million ≤ Turnover < RM100 million	2184	1048	1048	1048	1838	2886	0	0	2184	100.0%
Turnover ≥ RM100 million	478	2718	2718	478	0	0	0	0	478	100.0%
Amt. Dist.		3994			2245					
Missing		6			1					
Excess		2240			702					
Total Excess		2246			703					

Notes:

Max : Maximum Number

Amt. Dist.: Amount distributed at each round.

Round *i* : Number of sample distributed at round *i* = 1, 2, 3

End *i* : Number of sample allocated in round *i*.

Cumm *i* : Cumulative number of sample allocated at the end of round *i*

Amt. Dist. : Amount distributed

Missing: Sample not allocated due to rounding errors

Excess: Total sample not allocated at each round (required sample size – available firms)

Total Excess = Missing + Excess

Table 3.1: Technological Innovation Profile of the Manufacturing Sector, 1997-99

(Based on Stage 1 & Stage 2 Survey Data)

Code	Industry	Stage 1				Stage 2				Stage 1 & 2			
		Yes	No	Missing	Total	Yes	No	Missing	Total	Yes	No	Missing	Total
311	Food Manufacturing	83	101	272	456	20	37	26	83	20	138	298	456
312	Food Manufacturing	19	14	85	118	4	3	12	19	4	17	97	118
313	Beverage Industry	2	7	22	31	1	0	1	2	1	7	23	31
314	Tobacco Manufactures	1	2	11	14	1	0	0	1	1	2	11	14
321	Manufacture of Textiles	26	24	71	121	6	8	12	26	6	32	83	121
322	Manufacture of Wearing Apparel Except Footwear	12	25	109	146	2	4	6	12	2	29	115	146
323	Manufacture of Leather, Products of Leather, Leather Substitutes and Fur Except Footwear and Wearing Apparel												
		2	2	6	10	1	1	0	2	1	3	6	10
324	Manufacture of Footwear Except Vulcanised or Moulded Rubber or Plastic	3	1	7	11	0	2	1	3	0	3	8	11
331	Manufacture of Wood, and Wood and Cork Products Except Furniture	38	94	287	419	6	18	14	38	6	112	301	419
332	Manufacture of Furniture and Fixtures, Except Primarily of Metal	34	17	99	150	13	8	13	34	13	25	112	150
341	Manufacture of Paper and Paper Products	21	25	75	121	7	6	8	21	7	31	83	121
342	Printing, Publishing and Allied Industries	17	22	98	137	4	5	8	17	4	27	106	137
351	Manufacture of Industrial Chemicals	21	13	75	109	9	2	10	21	9	15	85	109
354	Manufacture of Miscellaneous Products of Petroleum and Coal	4	2	10	16	2	1	1	4	2	3	11	16
355	Manufacture of Rubber Products	64	31	163	258	27	18	19	64	27	49	182	258
356	Manufacture of Plastic Products, N.E.C.	57	51	199	307	14	10	33	57	14	61	232	307
369	Manufacture of Non-Metallic Mineral Products	32	37	130	199	8	6	18	32	8	43	148	199
371	Iron and Steel Basic Industries	19	15	76	110	6	4	9	19	6	19	85	110
381	Manufacture of Fabricated Metal Products, Except Machinery and Equipment	66	58	227	351	24	14	28	66	24	72	255	351
382	Manufacture of Machinery Except Electrical	40	17	136	193	9	9	22	40	9	26	158	193
383	Manufacture of Electrical Machinery, Apparatus, Appliances and Supplies	100	57	370	527	38	14	48	100	38	71	418	527
384	Manufacture of Transport Equipment	46	28	92	166	13	10	23	46	13	38	115	166
385	Manufacture of Professional and Scientific and Measuring and Controlling Equipment, N.E.C.	7	2	21	30	2	2	3	7	2	4	24	30
		714	645	2641	4000	217	182	315	714	217	827	2956	4000

Table 3.2: Technological Innovation Profile of the Manufacturing Sector, 1997-99

Code	Industry	Number			Percentage (%)		
		Yes	No	Total	Yes	No	Total
311	Food Manufacturing	20	138	158	12.7	87.3	100.0
312	Food Manufacturing	4	17	21	19.0	81.0	100.0
313	Beverage Industry	1	7	8	12.5	87.5	100.0
314	Tobacco Manufactures	1	2	3	33.3	66.7	100.0
321	Manufacture of Textiles	6	32	38	15.8	84.2	100.0
322	Manufacture of Wearing Apparel Except Footwear	2	29	31	6.5	93.5	100.0
323	Manufacture of Leather, Products of Leather, Leather Substitutes and Fur Except Footwear and Wearing Apparel	1	3	4	25.0	75.0	100.0
324	Manufacture of Footwear Except Vulcanised or Moulded Rubber or Plastic	0	3	3	0.0	100.0	100.0
331	Manufacture of Wood, and Wood and Cork Products Except Furniture	6	112	118	5.1	94.9	100.0
332	Manufacture of Furniture and Fixtures, Except Primarily of Metal	13	25	38	34.2	65.8	100.0
341	Manufacture of Paper and Paper Products	7	31	38	18.4	81.6	100.0
342	Printing, Publishing and Allied Industries	4	27	31	12.9	87.1	100.0
351	Manufacture of Industrial Chemicals	9	15	24	37.5	62.5	100.0
354	Manufacture of Miscellaneous Products of Petroleum and Coal	2	3	5	40.0	60.0	100.0
355	Manufacture of Rubber Products	27	49	76	35.5	64.5	100.0
356	Manufacture of Plastic Products, N.E.C.	14	61	75	18.7	81.3	100.0
369	Manufacture of Non-Metallic Mineral Products	8	43	51	15.7	84.3	100.0
371	Iron and Steel Basic Industries	6	19	25	24.0	76.0	100.0
381	Manufacture of Fabricated Metal Products, Except Machinery and Equipment	24	72	96	25.0	75.0	100.0
382	Manufacture of Machinery Except Electrical	9	26	35	25.7	74.3	100.0
383	Manufacture of Electrical Machinery, Apparatus, Appliances and Supplies	38	71	109	34.9	65.1	100.0
384	Manufacture of Transport Equipment	13	38	51	25.5	74.5	100.0
385	Manufacture of Professional and Scientific and Measuring and Controlling Equipment, N.E.C.	2	4	6	33.3	66.7	100.0
		217	827	1044	20.8	79.2	100.0

