CHAPTER 6

PRESENT POSITION OF THE MALAYSIAN AUTOMOBILE INDUSTRY AND ITS SUB-CONTRACTING ARRANGEMENTS

This Chapter is devoted to discuss the present position of the Malaysian automobile industry and its sub-contracting arrangements. This pursues the argument in the last Chapter that the government has targetted the development of the automobile industry and the domestically-based ENOs. Thus, this Chapter seeks to provide evidences about the achievement of the promotional efforts in the sector as reflected by the overall performance of auto market, production, parts manufactures and sub-contracting arrangements. The last sections of this Chapter discuss further details of the patterns, trends and performances of Malaysian sub-contracting arrangements based on the perspectives of three automakers and a number of sub-contracting firms.

6.1 Domestic Market for Automobiles

The growing population coupled with the increase in income levels have generated favourable demands for automobiles in Malaysia. The rate of passenger automobile ownership increased from one passenger automobile for every 55 residents in 1965 to one for every 25 residents in 1975 and one for 11 residents in 1985 (Torii 1991). Automobiles are no longer treated as a luxury, but an essential item, either to transport people or merchandise.

Table 6.1 demonstrates the Malaysian market demand for automobiles based on various makes. The demands for both passenger and commercial vehicles fluctuates depending upon the prevailing economic cycle. Between 1993 and 1997,

Table 6.1
Malaysian Market Demand for Automobiles Based on New Registration, 1993-1999

Makes	1993		1994		1995		1996		1997		1998		1999	
	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%
Passenger														
Audi	276	0.2	296	0.1	418	0.2	597	0.2	562	0.2	228	0.2	318	0.1
BMW	907	0.7	1,101	0.5	1,301	0.6	2,350	0.8	2,635	0.8	672	0.5	1,219	0.5
Citreon	726	0.6	1,711	0.7	2,125	0.9	1,712	0.6	1,336	0.4	327	0.2	703	0.3
Daihatsu	1,984	1.6	1,394	0.6	1,123	0.5	855	0.3	879	0.3	269	0.2	169	0.1
Ford	2,697	2.2	2,016	0.8	2,331	1.0	1,182	0.4	1,012	0.3	298	0.2	466	0.2
Honda	8,799	7.2	10,523	4.4	11,048	4.8	18,278	6.5	19,653	6.3	4,100	2.9	4,606	1.8
Perodua Kancil	0	0.0	88,880	37.5	39,906	17.4	46,941	16.7	58,255	18.5	38,921	27.4	66,499	26.0
Mazda	1,523	1.3	1,074	0.5	1,023	0.4	1,003	0.4	843	0.3	100	0.1	139	0.1
Mercedes Benz	1,282	1.1	2,010	0.8	4,026	1.8	4,470	1.6	4,423	1.4	1,160	0.8	1,163	0.5
Mitsubishi	97	0.1	35	0.0	21	0.0	57	0.0	116	0.0	18	0.0	37	0.0
Nissan	6,271	5.2	5,661	2.4	7,904	3.4	6,780	2.4	8,204	2.6	1,407	1.0	2,970	1.2
Peugeot	962	0.8	1,541	0.6	2,150	0.9	2,506	0.9	1,733	0.6	350	0.2	325	0.1
Proton	88,732	73.0	110,505	46.6	12,7327	55.4	138,073	49.1	140,968	44.8	67,595	47.5	112,899	44.1
KIA	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	115	0.0
Proton DRB- USPD	0	0.0	0	0.0	13,320	5.8	38,027	13.5	55,838	17.8	19,894	14.0	42,821	16.7
Renault	318	0.0	382	0.0	609	0.3	3	0.0	0	0	0	0.0	0	0.0
Suzuki	121	0.1	88	0.0	23	0.0	0	0.0	1	0.0	0	0.0	0	0.0
Subaru	48	0.0	37	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Toyota	4,839	4.0	6,425	2.7	8,401	3.7	10,407	3.7	9,212	2.9	1,930	1.4	4,556	1.8
Volvo	1,153	0.9	2,086	0.9	1,935	0.8	2,374	0.8	2,237	0.7	422	0.3	642	0.3
4x4 WD*	769	0.6	1,514	0.6	4,635	2.0	5,715	2.0	6,492	2.1	4,503	3.2	16,231	6.3
Sub-total	121,504	100.0	237,279	100.0	229,626	100.0	281,330	100.0	314,399	100.0	142,194	100.0	255,878	100.0

Table 6.1 (continued)