Table 3.3: Incidence of Innovation in Manufacturing Industries, 1997-99

Percentage of Innovating Firms in Industry	Code	Industry	OECD Product Classification*
Less than 10%	322 324 331	Manufacture of Wearing Apparel Except Footwear Manufacture of Footwear Except Vulcanised or Moulded Rubber or Plastic Manufacture of Wood, and Wood and Cork Products Except Furniture	Low-Technology Low-Technology Low-Technology
Between 10% and 20%	311 312 313 321 341 342 356 369	Food Manufacturing Food Manufacturing Beverage Industry Manufacture of Textiles Manufacture of Paper and Paper Products Printing, Publishing and Allied Industries Manufacture of Plastic Products, N.E.C. Manufacture of Non-Metallic Mineral Products	Low-Technology Low-Technology Low-Technology Low-Technology Low-Technology Low-Technology Medium-Low-Technology Medium-Low-Technology
Between 20% and 30%	323 371 381 382 384	Manufacture of Leather, Products of Leather, Leather Substitutes and Fur Except Iron and Steel Basic Industries Manufacture of Fabricated Metal Products, Except Machinery and Equipment Manufacture of Machinery Except Electrical Manufacture of Transport Equipment	Low-Technology Medium-Low-Technology Medium-Low-Technology Medium-High-Technology Medium-High-Technology
Between 30% and 40%	314 332 351 354 355 383 385	Tobacco Manufactures Manufacture of Furniture and Fixtures, Except Primarily of Metal Manufacture of Industrial Chemicals Manufacture of Miscellaneous Products of Petroleum and Coal Manufacture of Rubber Products Manufacture of Electrical Machinery, Apparatus, Appliances and Supplies Manufacture of Professional and Scientific and Measuring and Controlling Equipment	Low-Technology Low-Technology Medium-Low-Technology Medium-Low-Technology Medium-Low-Technology High-Technology High-Technology

Table 3.4: Employment Size of Innovating and Non-Innovating Firms, 1999

Employment Size	Number			Percentage (%)		
	Innovating	Non-Innovating	Total	Innovating	Non-Innovating	Total
19 or Less	4	80	84	1.8	9.7	8.0
20 - 49	22	126	148	10.1	15.2	14.2
50 - 249	99	427	526	45.6	51.6	50.4
250 or More	64	134	198	29.5	16.2	19.0
Missing Value	28	60	88	12.9	7.3	8.4
Total	217	827	1044	100.0	100.0	100.0

Table 3.5: Share of Local Ownership of Innovating and Non-Innovating Firms, 1999

Percentage Share of Local Ownership	Number			Percentage (%)		
	Innovating	Non-Innovating	Total	Innovating	Non-Innovating	Total
x = 0	51	138	189	23.5	16.7	18.1
0 < x <= 10	4	20	24	1.8	2.4	2.3
10 < x <= 20	2	11	13	0.9	1.3	1.2
20 < x <= 30	6	26	32	2.8	3.1	3.1
30 < x <= 40	3	10	13	1.4	1.2	1.2
40 < x <= 50	6	22	28	2.8	2.7	2.7
50 < x <= 60	7	31	38	3.2	3.7	3.6
60 < x <= 70	9	25	34	4.1	3.0	3.3
70 < x <= 80	6	16	22	2.8	1.9	2.1
80 < x <= 90	8	19	27	3.7	2.3	2.6
90 < x < 100	9	25	34	4.1	3.0	3.3
x = 100	106	484	590	48.8	58.5	56.5
Total	217	827	1044	100.0	100.0	100.0

Table 3.6: Ownership Type for Innovating and Non-Innovating Firms, 1999

Ownership Type	Number			Percentage (%)		
	Innovating Firms	Non-Innovating Firms	Total	Innovating Firms	Non-Innovating Firms	Total
Sole Proprietorship	1	42	43	0.5	5.1	4.1
Partnership	3	48	51	1.4	5.8	4.9
Limited Company (Sdn Bhd)	188	636	824	86.6	76.9	78.9
Public Listed (Berhad)	25	55	80	11.5	6.7	7.7
Missing Value	0	46	46	0.0	5.6	4.4
Total	217	827	1044	100.0	100.0	100.0

Table 4.1: Profile of Innovative Companies in the Manufacturing Sector, 1997-1999