Makes	1993		1994		1995		1996		1997		1998		1999	
	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%
						Commercial								
BMC	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	16	0.1	21	0.1
Citreon	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.0	0	0.0
Daewoo	0	0.0	1	0.0	48	0.1	175	0.2	130	0.1	0	0.0	13	0.0
Daihatsu	5,061	15.4	6,942	16.1	8,793	15.7	10,537	12.6	8,229	9.1	1,114	5.1	2,308	7.1
Ford	2,365	7.2	2,619	6.1	3,546	6.3	4,797	5.7	5,633	6.2	1,311	6.1	1,770	5.4
Hino	1,240	3.8	1,422	3.3	1,739	3.1	2,557	3.1	2,188	2.4	379	1.8	381	1.2
Inokom Permas	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	64	0.2
Isuzu	3,043	9.3	3,594	8.3	7,224	12.9	10,983	13.2	9,480	10.5	1,058	4.9	627	1.9
Iveco Euro Cargo	0	0.0	0	0.0	0	0.0	87	0.1	178	0.2	18	0.1	2	0.0
Man	0	0.0	103	0.2	93	0.2	108	0.1	156	0.2	0	0.0	12	0.0
Mazda	1,505	4.6	1,550	3.6	1,960	3.5	2,119	2.5	2,039	2.3	315	1.5	733	2.3
Mercedes Benz	719	2.2	800	1.9	785	1.4	632	0.8	805	0.9	321	1.5	127	0.4
Mitsubishi	1,628	5.0	1,935	4.5	2,610	4.6	2,955	3.5	2,819	3.1	576	2.7	1,322	4.1
Nissan	5,332	16.2	6,084	14.1	9,012	16.0	12,963	15.5	14,631	16.2	3,516	16.2	6,377	19.6
Perodua Rusa	0	0.0	0	0.0	0	0.0	7,240	8.7	10,476	11.6	2,452	11.3	1,589	4.9
Scania	15	0.0	42	0.1	164	0.3	272	0.3	351	0.4	16	0.1	105	0.3
Subaru	765	2.3	194	0.4	55	0.1	105	0.1	49	0.1	94	0.4	79	0.2
Suzuki	200	0.6	385	0.9	761	1.4	1,066	1.3	965	1.1	97	0.4	508	1.6
Tata	182	0.6	190	0.4	92	0.2	696	0.8	701	0.8	62	0.3	259	0.8
Toyota	5,354	16.3	7,948	18.4	9,958	17.7	11,616	13.9	10,281	11.4	4,806	22.2	7,057	21.7
Volvo	96	0.3	164	0.4	395	0.7	536	0.6	447	0.5	116	0.5	75	0.2
Kia	0	0.0	0	0.0	0	0.0	0	0.0	151	0.2	47	0.2	75	0.2
Volkswagen	10	0.0	1	0.0	0	0.0	0	0.0	0	0	0	0.0	0	0.0
Hicom MTB	0	0.0	0	0.0	0	0.0	0	0.0	625	0.7	1,323	6.1	2,545	7.8
Honda	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.0	0	0.0
4x4 WD*	5,348	16.3	9,182	21.3	8,931	15.9	14,014	16.8	20,104	22.2	4,016	18.5	6,498	20.0
Sub-total	32,863	100.0	43,155	100.0	56,166	100.0	83,458	100.0	90,438	100.0	21,657	100.0	32,547	100.0
Grand Total	154,367		280,435		285,792		364,788		404,837		163,851		288,425	

Note: The data are inclusive of Sabah and Sarawak
* Data on 4x4 WD vehicles are based on various makes, such as Daihatsu, Isuzu, Mitsubishi, Suzuki, Nissan, Toyota, Chrysler Cherokee Jeep, Honda, Land Rover, Kia, Perodua Kembara. 4x4 Kia was first registered in 1997' Perodua Kembara was in 1998

Source: Malaysian Automotive Association (MAA).

the market demand for passenger vehicles increased dramatically from 121,504 units to 314,399 units. In contrast, it contracted drastically in 1998 due to the Asian economic crisis and the tighter conditions for hire-purchase agreements. The crisis resulted in an increase in unsold automobiles and the stock excess of both CKD and CBU vehicles valued at about RM1.8 billion as of December 1998 (MITI 1999).

The Malaysian market demand lies in passenger vehicles, rather than in commercial vehicles as in the case of Thailand and Indonesia (Table 6.2). Its market share also shows a changing feature. In the 1960s, the passenger car market was dominated by European and American makes. From the 1970s to the first half of the 1980s, Japanese cars captured and dominated the market. In 1987, the first national car, Proton Saga gained a majority share in the market. At present, Proton and Perodua hold the first and the second largest share of the local passenger cars market respectively. Lower prices attributed to lower taxes (lower tax ratio, see Appendix F) imposed on national cars (than imported cars) have made national cars more affordable for Malaysian buyers.

The market force is also dependent upon small and medium passenger cars. The production of this type of passenger car (below 1000c.c and up to 1550c.c) in 1998 was 92.6 per cent (see Table 6.7). This is largely contributed by the national cars, Proton and Perodua. For commercial vehicle category, Toyota, Mitsubishi, Daihatsu and Ford are among the most popular automobiles. Malaysian made commercial vehicles, HICOM MTB, also grows in its popularity among the domestic consumers (see Table 6.1).

Table 6.2
Asian Automobile Markets by Country and Region, 1990-1998 (Unit of Sales)

Country/Region	1990	1991	1992	1993	1994	1995	1996	1997	1998
					Passenger*				
Korea	626,126	772,548	876,262	1,037,488	1,140,399	1,149,409	1,238,940	1,151,287	568,063
China	76,500	188,426	164,100	99,324	276,684	448,000	386,743	474,203	508,284
Hong Kong	33,508	35,783	46,428	47,374	35,289	24,895	22,196	38,899	29,038
Taiwan	354,556	353,656	409,640	404,244	434,787	418,766	368,336	368,782	359,450
East Asian Sub-total	1,090,690	1,350,413	1,496,430	1,788,430	1,887,159	2,041,070	2,016,215	2,033,171	1,464,835
Thailand	65,864	66,779	121,488	174,169	155,670	163,371	172,730	132,060	46,300
Indonesia	56,510	45,774	30,006	32,231	40,219	37,835	43,914	73,215	11,869
Malaysia	106,454	121,660	109,432	128,600	155,765	224,991	275,615	307,907	137,691
Philippines	35,193	27,798	35,152	51,199	58,501	71,195	88,977	75,760	34,688
Singapore	30,651	27,659	29,051	37,676	33,065	34,407	29,287	26,603	28,519
Vietnam	1,021	156	2,468	3,541	2,801	4,011	4,842	3,359	3,054
Southeast Asian Sub-total	295,693	289,826	327,597	427,416	446,021	535,810	615,365	618,904	262,121
India	174,663	172,485	164,581	199,969	232,798	330,496	389,659	431,513	401,599
Pakistan	40,019	26,474	32,614	48,585	35,000	36,100	37,869	16,206	19,505
South Asia Sub-total	241,682	198,959	197,195	248,554	267,798	366,596	427,528	447,719	421,104
Total	1,601,065	1,839,198	2,021,222	2,464,400	2,600,978	2,943,476	3,059,108	3,099,794	2,148,060
					Commercial				
Korea	328,151	331,636	392,112	398,479	415,203	406,493	405,192	361,648	211,842
China	485,000	618,375	916,000	1,170,827	1,175,012	1,116,000	1,071,923	1,093,271	1,094,770
Hong Kong	18,644	17,058	19,945	20,460	15,046	9,431	12,090	14,685	10,962
Taiwan	128,325	137,641	158,130	152,939	140,712	127,868	102,300	112,781	114,619
East Asian Sub-total	960,120	1,104,710	1,486,187	1,742,705	1,745,973	1,659,792	1,591,505	1,582,385	1,432,193
Thailand	238,207	201,781	241,499	282,299	330,008	408,209	416,396	231,096	97,765
Indonesia	218,093	215,930	139,527	178,448	281,541	340,859	288,121	313,476	46,392
Malaysia	59,407	60,217	35,652	39,328	44,670	60,801	89,173	96,930	26,160
Philippines	23,854	20,151	25,208	32,612	44,970	56,967	73,118	68,675	45,543
Singapore	5,074	4,837	5,195	5,431	4,534	7,297	7,628	8,209	8,974
Vietnam	1,071	389	2,083	3,325	3,349	3,008	3,039	2,581	2,346
Southeast Asian Sub-total	545,706	503,305	449,164	541,443	709,072	877,141	877,475	720,967	227,180
India	182,519	172,462	165,489	181,229	236,671	308,293	360,705	329,925	248,109
Pakistan	23,174	40,255	31,546	41,965	22,000	20,800	17,566	10,381	12,495
South Asia Sub-total	205,693	212,717	197,035	223,194	258,671	329,093	378,271	340,306	260,604
Total	1,711,519	1,820,732	2,132,386	2,507,342	2,713,716	2,866,026	2,847,251	2,643,658	1,919,977
Grand Total	3,312,584	3,659,930	4,153,608	4,971,742	5,314,694	5,809,502	5,906,359	5,743,452	4,068,037

Note: Grand Total is calculated from the total of passenger and commercial vehicles.
The data are inclusive of passenger cars only and exclusive of 4x4 WD.
Source: Terai (1999).

Compared with the other Asian countries, the performance of the Malaysian domestic market is rather mixed. As shown in Table 6.2 and Table 6.3, the Malaysian share of the market for both passenger and commercial vehicles in Asia is highly insignificant. The ratio of its passenger and commercial vehicle sales to the regional total sales was far below than one during the period, 1990-1998 (Table 6.3). Comparing the Malaysian total auto sales to the total sales of other single Asian countries, once again, produces a rather mixed result. For passenger vehicles, the Malaysian domestic market is much lower than that of the South Korea, Taiwan and India; but much higher than that of most other Asian countries. For commercial vehicles, its market share is far lower than that of the South Korea, China, Taiwan, Thailand, Philippines and India; but higher than that of other Asian countries (excluding Japan).

6.2 The Malaysian International Trade in Automobiles

The Malaysian automobile industry is characterised by higher imports than exports in both unit and value. Except for the crisis period of 1997-1998, imports of both CKD and CBU increased drastically; whilst the exports fluctuated. Certainly, the higher imports than exports account for the country's trade account deficits over the years (Table 6.4). It also means that Malaysia is the net importer of automobiles. Though some protective measures were enforced to protect local producers and suppliers, most specialised and functional components and, to some extent, materials are still imported. Hence, the import of CKD increased steadily in the 1990s, except for the 1997-1998 crisis period.

Table 6.3
Ratio of Malaysian Domestic Market of Automobiles to Other Country's or Regional Markets

Country/Region	1990	1991	1992	1993	1994	1995	1996	1997	1998
					Passenger*				
Korea	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.2
China	1.4	0.6	0.7	0.4	0.6	0.5	0.7	0.6	0.3
Hong Kong	3.2	3.4	2.4	2.7	4.4	9.0	12.4	7.9	4.7
Taiwan	0.3	0.3	0.3	0.3	0.4	0.5	0.7	0.8	0.4
East Asian Sub-total	0.1	0.09	0.07	0.07	0.08	0.1	0.1	0.2	0.09
Thailand	1.6	1.8	0.9	0.7	1.0	1.4	1.6	2.3	3.0
Indonesia	1.2	2.7	3.6	4.0	3.9	5.9	6.3	4.2	11.6
Philippines	3.0	4.4	3.1	2.5	2.7	3.2	3.1	4.1	4.0
Singapore	3.5	4.4	3.8	3.4	4.7	6.5	9.4	11.6	4.8
Vietnam	1043	779.9	443	36.3	55.6	56.1	56.9	91.7	45.1
Southeast Asian Sub-total	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.5	0.5
India	0.6	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.3
Pakistan	2.7	4.6	3.3	2.6	4.5	6.2	7.3	19.0	7.1
South Asia Sub-total	0.4	0.6	0.6	0.5	0.6	0.6	0.6	0.7	0.3
Total	0.07	0.07	0.05	0.05	0.06	0.08	0.09	0.1	0.06
					Commercial				
Korea	0.2	0.2	0.09	0.1	0.1	0.2	0.2	0.3	0.1
China	0.1	0.1	0.04	0.03	0.04	0.05	0.08	0.09	0.02
Hong Kong	3.2	3.5	1.8	1.9	3.0	6.4	7.4	6.6	2.4
Taiwan	0.5	0.4	0.2	0.3	0.3	0.5	0.9	0.9	0.2
East Asian Sub-total	0.06	0.05	0.02	0.02	0.03	0.04	0.06	0.06	0.02
Thailand	0.2	0.3	0.1	0.1	0.1	0.1	0.2	0.4	0.3
Indonesia	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.6
Philippines	2.5	29.9	1.4	1.2	1.0	1.1	1.2	1.4	0.6
Singapore	11.7	12.4	6.9	7.2	9.9	8.3	11.7	11.8	2.9
Vietnam	55.5	154.8	17.1	11.8	13.3	20.2	29.3	37.6	11.2
Southeast Asian Sub-total	0.1	0.1	0.08	0.07	0.06	0.07	0.1	0.1	0.1
India	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.1
Pakistan	2.6	1.5	1.1	0.9	2.0	2.9	5.1	9.3	2.1
South Asia Sub-total	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	10.0
Total	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.04	0.01
Grand Total	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01