	Number	(%)		Number	%
<u>Industry</u>			<u>Year Established</u>		
Food Products, Beverages & Tobacco	26	12	Prior to 1960	9	4.1
Textiles, Wearing Apparel and Leather Industries	9	4.1	1960 - 1969	12	5.5
Wood & Wood Product Including Furniture	19	8.8	1970 - 1979	49	22.6
Paper and Paper Products	11	5.1	1980 - 1989	79	36.4
Chemicals & Chemical Product	52	23.9	1990 - 1999	67	30.9
Other Non-Metallic Mineral Products	8	3.7	Missing Value	1	0.5
Basic Metals Industries	6	2.8	Total	217	100
Fabricated Metal Product, Machinery & Equipment	86	39.6	<u>Ownership Structure</u>		
Total	217	100	Wholly Local	106	48.8
			Wholly Foreign	51	23.5
			Local Foreign	60	27.7
			Total	217	100
<u>Corporate Headquarters</u>			<u>Employment Size</u>		
Australia	3	1.4	Less than 20	4	1.8
Denmark	2	1	20 - 49	22	10.2
France	1	0.5	50 - 249	99	45.6
Germany	5	2	250 & More	86	39.6
Holland	1	0.5	Missing Value	6	2.8
Hong Kong	1	0.5	Total	217	100
Japan	27	12.4			
Malaysia	75	34.6	<u>Turnover (Million), 1999</u>		
Singapore	5	2.3	Less than RM 1	3	1.4
South Korea	1	0.5	RM 1 to Less than RM 5	8	3.7
Taiwan	3	1.4	RM 5 to Less than RM 10	28	12.9
USA	9	4	RM 10 or More	173	79.7
Missing Value	84	40	Missing Value	5	2.3
Total	217	100	Total	217	100
<u>By State</u>			<u>Percentage of Turnover Derived from Export, 1999</u>	1999	%
Johor	33	15.2	0%	30	13.8
Kedah	8	3.7	19 % or more than 0	41	18.9
Kelantan	1	0.4	20% to Less than 40	25	11.5
Melaka	5	2.3	40 to Less than 60	15	6.9
Negeri Sembilan	11	5.1	60 to Less than 80	11	5.1
Pahang	6	2.8	80 to Less than 100	49	22.6
Penang	30	13.8	100	29	13.4
Perak	25	11.5	Missing Value	17	7.8
Perlis	1	0.4	Total	217	100
Sabah	6	2.8			
Sarawak	12	5.5			
Selangor	65	30.0			
Terengganu	3	1.4			
Wilayah Persekutuan, K. Lumpur	11	5.1			
Total	217	100			

Table 4.2: Innovative Companies by Industry (3 digit classification)

Industry	Number	Percent
311-312: Food Manufacturing	24	11
313: Beverage Industries	1	0.5
314: Manufacturing of Tobacco Products	1	0.5
321: Manufacturing of Textiles	6	2.8
322: Manufacturing of Wearing Apparel, Except Footwear	2	0.9
323: Manufacturing of Leather, Leather Products & Substitutes	1	0.5
331: Manufacture of Wood, Wood & Cork Products	6	2.8
332: Manufacturing of Furniture and Fixtures	13	6
341: Manufacturing of Paper and Paper Products	7	3.2
342: Printing, Publishing and Allied Industries	4	1.8
351: Manufacture of Industrial Chemical	9	4.1
354: Manufacture of Miscellaneous Products of Petroleum & Coal	2	1
355: Manufacturing of Rubber Products	27	12.4
356: Manufacture of Plastic Products, Nec	14	6.5
369: Manufacturing of Non-Metallic Mineral Products	8	3.7
371: Iron and Steel Basic Industries	6	2.8
381: Manufacturing of Fabricated Metal Products, Machinery And	24	11
382: Manufacture of Machinery Except Electrical	9	4.1
383: Manufacture of Electrical, Machinery, Apparatus, Appliances & Supplies	38	17.5
384: Manufacture of Transport Equipment	13	6
385: Manufacture of Professional, Scientific, Measuring & Controlling Equipment	2	0.9
Total	217	100

Tables 4.3: Types of Innovation by Industry, Employment Size, Turnover, Age and Ownership Structure, 1997 – 1999

	Product Only		Process Only		Product & Process		Product, Process & Project in Progress			
	No.	%	No.	%	No.	%	No.	%	No.	%
<u>Industry</u>										
Food Products, Beverages & Tobacco	-	-	8	40	3	10.7	15	10.3		
Textiles, Wearing Apparel & Leather	-	-	3	15	1	3.6	5	3.4		
Wood & Wood Product Including Furniture	3	13	2	10	4	14.3	10	6.8		
Paper & Paper Products	1	4.3	1	5	1	3.6	8	5.5		
Chemicals & Chemical Product	5	21.7	3	15	9	32.1	35	23.9		
Other Non-Metallic Mineral Products	3	13	-	-	2	7.1	3	2.1		
Basic Metal Industries	2	8.9	-	-	1	3.6	3	2.1		
Fabricated Metal Product, Machinery & Equipment	9	39.1	3	15	7	25	67	45.9		
Total	23	100	20	100	28	100	146	100		
<u>Employment Size</u>										
Less than 20	1	4.3	-	-	1	3.6	2	1.4		
20 – 49	3	13	3	15	2	7.1	14	10		
50 – 249	11	48	9	45	12	42.9	67	47.5		
250 & More	7	30.4	8	40	13	46.4	58	41.1		
Missing Value	1	4.3	-	-	-	-	5	3.4		
Total	23	100	20	100	28	100	146	100		
<u>Turnover * (Million)</u>										
Less than RM 1	-	-	1	5	1	3.7	1	0.7		
RM 1 to Less than RM 5	1	4.3	2	10	-	-	5	3.5		
RM 5 to Less than RM 10	4	17.4	2	10	2	7.4	20	14.1		
RM 10 or More	18	78.3	15	75	24	88.9	116	81.7		
Total	23	100	20	100	27	100	142	100		
	Product Only		Process Only		Product & Process		Process & Project in Progress		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<u>Age*</u>										
Prior 1960	-	-	-	-	2	7.1	7	4.8	9	100
1960 to 1969	2	8.7	2	10	3	10.7	5	3.5	12	100
1970 to 1979	3	13	6	30	5	17.9	35	24.1	49	100
1980 to 1989	10	43.5	6	30	13	46.4	50	34.5	79	100
1990 to 1999	8	34.8	6	30	5	17.9	48	33.1	67	100
Total	23	100	20	100	28	100	145	100	216	100
<u>Ownership Structure</u>										
Wholly Local-Owned	8	34.8	12	60	12	42.9	74	50.7	106	100
Wholly Foreign-Owned	2	8.7	3	15	4	14.2	42	28.8	51	100
Foreign-Local Ownership	13	56.5	5	25	12	42.9	30	20.5	60	100
Total	23	100	20	100	28	100	146	100	217	100