Note: The data are inclusive of passenger cars only and exclusive of 4x4 WD.
The Ratio= Malaysian Domestic Sales/Respective National or Regional Sales
Source: Calculated from Table 6.2

Table 6.4
Malaysian International Trade in Automobiles, 1993-1998 (Unit)

Year	Passenger			Commercial			Automobile Total			
	CKD	CBU	Sub-total	CKD	CBU	Sub-total	CKD	CBU	Grand-total	Chg (%)
					A. Import					
1993	139,271	12,648	151,919	33,496	10,294	43,790	172,767	22,942	195,709	-
	(1,338.3)	(192.8)	(1,531.1)	(777.0)	(257.5)	(1,034.5)	(2,115.3)	(450.3)	(2,565.6)	-
1994	181,052	16,246	197,298	43,689	15,892	59,581	224,741	32,138	256,879	31.3
	(1,934.0)	(278.6)	(2,212.6)	(1,114.1)	(272.2)	(1386.3)	(3048.1)	(550.8)	(3,598.9)	(40.3)
1995	262,566	17,812	280,378	63,049	16,242	79,291	325,615	34,054	359,669	40.0
	(3,043.4)	(385.4)	(3,428.8)	(1,702.0)	(510.6)	(2,212.6)	(4,745.4)	(896.0)	(5641.4)	(56.8)
1996	290,268	20,523	310,791	85,808	51,787	137,595	376,076	72,310	448,386	24.7
	(2,794.8)	(425.1)	(3,219.9)	(2,281.1)	(797.7)	(3,078.8)	(5,075.9)	(1,222.8)	(6,298.7)	(11.7)
1997	363,181	11,608	374,789	103,334	29,887	133,221	466,515	41,495	508,010	13.3
	(2,795.3)	(289.0)	(3,084.3)	(2,476.7)	(344.1)	(2,820.8)	(5,272)	(633.1)	(5,905.1)	(-6.2)
1998	145,235	5,218	150,453	15,787	5,432	21,219	161,022	10,650	171,672	-66.2
	(1,173.8)	(140.7)	(1,314.5)	(471.6)	(295.9)	(767.5)	(1,645.4)	(436.6)	(2,082)	(-64.7)
					B. Export					
1993	-	-	19,547	-	-	679	-	-	20,226	-
			(387.8)			(39.1)			(426.9)	-
1994	-	-	14,406	-	-	815	-	-	15,221	-24.7
			(313.4)			(22.5)			(335.9)	-21.3
1995	-	-	21,087	-	-	1,434	-	-	22,521	48.0
			(418.8)			(27.6)			(446.4)	32.9
1996	-	-	21,748	-	-	698	-	-	22,446	-0.3
			(475.4)			(32.5)			(507.9)	13.8
1997	-	-	26,948	-	-	1,029	-	-	27,977	24.6
			(559.8)			(43.9)			(603.7)	18.9
1998	-	-	23,700	-	-	3,520	-	-	27,220	-2.7
			(667.8)			(305.5)			(973.3)	61.2
					C. Deficit/Surplus in RM Million (B-A)					
1993	-	-	(-1,143.3)	-	-	(-995.4)	-	-	(-2,138.7)	-
1994	-	-	(-1,899.2)	-	-	(-1,363.8)	-	-	(-3,263.0)	-
1995	-	-	(-3,010.0)	-	-	(-2,185.0)	-	-	(-5,195.0)	-
1996	-	-	(-2,744.5)	-	-	(-3,046.3)	-	-	(-5,790.8)	-
1997	-	-	(-2,524.5)	-	-	(-2,776.9)	-	-	(-5,301.4)	-
1998	-	-	(-646.7)	-	-	(-462.0)	-	-	(-1,108.7)	-

Note: Figures in parentheses are in value (RM Million), except the change is in percentage value
CKD Completely knocked down- imports of individual parts
CBU Completely built-up- imports of ready assembled vehicles
Data for Malaysian automobile exports are not broken up into CKD and CBU. Most probably the data refer to CBU vehicles

Source: Adapted and calculated from unpublished materials of MIDA.

Import sources of automobile products are dependent on its types. In 1998, pan, Germany and France were the top three sources of Malaysian import of ssenger cars; while the top three sources of commercial vehicle import were the nited Kingdom, Germany and France. The top three sources of imported component rts were Japan, Germany and Taiwan (MITI 1999).

Export of Malaysian automobiles is mainly for passenger rather than mmercial vehicles (see Table 6.4). Most export of passenger cars were sourced from oton, which constituted about 75 per cent of the 23,700 units exported in 1998 (MITI 999). Export of Proton cars increase steadily from 25 units in 1986 to 15,643 units in 999 (Proton, unpublished).