* Numbers differ due to missing values

Table 4.4: Number of New Products, Process, Improved Products and Processes Introduced, 1997 – 1999: Sources of Development

Developed by	New Product		New Process		Improved Product		Improved Process		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	%
Own Company	65	75.6	77	77.0	85	78.7	80	74.1	307	74.5
Other Companies or Institutes	8	9.3	18	13.5	8	7.4	12	11.1	46	11.2
Own Company & Other	13	15.1	15	9.5	15	13.9	16	14.8	59	14.3
Total	86	100	74	100	108	100	108	100	412	100

Table 4.5: Objectives For Innovation

	Very Important		Moderately Important		Slightly Important		Not Relevant		Total*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Replace Product	46	25.7	62	34.6	30	16.8	41	22.9	179	100
Improving Product	140	76.5	33	18	4	2.2	6	3.3	183	100
Extend Products	100	55.2	49	27	20	11.1	12	6.7	181	100
Open Up New Markets	124	68.5	37	20.4	11	6.1	9	5	181	100
Fulfilling Regulations & Standards	86	46.7	55	29.9	25	13.6	18	9.8	184	100
Improve Production Flexibility	85	47	66	36.4	22	12.2	8	4.4	181	100
Reduce Labor Costs	96	52.7	57	31.3	21	11.6	8	4.4	182	100
Reduce Raw Material Consumption	80	43.9	63	34.6	29	16	10	5.5	182	100
Reduce Energy Consumption	79	43.4	58	31.9	29	15.9	16	8.8	182	100
Reduce Environmental Damage	79	43.9	58	32.2	24	13.3	19	10.6	180	100
Government Support (e.g. Government as a Buyer)	76	42.7	39	21.9	27	15.2	36	20.2	178	100

* Numbers differ due to missing values

Table 4.6: Sources of Information for Innovation

	Very Important		Moderately Important		Slightly Important		Not Relevant		Total*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sources Within Company	85	47.2	75	41.7	15	8.3	5	2.8	180	100
Other Companies Within Group	51	28.8	56	31.7	39	22	31	17.5	177	100
Competitors	62	34.4	78	43.3	30	16.7	10	5.6	180	100
Clients or Customers	118	65.2	51	28.2	8	4.4	4	2.2	181	100
Consultancy Companies	20	11.2	56	31.3	57	31.8	46	25.7	179	100
Suppliers of Equipment, Materials	57	31.8	83	46.4	30	16.8	9	5	179	100
Universities or Other Education Institutes	11	6.2	47	26.4	73	41	47	26.4	178	100
Government Non-Profits Institutes	21	11.7	46	25.7	58	32.4	54	30.2	179	100
Patent Disclosers	17	9.6	38	21.5	65	36.7	57	32.2	177	100
Professional Conference, Meetings, Journals	29	16.2	67	37.4	57	31.9	26	14.5	179	100
Computer-Based Information Networks	33	18.4	62	34.7	53	29.6	31	17.3	179	100
Fair, Exhibitions	42	23.3	68	37.8	52	28.9	18	10	180	100
Strategic Allies	35	19.9	66	37.5	44	25	31	17.6	176	100

* Numbers differ due to missing values

Table 4.7: Innovation Co-operation

	Yes		No		Missing Value		Total	
	No.	%	No.	%	No.	%	No.	%
Co-operation Arrangements on Innovation Activities	85	43.8	106	54.6	3	1.6	194	100
	Malaysia	UK	USA	Japan	Taiwan	Korea	S'pore	Total
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
Type of Partner								
Competitor	15 (27.7)	5 (9.3)	5 (9.3)	13 (24)	6 (11.1)	5 (9.3)	5 (9.3)	54 (100)
Clients or Customers	30 (26.3)	16 (14)	20 (17.5)	26 (22.8)	5 (4.4)	6 (5.3)	11 (9.7)	114 (100)
Consultancy Companies	16 (42.1)	3 (7.9)	3 (7.9)	11 (28.9)	2 (5.3)	-	3 (7.9)	38 (100)
Suppliers of Equipment, Materials Components or Software	25 (25)	10 (10)	16 (16)	25 (25)	12 (12)	5 (5)	7 (7)	100 (100)
Universities or Other Higher Education Institutes	20 (58.8)	4 (11.8)	4 (11.8)	4 (11.8)	1 (2.9)	-	1 (2.9)	34 (100)
Government or Private Non-Profit Institute	19 (63.3)	1 (3.3)	1 (3.3)	6 (20)	1 (3.3)	1 (3.3)	1 (3.3)	30 (100)
Strategic Allies	11 (30.6)	3 (8.3)	7 (19.4)	10 (27.7)	1 (2.8)	2 (5.6)	2 (5.6)	36 (100)

Table 4.8: Government Support, Assistance and Incentives for Innovation, 1997 – 1999