The top three markets for the export of passenger cars were the United ingdom, Germany and France. For commercial vehicles, the top three markets for the xport were the U.S.A., Taiwan and Singapore. Between 1997-1998, the export value of oth passenger and commercial vehicles increased about 61 per cent though the export olume decreased by about 3 per cent mostly due to the favourable exchange rates that enefited this country.[1]

Export of component parts were relatively insignificant and were mainly to meet narket demand in Singapore, Taiwan and the U.K. Their export value was about RM226 million in 1997 and RM298 million in 1998 (MITI 1999).

6.3 Structure of the Automobile Industry

The automobile industry consists of two strands of manufacturing activities. They are the down-stream production processes - consisting of sub-assembly and or final assembly activities and the up-stream parts and component-system manufacturing

ocesses. Whereas the former activity is much dependent directly on domestic and ternational market demands, the latter is directly contingent upon the demand from e production lines of the former.

The development of a country's automobile industry can be generally divided ito four stages (Torii 1991: 389):

1. Import and sale of CBU automobiles;
2. Assembly of imported CKD parts and localisation of parts which can be sub-divided into three stages, defined by technical level and market size for parts: i) Local production of replacement parts, or components; ii) Local production of original equipment manufacturer (OEM) parts for automobile assembly; iii) Local production of major and functional parts (OEM), such as engine and transmission components;
3. Local production of materials for cars and components; and
4. Local design of automobile bodies and other components.

According to Torri (1991), Malaysia went through the first stage between 1896-1966 and the 2(i)-stage between 1967-1978. He asserts that Malaysia is now at the 2(ii)-stage. But, if one follows closely the recent development of the Malaysian automobile industry, one would find that the country has entered the 2 (iii)-stage and to a certain extent, leapt to the fourth stage.

It is estimated that the output of the automobile sub-sector accounted for about 5.0 per cent of total manufacturing output and 3.3 per cent of employment in 1995. Both automobile producers and component manufacturers (suppliers) employed 12,304 workers in 1987 and 37,541 workers in 1995 (MITI 1996).

6.3.1 The Automobile Production Industry

Besides the two national manufacturers, PROTON and PERODUA, there are a number of automobile producers (automakers or assemblers) in Malaysia. They include Associated Motor Ind. (M) Sdn. Bhd., Assembly Services Sdn. Bhd., Asia Automobile Industries Sdn. Bhd., Swedish Motor Assemblies Sdn. Bhd., UMW Dennis Specialist Vehicles Sdn. Bhd. and TVR Sports (M) Sdn. Bhd. in Selangor; Tan Chong Motor Assemblies Sdn. Bhd. in Kuala Lumpur; Oriental Assemblers Sdn. Bhd. in Johore; Automotive Manufacturer (M) Sdn. Bhd. and Malaysian Truck and Bus Sdn. Bhd. (MTB) in Pahang; and Industri Otomotif Komersial (M) Sdn. Bhd (INOKOM) in Kedah. Until recently, licences for the establishment of new assembling firms were frozen (as informed by a MIDA officer). Malaysian automobile producers and their product base are shown in Table 6.5.[2]

A large portion of the local automobile production is for domestic market. In 1998, only about 18 per cent and 19 per cent of the total production of passenger and commercial vehicles were exported respectively (calculated from MIDA, unpublished data). Some domestic demand is, in turn, met by the import of either used, reconditioned or new CBU vehicles. In 1998, about 4 per cent of domestic demand (based on sales) for passenger vehicles and 21 per cent for commercial vehicles were also met by the imported CBU vehicles (calculated from MIDA, unpublished data).

Owing to the significant share of local consumption in the automobile production, any changes in domestic demand would significantly affect the production of the industry. Based on Table 6.6, the production of both passenger and commercial vehicles has fluctuated regularly since 1980. The peak production year for both vehicles was in 1997, when their production reached 335,030 and 108,140 for passenger and commercial vehicles respectively.

Table 6.5
Malaysian Automobile Producers and Their Product Base

Automobile Producers	Product Base	
	Passenger	Commercial
1. Perusahaan Otomobil Nasional Berhad (PROTON)	Proton	-
2. Perusahaan Otomobil Kedua Sdn. Bhd. (PERODUA)	Kancil, Daihatsu	Rusa, Daihatsu
3. Associated Motor Ind. (M) Sdn. Bhd.	Ford, BMW, Mazda, Proton	Ford, Chrysler Jeep, Land Rover, Suzuki, Scania, Tata
4. Assembly Services Sdn. Bhd.	Toyota, Daihatsu	Toyota, Hino
5. Asia Automobile Industries Sdn. Bhd.*	Mercedes	Mercedes, Mazda
6. Swedish Motor Assemblies Sdn. Bhd.	Volvo	Volvo, Daihatsu, Suzuki
7. UMW Dennis Specialist Vehicles Sdn. Bhd.	-	Dennis
8. TVR Sports (M) Sdn. Bhd.		TVR
9. Tan Chong Motor Assemblies Sdn. Bhd.	Nissan, Audi, Peugeot	Nissan, Subaru
10. Oriental Assemblers Sdn. Bhd.	Honda, Mercedes, Peugeout	Man
11. Automotive Manufacturer (M) Sdn. Bhd.	Citreon, Proton	Isuzu, Mitsubishi
12. Malaysian Truck and Bus Sdn. Bhd. (MTB)	-	MTB
13. Industri Otomotif Komersial (M) Sdn. Bhd (INOKOM)	-	Renault

Note: - * I checked with the company and was told that the company name is the Cycle and Carriage Bintang Berhad.
- There are other minor companies, such as Bufori and newly joint-venture firms producing automobiles; but the information on them is not available at MIDA.

Source: MIDA (unpublished)

Table 6.6
Malaysian Automobile Production by Utility, 1980-1999

Year	Passenger		Commercial		Automobile Total		Per cent of Total	
	Unit	% Chg	Unit	% Chg	Unit	% Chg	Passenger	Commercial
1980	81,065	-	25,187	-	106,252	-	76.3	23.7
1981	87,822	8.3	24,353	-3.3	112,175	5.6	78.3	21.7
1982	85,321	-2.9	14,043	-42.3	99,364	-11.4	85.9	14.1
1983	100,223	17.5	18,239	29.9	118,462	19.2	84.6	15.4
1984	96,361	-3.9	28,555	56.6	124,916	5.4	77.1	22.9
1985	69,769	-27.6	42,053	47.3	111,822	-10.5	62.4	37.6
1986	42,180	-39.5	19,814	-52.9	61,994	-44.6	68.0	32.0
1987	33,685	-20.1	15,295	-22.8	48,980	-21.0	68.8	31.2
1988	61,338	82.1	23,788	55.5	85,126	73.8	72.1	27.9
1989	81,873	33.5	48,772	105.0	130,645	53.5	62.7	37.3
1990	116,979	42.9	75,054	53.9	192,033	47.0	60.9	39.1
1991	136,184	16.4	81,099	8.1	217,283	13.1	62.7	37.3
1992	117,773	-13.5	34,750	-57.2	152,523	-29.8	77.2	22.8
1993	123,521	4.9	34,929	0.5	158,450	3.9	78.0	22.0
1994	157,536	27.5	43,834	25.5	201,370	27.1	78.2	21.8
1995	227,727	44.6	61,128	39.5	288,855	43.4	78.8	21.2
1996	280,944	23.4	92,733	51.7	373,677	29.4	75.2	24.8
1997	335,030	19.3	108,140	16.6	443,170	18.6	75.6	24.4
1998	128,979	-61.5	18,370	-83.0	147,349	-66.8	87.5	12.5
1999	260,000	101.6	40,714	121.6	300,714	104.1	86.5	13.5
Total	2,624,310		850,850		3,475,160		75.5	24.5

Source: Adapted from MIDA (unpublished)

The economic crisis that hit Malaysia since July 1997 resulted in the drastic contraction of the production of both passenger and commercial vehicles. A slowdown in the construction and general business activities, the tightening of hire-purchase agreements and the increase in interest rates have been the major causes for the contraction of the demand and production of automobiles. Further impact was the contraction of the capacity utilisation of the automobile industry from 88.2 per cent in 1997 to 35 per cent in 1998 (MITI 1999).

On average, about 75 per cent of the total production is passenger vehicles (Table 6.6). A significant portion of the production of passenger vehicles is in the low and intermediate classes in line with the generally intermediate incomes earned by Malaysian. In 1998 for example, passenger vehicles (below 1000 c.c, 1151-1350 c.c. and 1351-1550 c.c.) shared the highest percentage in the total production (Table 6.7), certainly contributed mostly by the Perodua and Proton.

Table 6.8 provides the details of the passenger car production by makes. It is clear that the significant part of the total production (over 80 per cent) comes from Proton. For commercial vehicles; 4 x 4 (ATV), vans and trucks are the most significant output since 1988. The largest production among the trucks is the smallest one which is below than 3 tonne (Table 6.7). In 1999, the largest volume of commercial vehicle production, in order, was Toyota, Nissan, Mitsubishi, Ford and Isuzu (see Table 6.8).

6.3.2 The Auto-Component-System Manufacturing Industry

The Malaysian auto-component-system industry is mostly influenced by the government through the local content policy. Although several protective and stimulatory measures[3] are implemented by the government, the Malaysian automobile

Table 6.7
Production of Passenger and Commercial Automobiles by Variants, 1988-1998