	Number of Companies			
	Yes	(%)	No	(%)
Specifications				
Government Support	9	4.7	177	18.7
Tax Incentives	62	32.6	122	12.9
Technical Consultancy Services	11	5.9	181	19.1
Technical Support Services	13	6.8	179	18.9
Duty Free Importation of Machinery	88	46.3	103	10.9
Commercialization of R&D Fund	7	3.7	185	19.5
Evaluation				
Overall Usefulness of Government Support, Assistance and Incentives	No. of Companies		Percentage	
Very Useful	59		35.3	
Moderately Useful	41		24.5	
Slightly Useful	29		17.4	
Not Relevant	38		22.8	
Total	167		100	

Table 4.9: Resources Devoted to Innovation Activities, 1999

Type of Expenditure	Amount		RM 100,000 or Less		RM 100,001 to RM 200,000		RM 200,001 to RM 300,000		RM 300,001 to RM 400,000		RM 400,001 or More		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Intramural R&D	49	58.3	12	14.3	9	10.7	1	1.2	13	15.5	84	100		
Acquisition of R&D Service	17	77.3	2	9.1	-	-	-	-	3	13.6	22	100		
*Acquisition of Machinery & Equipment	23	22.5	15	14.7	4	3.9	8	7.8	52	51	102	100		
Industrial Design, Other Production Preparations for Innovation	28	53.8	13	25	4	7.7	-	-	7	13.5	52	100		
Training Directly Related to Technological Innovations	50	80.6	4	6.5	1	1.6	-	-	7	11.3	62	100		
Market Introduction of Technological Innovations	26	83.9	3	9.7	-	-	1	3.2	1	3.2	31	100		

* Five companies spent RM 10 million or more for the acquisition of machinery and equipment

Table 4.10: Impact of Innovation: Percentage of Turnover Due to New or Improved Products, 1997-1999

	Turnover Due to New Products		Turnover Due to Improved Products	
	RM	%	RM	%
Industry (2 digit classification)				
Food, Beverages & Tobacco	77,763,598	1.4	253,795,084	4.1
Textiles, Wearing Apparel & Leather	3,253,429	0.1	33,914,096	0.6
Wood & Wood Products, Including Furniture	15,327,875	0.3	169,355,956	2.9
Paper & Paper Products	28,519,069	0.5	13,957,206	0.2
Chemicals & Chemical, Petroleum Coal, Rubber & Plastic Product	424,670,063	7.5	491,438,861	8.1
Non-Metallic Mineral Products	68,696,250	1.2	37,706,250	0.6
Basic Metal Industries	208,902	0.003	26,339,654	0.4
Fabricated Metal Industries	5,036,861,411	89	5,041,097,141	83.1
Total	5,655,300,597	100	6,067,604,247	100

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Industry (3 digit classification)	Turnover Due to New Products		Turnover Due to Improved Products	
	RM	%	RM	%
311-312 Food Manufacturing	67,645,738	87	253,795,084	100
313: Beverage Industries	0	0	0	
314: Manufacturing of Tobacco Products	10,117,860	13	0	
Sub Total	77,763,598	100	253,795,084	100
321: Manufacturing of Textiles	3,253,429	100	18,914,096	55.8
322: Manufacturing of Wearing Apparel, Except Footwear	0	0	15,000,000	44.2
Sub Total	3,253,429	100	33,914,096	100
331: Manufacture of Wood, Wood & Cork Products	5,588,152	36.5	134,370,610	79.3
332: Manufacturing of Furniture and Fixtures	9,739,723	63.5	34,985,346	20.7
Sub Total	15,327,875	100	169,355,956	100
341: Manufacturing of Paper and Paper Products	6,519,069	22.9	13,957,206	100
342: Printing, Publishing and Allied Industries	22,000,000	77.1	0	0
Sub Total	28,519,069	100	13,957,206	100
351: Manufacture of Industrial Chemical	274,099,845	64.5	46,288,298	9.4
354: Manufacture of Miscellaneous Products of Petroleum & Coal	1,154,684	0.3	0	0
355: Manufacturing of Rubber Products	96,146,489	22.6	356,957,738	72.6
356: Manufacture of Plastic Products, Nec	53,269,044	12.6	88,192,825	18
Sub Total	424,670,062	100	491,438,861	100
369: Manufacturing of Non-Metallic Mineral Products	68,696,250	100	37,706,250	100
Sub Total	68,696,250	100	37,706,250	100
371: Iron and Steel Basic Industries	208,902	100	26,339,654	100
Sub Total	208,902	100	26,339,654	100
381: Manufacture of Fabricated Metal Products, Machinery	188,772,563	3.7	290,162,920	5.8
382: Manufacture of Machinery Except Electrical	27,163,558	0.5	25,577,247	0.5
383: Manufacture of Electrical, Machinery, Apparatus, Appliances & Supplies	4,668,246,530	92.7	4,639,123,479	92
384: Manufacture of Transport Equipment	148,860,242	3	84,324,237	1.7
385: Manufacture of Professional, Scientific, Measuring & Controlling Equipment	3,818,518	0.1	1,909,259	0
Sub Total	5,036,861,411	100	5,041,097,142	100
Grand Total	5,655,300,597	100	6,067,604,247	100

Table 4.11: Innovation Intensity by Industry, Employment Size, Age, and Ownership Structure, 1999