Variants	1988		1989		1990		1991		1992		1993		1994		1995		1996		1997		1998	
	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%	Unit	%
Passenger Vehicles by Engine Capacity - C.C.																						
Below 1000	1,001	1.6	2,084	2.5	3,835	3.3	5,554	4.1	1,926	1.6	1,282	1.0	11,417	7.2	41,541	18.2	49,313	17.6	63,853	19.1	39,919	30.9
1000-1150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,457	3.7	14,297	4.3	3,427	2.7
1151-1350	23,578	38.4	25,737	31.4	26,611	22.7	31,984	23.5	29,230	24.8	27,565	22.3	50,740	32.2	69,768	30.6	79,757	28.4	103,297	30.8	57,071	44.2
1351-1550	29,822	48.6	40,549	49.5	61,202	52.3	69,719	51.2	63,609	54.0	63,294	51.2	52,531	33.3	48,068	21.1	59,181	21.1	79,590	23.8	19,151	14.8
1551-1750	1,790	2.9	4,202	5.1	9,220	7.9	11,643	8.5	11,440	9.7	20,167	16.3	25,673	16.3	35,442	15.6	46,163	16.4	39,442	11.8	5,277	4.1
1751-1950	825	1.3	1,449	1.8	3,258	2.8	3,108	2.3	1,937	1.6	2,188	1.8	2,745	1.7	5,991	2.6	8,303	3.0	5,213	1.6	819	0.6
1951-2150	2,946	4.8	5,295	6.5	8,811	7.5	11,517	8.5	6,669	5.7	7,032	5.7	5,360	3.4	15,987	7.0	14,175	5.0	16,984	5.1	1,239	1.0
2157-2350	1,341	2.2	2,221	2.7	3,132	2.7	1,746	1.3	2,327	2.0	933	0.8	6,978	4.4	8,358	3.7	11,069	3.9	7,668	2.3	1,127	0.9
Above 2350	35	0.1	336	0.4	910	0.8	913	0.7	635	0.5	1,060	0.9	2,092	1.3	2,572	1.1	2,526	0.9	4,686	1.4	949	0.7
Total	61,338	100.0	81,873	100.0	116,979	100.0	136,184	100.0	117,773	100.0	123,521	100.0	157,536	100.0	227,727	100.0	280,944	100.0	335,030	100.0	128,979	100.0
Commercial Vehicles by Gross Vehicle Weight (GVW)																						
Below 3T	3,419	14.4	6,575	13.5	9,437	12.6	12,143	15.0	6,089	17.5	6,104	17.5	7,607	17.4	13,379	21.9	17,927	19.3	13,896	12.9	931	5.1
3-5T	849	3.6	742	1.5	960	1.3	1,292	1.6	505	1.5	567	1.6	480	1.1	821	1.3	1,503	1.6	7,112	6.6	383	2.1
5-8T	464	2.0	736	1.5	1,039	1.4	771	1.0	726	2.1	1,044	3.0	1,352	3.1	2,410	3.9	2,763	3.0	7,228	6.7	477	2.6
8-12T	160	0.7	168	0.3	209	0.3	366	0.5	327	0.9	308	0.9	307	0.7	437	0.7	799	0.9	962	0.9	402	2.2
12-15T	505	2.1	1,646	3.4	2,252	3.0	1,638	2.0	471	1.4	361	1.0	535	1.2	723	1.2	1,118	1.2	754	0.7	70	0.4
Above 15T	193	0.8	542	1.1	1,177	1.6	1,932	2.4	1,206	3.5	1,086	3.1	1,726	3.9	2,870	4.7	4,848	5.2	4,416	4.1	487	2.7
Total Trucks	5,590	23.5	10,409	21.3	15,074	20.1	18,142	22.4	9,324	26.8	9,470	27.1	12,007	27.4	20,640	33.8	28,958	31.2	34,368	31.8	2,750	15.0
Pick up	2,044	8.6	3,768	7.7	5,983	8.0	7,235	8.9	5,324	15.3	4,985	14.3	5,569	12.7	8,718	14.3	9,179	9.9	9,944	9.2	771	4.2
Van	11,303	47.5	24,623	50.5	40,845	54.4	40,312	49.7	11,440	32.9	12,917	37.0	14,530	33.1	18,749	30.7	32,705	35.3	38,354	35.5	7,333	39.9
4 x 4 (ATV)	4,004	16.8	9,116	18.7	11,873	15.8	13,500	16.6	6,572	18.9	5,552	15.9	9,289	21.2	11,300	18.5	19,424	20.9	23,300	21.5	7,366	40.1
Bus	847	3.6	856	1.8	1,279	1.7	1,910	2.4	2,090	6.0	2,005	5.7	2,439	5.6	1,721	2.8	2,467	2.7	2,174	2.0	150	0.8
Total Comm.	23,788	100.0	48,772	100.0	75,054	100.0	81,099	100.0	34,750	100.0	34,929	100.0	43,834	100.0	61,128	100.0	92,733	100.0	108,140	100.0	18,370	100.0

Source: Adapted and calculated from MIDA (unpublished)

Table 6.8
Malaysian Automobile Production by Make, 1993-1999

Makes	1993		1995		1997		1998		1999	
	Unit	% Sub-total	Unit	% Sub-total	Unit	% Sub-total	Unit	% Sub-total	Unit	% Sub-total
Passenger										
Audi	185	0.13	463	0.23	660	0.25	47	0.05	217	0.12
BMW	949	0.66	1,314	0.65	2,466	0.94	718	0.73	640	0.36
Citreon	478	0.33	1,683	0.84	857	0.33	98	0.10	334	0.19
Daihatsu	0	0.00	1,154	0.57	0	0.00	0	0.00	0	0.00
Ford	2,002	1.40	2,785	1.39	1012	0.39	283	0.29	305	0.17
Honda	9,024	6.31	11,207	5.57	20,600	7.87	1,995	2.02	4,778	2.66
Perodua Kancil	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Mazda	621	0.43	1,228	0.61	496	0.19	292	0.30	18	0.01
Mercedes Benz	20	0.01	4,064	2.02	3,999	1.53	1,089	1.10	805	0.45
Nissan	5,479	0.04	8,895	0.04	6,859	0.03	552	0.01	2,699	0.02
Peugeot	760	0.53	2,157	1.07	1,617	0.62	149	0.15	248	0.14
Proton*	118,100	82.57	155,000	77.09	212,900	81.31	91,500	92.55	164,200	91.39
Renault	50	0.03	503	0.25	0	0.00	0	0.00	0	0.00
Suzuki	92	0.06	1	0.00	0	0.00	0	0.00	0	0.00
Subaru	28	0.02	0	0.00	0	0.00	0	0.00	0	0.00
Toyota	4,716	3.30	8,583	4.27	8,338	3.18	1,558	1.58	4,779	2.66
Volvo	530	0.37	2,023	1.01	2,027	0.77	587	0.59	645	0.36
Sub-total	143,034	100.00	201,060	100.00	261,831	100.00	98,868	100.00	179,668	100.00

Table 6.8 (continued)