	Total Expenditure (RM)	Turnover (RM)	Intensity (100)
<u>Industry (2 digit classification)</u>			
Food, Beverages & Tobacco	10,095,526	2,312,523,672	0.43
Textiles, Wearing Apparel & Leather	7,854,000	129,330,888	6.07
Wood & Wood Products, Including Furniture	20,405,010	542,783,681	3.75
Paper & Paper Products	3,621,000	594,063,375	0.61
Chemicals & Chemical, Petroleum Coal, Rubber & Plastic Product	22,822,545	2,349,376,587	0.97
Non-Metallic Mineral Products	5,284,000	343,071,113	1.54
Basic Metal Industries	136,171	33,427,117	0.4
Fabricated Metal Industries	134,277,356	8,504,899,491	1.57
Total	204,495,609	14,809,475,924	1.38
<u>Employment Size</u>			
19 or Less Employees	1,180,000	32,833,066	3.59
20 – 49 Employees	4,559,879	325,927,288	1.39
50 – 249 Employees	50,435,294	2,125,483,312	2.37
250 or More Employees	146,670,436	11,880,351,992	1.23
Total	204,495,609	14,809,475,924	1.38
<u>Age</u>			
Prior to 1960	5,593,010	931,846,245	0.6
1960-1969	5,906,000	896,093,533	0.65
1970-1979	105,086,863	6,619,119,383	1.58
1980-1989	39,689,839	3,862,581,903	1.02
1990-1999	48,214,897	2,491,634,860	1.93
Unknown	5,000	8,200,000	0.06
Total	204,495,609	14,809,475,924	1.38
<u>Ownership Structure</u>			
Wholly Local-Owned	74,160,970	3,230,994,404	2.29
Wholly Foreign-Owned	109,567,042	7,315,050,671	1.49
Foreign-Local Ownership	20,767,597	4,263,430,849	0.48
Total	204,495,609	14,809,475,924	1.38

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Industry (3 digit classification)	Total Expenditure On R&D		Turnover		Intensity
	No.	RM	No.	RM	%
311-312: Food Manufacturing	20	9,597,527	20	1,428,867,164	0.67
313: Beverage Industries	1	0	1	564,187,000	0
314: Manufacture of Tobacco Products	1	498,000	1	337,262,000	0.14
321: Manufacture of Textiles	6	7,310,000	6	102,780,511	7.1
322: Manufacture of Wearing Apparel, Except Footwear	1	544,000	1	18,000,000	3.02
323: Manufacture of Leather, Leather Products & Substitutes	1	0	1	8,550,377	0
331: Manufacture of Wood , Wood & Cork Products	5	13,212,000	5	352,454,381	3.74
332: Manufacture of Furniture and Fixtures	10	7,193,010	10	190,329,300	3.77
341: Manufacture of Paper and Paper Products	7	2,121,000	7	450,063,375	0.26
342: Printing, Publishing and Allied Industries	3	1,500,000	3	144,000,000	1.04
351: Manufacture of Industrial Chemical	7	13,270,726	7	922,567,161	1.43
354: Manufacture of Miscellaneous Products of Petroleum & Coal	1	0	1	13,489,470	0
355: Manufacture of Rubber Products	17	5,478,819	17	850,787,577	0.64
356: Manufacture of Plastic Product, Nec	11	4,073,000	11	562,532,379	0.72
369: Manufacture of Non-Metallic Mineral Products	8	5,284,000	8	343,071,113	1.54
371: Iron and Steel Basic Industries	2	136,171	2	33,427,117	0.4
381: Manufacture of Fabricated Metal Products, Machinery and	17	15,425,714	17	1,129,461,185	1.36
382: Manufacture of Machinery Except Electrical	6	2,995,000	6	212,543,753	1.4
383: Manufacture of Electrical Machinery, Apparatus, Appliances & Supplies	22	108,085,197	22	6,749,905,625	1.6
384: Manufacture of Transport Equipment	8	4,839,600	8	278,803,748	1.73
385: Manufacture of Professional, Scientific, Measuring & Controlling Equipment	2	2,931,845	2	134,185,180	2.18
Total	156	204,495,609	156	14,809,475,924	1.38

Table 4.12: Impact of Innovation: Patent and Industrial Design Application and Approval, 1997 – 99

Number Applied/ Granted	Number of Companies			
	Patent		Industrial Design	
	Applied	Granted	Applied	Granted
1	10	7	3	2
2	2	-	3	1
3	3	1	1	1
4 and above	3	2	2	2

Table 4.13: Impact of Innovation: Effectiveness & Efficiency Measures

	Very Poor	Poor	Average	Good	Excellent	Total*
Efficiency						
Getting New Products to the Market Quickly	7 (3.9)	18 (10.2)	78 (44.1)	66 (37.3)	8 (4.5)	177 (100)
Making Efficient Use of R&D Expenditure	13 (7.4)	36 (20.5)	74 (42.0)	48 (27.3)	5 (2.8)	176 (100)
Effectiveness						
Coming up with Breakthrough/Radical Technologies	12 (6.6)	32 (17.7)	92 (50.8)	37 (20.4)	8 (4.4)	181 (100)
Bringing Breakthrough Technologies to the Market	14 (8)	34 (19.4)	84 (48)	34 (19.4)	9 (5.1)	175 (100)

* Numbers differ due to missing values

Table 4.14: Factors Hampering Innovation Activities

	Number of Company that Responded					
	Yes	(%)	No	(%)	Total*	(%)
Companies that Faced Problems in Innovation Activities	106	49.8	107	50.2	213	100
Seriously Delayed	74	34.7	139	65.3	213	100
Abolished	31	14.8	179	85.2	210	100
Not Even Started	40	19	170	81	210	100

* Does not add up to 217 due to missing values

Companies that Faced Problems in Innovation Activities

Overall

Factors	Very Important		Moderately Important		Slightly Important		Not Relevant		Total*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Excessive Perceived Economic Risks	40	41.2	34	35.1	13	13.4	10	10.3	97	100
Innovation Costs too High	53	53	30	30	14	14	3	3	100	100
Lack of Appropriate Source of Finance	29	30	37	38.1	17	17.5	14	14.4	97	100
Organizational Rigidities	9	9.8	31	33.7	34	36.9	18	19.6	92	100
Lack of Information on Technology	24	25.3	32	33.6	26	27.4	13	13.7	95	100
Lack of Information in Markets	22	22.9	41	42.7	21	21.9	12	12.5	96	100
Fulfilling Regulations and Standards	19	20.2	32	34.1	24	25.5	19	20.2	94	100
Lack of Customer Responsiveness to New Products	30	30.3	34	34.4	23	23.2	12	12.1	99	100
Lack of Skilled Personnel	38	38.4	29	29.3	24	24.2	8	8.1	99	100
Recent Economic Crisis	43	43.4	24	24.2	15	15.2	17	17.2	99	100

* Does not add up to 106 due to missing value

Projects Seriously Delayed

Factors	Very Important		Moderately Important		Slightly Important		Not Relevant		Total*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Excessive Perceived Economic Risks	25	35.7	26	37.1	10	14.3	9	12.9	70	100
Innovation Costs too High	36	50.7	23	32.4	9	12.7	3	4.2	71	100
Lack of Appropriate Source of Finance	22	31.4	25	35.7	13	18.6	10	14.3	70	100
Organizational Rigidities	6	9.1	23	34.8	23	34.8	14	21.3	66	100
Lack of Information on Technology	17	24.3	23	32.9	19	27.1	11	15.7	70	100
Lack of Information in Markets	16	22.9	28	40	15	21.4	11	15.7	70	100
Fulfilling Regulations and Standards	17	24.6	21	30.4	17	24.7	14	20.3	69	100
Lack of Customer Responsiveness to New Products	23	31.9	19	26.4	20	27.8	10	13.9	72	100
Lack of Skilled Personnel	23	32.4	25	35.2	18	25.4	5	7	71	100
Recent Economic Crisis	27	38	17	24	13	18.3	14	19.7	71	100

* Does not add up to 74 due to missing value

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Projects Abolished

Factors	Very Important		Moderately Important		Slightly Important		Not Relevant		Total*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Excessive Perceived Economic Risks	18	60	9	30	3	10	-	-	30	100
Innovation Costs too High	17	54.8	9	29	4	13	1	3.2	31	100
Lack of Appropriate Source of Finance	7	24.1	13	44.8	5	17.2	4	14	29	100
Organizational Rigidities	3	10.3	11	38	9	31	6	20.7	29	100
Lack of Information on Technology	8	30	10	37	6	22.2	3	11.1	27	100
Lack of Information in Markets	8	28.6	13	46.4	5	17.9	2	7.1	28	100
Fulfilling Regulations and Standards	3	11.1	8	30	11	40.7	5	18.5	27	100
Lack of Customer Responsiveness to New Products	8	28.6	11	39.3	7	25	2	7.1	28	100
Lack of Skilled Personnel	12	41.4	10	34.5	7	24.1	-	-	29	100
Recent Economic Crisis	12	40	6	20	8	26.7	4	13.3	30	100

* Does not add up to 31 due to missing values

Not Even Stated

Factors	Very Important		Moderately Important		Slightly Important		Not Relevant		Total*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Excessive Perceived Economic Risks	14	38.9	17	47.2	4	11.1	1	2.8	36	100
Innovation Costs too High	21	56.8	9	24.3	6	16.2	1	2.7	37	100
Lack of Appropriate Source of Finance	10	27	16	43.2	6	16.2	5	13.5	37	100
Organizational Rigidities	2	5.4	15	41.7	14	38.9	5	13.9	36	100
Lack of Information on Technology	11	30.6	12	33.3	11	30.6	2	5.6	36	100
Lack of Information in Markets	7	19.4	17	47.2	10	27.8	2	5.6	36	100
Fulfilling Regulations and Standards	6	17.1	13	37.1	11	31.4	5	14.3	35	100
Lack of Customer Responsiveness to New Products	9	33.3	5	18.5	10	37	3	11.1	27	100
Lack of Skilled Personnel	11	29.7	12	32.4	11	29.7	3	8.1	37	100
Recent Economic Crisis	15	41.7	11	30.6	7	19.4	3	8.3	36	100

* Does not add up to 40 due to missing values

Table 5.1: Size of Economy for Selected Countries, 1999

Economy	Population (million) 1999	Gross National Product (GNP)		GNP per capita	
		Billions of US dollars 1999	Rank 1999	US Dollars 1999	Rank 1999
Belgium	10	251	19	24,510	16
Germany	82	2079	3	25,350	13
Denmark	5	170	23	32,030	7
Spain	39	552	10	14,000	40
France	59	1427	4	23,480	21
Italy	58	1136	6	19,710	28
Ireland	4	71	42	19,160	30
Luxembourg	0.4	17	NA	41,009	NA
Netherlands	16	384	14	24,320	18
Austria	8	210	21	25,970	12
Portugal	10	106	34	10,600	47
Finland	5	123	30	23,780	19
Sweden	9	222	20	25040	15
UK	59	1338	5	22,640	22
Norway	4	146	27	32,880	5
United States	273	8351	1	30,600	8
Australia	19	381	15	20,050	26
Poland	39	153	25	3,960	73
Hungary	10	47	51	4,650	68
Canada	31	591	9	19,320	29
Malaysia	23	77	41	3,400	82

Source: World Bank, U.S.Department of State

Table 5.2: Structure of Output for Selected Countries, 1999

Economy	Gross Domestic Product (mil., USD)	Structure of Output		
		Industry	Manufacturing	Services
Belgium	245,706	28	18	71
Germany	2,081,202	32	24	67
Denmark	174,363	25.9	NA	71.3
Spain	562,245	30.7	NA	64.9
France	1,410,262	26	19	72
Italy	1,149,958	31	20	67
Ireland	84,861	43.4	NA	51
Luxembourg	18,700	23.1	NA	76.1
Netherlands	384,766	27.5	NA	69.3
Austria	208,949	33.1	21	64.5
Portugal	107,716	35.7	NA	60.2
Finland	126,130	33.2	25.6	63
Sweden	226,388	29.9	NA	67.9
UK	1,373,612	28.8	NA	69.9
Norway	145,449	32	11	66
United States	8,708,870	26	18	72
Australia	389,691	26.4	NA	70.4
Poland	154,146	33	20	63
Hungary	48,355	34	25	60
Canada	612,049	27	18	67
Malaysia	74,634	44	35	43

Note: The output structure for Denmark, Spain, Ireland, Luxembourg, Portugal, Finland, Sweden, United Kingdom, and Australia refers to output structure in 1998.

NA: Not Available

Source: World Bank, OECD

Table 5.3: Innovation Surveys Conducted by Selected Countries

Country	Reference Period	Gross Sample Size No of Firms	
		Manufacturing	Services
Belgium	1994-96	2,170	1,394
Germany	1994-96	7,529	5,951
Denmark	1994-96	1,530	1,073
Spain	1994-96	10,453	0
France	1994-96	6,500	4,000
Italy	1993-95	10,562	6,005
Ireland	1994-96	1,972	967
Luxembourg	1994-96	319	238
Netherlands	1994-96	4,616	3,590
Austria	1994-96	2,596	1,003
Portugal	1994-96	1,531	2,469
Finland	1994-96	1,687	964
Sweden	1994-96	1,040	1,108
United Kingdom	1994-96	3,778	2,114
Norway	1994-96	2,600	1,102
United States	1990-92	1000*	NA
Australia	1994-97	6,000	2,600
Poland	1994-96	8962**	NA
Hungary	1998	0	1,000
Canada	1997-99	NA	NA
Malaysia	1997-99	4,000	2,000

*Includes one service sector (computer related service)

**Includes mining and utilities

Source: OECD (1999), Rausch (1996), ABS (1998), Niedbalska (2000), Statistics Canada (2001)

Table 5.4: Number of Innovators for Selected Countries (%)

	Belgium		Germany		Denmark		Spain		France		Italy		Ireland		Luxembourg		Netherlands		Austria		Portugal		Finland		Sweden		Norway		EA		USA		Australia		Ireland		Canada		Malay			
	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999				
Manufacturing Sector	34	69	71	29	43	48	73	42	62	67	26	36	54	59	48	51	84	26	38	80	21																					
By Size																																										
Small	33	63	64	21	34	44	68	21	54	59	22	26	43	54	39	44	NA	43	48	NA	15																					
Medium	34	70	76	43	48	57	78	52	71	73	30	40	61	59	56	58	NA	NA	NA	NA	19																					
Large	51	85	91	76	75	73	85	85	84	88	52	77	79	81	77	79	NA	NA	NA	NA	32																					
Industry																																										
Food, beverages, tobacco	27	68	73	22	45	59	65	15	58	67	25	25	38	58	47	50	NA	36	38	77 to 81	13 to 33																					
Textile and Leather	28	62	55	18	30	32	58	-	49	55	19	37	45	56	45	35	NA	15	30	70 to 85	16 to 25																					
Wood, pulp and printing	30	59	70	21	32	45	68	43	53	62	23	30	45	51	36	45	NA	NA	NA	65 to 85	5 to 18																					
Coke and chemicals	46	75	93	62	68	61	79	53	85	71	77	61	61	81	76	70	NA	42	NA	76 to 88	38 to 40																					
Rubber and other non-metallic	34	67	63	31	49	44	79	51	67	45	36	44	57	53	54	51	NA	NA	NA	86 to 72	16 to 36																					
Basic and fabricated metals	39	59	58	25	31	54	68	44	53	68	19	31	41	56	43	48	NA	21	NA	74 to 76	24 to 25																					
Machinery and equipment	44	84	80	46	63	61	89	70	80	80	36	41	73	63	64	68	NA	35	14	87 to 100	26																					
Electrical and optical equipment	51	78	88	55	61	56	88	50	74	87	80	51	75	76	65	69	NA	NA	NA	90 to 91	35																					
Transport equipment	41	72	85	46	49	47	88	-	60	78	19	36	58	63	44	56	NA	NA	NA	75	26																					

Source: OECD (1999), Rausch (1996), ABS (1998), Niedbalska (2000), Statistics Canada, Eurostat

Table 5.5: Descriptive Statistics of Number of Innovation in EEA Countries (%)

	Min	Max	Standard Deviation	Average	Ranking Based on Average
By Size					
Small	21	68	17	43	3
Medium	30	78	15	57	2
Large	51	91	12	77	1
Industry					
Food, beverages, tobacco	15	73	19	46	6
Textile and Leather	18	62	15	42	9
Wood, pulp and printing	21	70	16	45	8
Coke and chemicals	46	93	13	70	1
Rubber and other non-metallic	31	79	13	52	5
Basic and fabricated metals	19	68	15	46	6
Machinery and equipment	36	89	17	65	3
Electrical and optical equipment	50	88	14	69	2
Transport equipment	19	88	20	56	4

Source: OECD (1999), Rausch (1996), ABS (1998), Niedbalska (2000), Statistics Canada, Eurostat