Makes	1993		1995		1997		1998		1999	
	Unit	% Sub-total	Unit	% Sub-total	Unit	% Sub-total	Unit	% Sub-total	Unit	% Sub-total
					Commercial					
Daihatsu	4,975	14.24	4,754	8.33	2,089	2.35	-	0.00	457	1.56
Ford	2,920	8.36	3,668	6.43	7,496	8.42	1,198	10.35	3,007	10.25
Hino	1,535	4.39	1,866	3.27	2,232	2.51	40	0.35	276	0.94
Isuzu	3,611	10.34	9,169	16.07	13,690	15.38	1,404	12.13	2,013	6.86
Iveco Euro Cargo	-	0.00	5	0.00	29	0.00	81	0.00	2	0.00
Man	64	0.18	107	0.19	132	0.15	-	0.00	-	0.00
Mazda	1,149	3.29	2,128	3.73	2,467	2.77	222	1.92	341	1.16
Mercedes Benz	857	2.45	697	1.22	1,017	1.14	102	0.88	80	0.27
Mitsubishi	5,255	15.04	5,405	9.47	7,553	8.48	1,253	10.83	3,092	10.54
Nissan	3,873	11.09	10,146	17.78	19,925	22.38	1,656	14.31	7,144	24.35
Scania	5	0.01	81	0.14	366	0.41	31	0.27	95	0.32
Subaru	467	1.34	33	0.06	6	0.01	27	0.23	51	0.17
Suzuki	710	2.03	3,276	5.74	4,157	4.67	570	4.93	746	2.54
Tata	150	0.43	90	0.16	519	0.58	9	0.08	184	0.63
Toyota	8,772	25.11	13,750	24.10	21,390	24.03	4,000	34.57	9,187	31.32
Volvo	-	0.00	377	0.66	468	0.53	82	0.71	105	0.36
Kia Ceres	-	0.00	-	0.00	1,052	1.18	50	0.43	51	0.17
Hicom (MTB)	-	0.00	-	0.00	3,355	3.77	493	4.26		0.00
Perkasa (MTB)	-	0.00	-	0.00	-	0.00	-	0.00	2,271	0.00
4x4 WD**	539	1.54	1,378	2.42	966	1.09	197	1.70	185	0.63
Others	47	0.13	124	0.22	116	0.13	157	1.36	48	0.16
Sub-total	34,929	100.00	57,054	100.00	89,025	100.00	11,572	100.00	29,335	100.00

Note: * Including for export market

** Data on 4x4 WD vehicles are based on various makes, such as Chrysler Cherokee Jeep and Land Rover.

Source: Malaysian Automobile Association; Proton (unpublished data).

component-system industry is quite undeveloped. The industry is weak in its own structure. The local component industry is characterised by small-scale production and low-technology products (UNIDO 1991). Moreover, it is heavily dependent upon imported technology, particularly in design, engineering and R & D. Its trade balance is always negative; in 1996 its trade deficit was RM763.2 million (MITI 1997).

This industry is directly contingent upon the domestic automobile production industry. Its production increased dramatically during the economic boom at the end 1980s through the first half of the 1990s; but decreased unprecedentedly during the economic crisis in 1997, led by decrease in local demand. Between 1997-1998, the production of automobile component parts declined by almost 40 per cent due to the contraction in the production of passenger and commercial vehicles by 68.4 per cent during the same period (MITI 1999).

The proliferation of different makes, models and variants as well as an excess number of assembly plants competing for a small domestic market have hindered the development of local component-system manufacturers. Under the condition of diseconomies of scale, they are required to invest in new equipment (machine and tools) and most probably technology for every change in auto model. It is more costly and difficult when new process engineering, technical and technology have to be obtained from foreign firms. According to a recent study, about 70 per cent of the suppliers were dependent upon local market for their survival and most of them were also dependent on foreign technology (MITI, undated).

Due to slow progress of independent supplier firms in developing critical auto-parts and component manufacturing, the government requested the two national car makers - Proton and Perodua - to develop their own parts industry. Following Maeda (1998), Proton started casting in 1994 to internally produce crank shafts and flywheels. It also entered joint ventures with a number of companies of which it held at least 20 per cent of the total share of each of the joint venture firms.

These affiliated firms were to produce small and medium stamped parts, aluminum alloy cast wheels, intake manifolds, rubber molded parts, rubber hoses, hydraulic brake hoses, power steering hoses, fuel hoses, seat fabric, manual clutches, automatic transmission parts, cross members and rear suspension systems. Perodua started to produce cylinder heads and intake manifold in May 1996 and 14 large stamped parts in November 1997. Recently, the two automakers produced many more critical parts: engine, transmission, chassis and brake parts.

6.4 Sub-contracting Arrangements: Some Evidence from Three Automakers

Due to the request for confidentiality, the company names of the three automakers would not be exposed throughout this study volume. For analytical purposes, these firms are consistently referred to Automaker A, Automaker B and Automaker C in accordance with their relative contributions to the Malaysian automobile production and market share.

Although these sample firms were insignificant in number, they had special implications on the future development of the Malaysian automobile industry due to

several reasons. First, the two national automakers (Proton and Perodua) were incorporated into the sample. Second, the government attention on these three automakers was relatively high. Third, the majority shares of all the three automakers were owned by Malaysian investors. Fourth, Bumiputera shares (individual and institutional, particularly government-sponsored institutions, such as HICOM, Khazanah Holdings and Permodalan Nasional Berhad) were also significant in all the automakers' firms. Finally, their management were controlled by Malaysians. But technologically, the two automakers collaborated closely with Japanese firms, while the other had technical collaboration with French and Korean firms.

6.4.1 Profiles of the Automakers

As shown in Table 6.9, Automaker A was a public listed company, whilst both Automaker B and Automaker C were private limited companies. Automaker A specialised in the production of passenger cars, Automaker B manufactured passenger and commercial vehicles and Automaker C produced commercial vehicles. Detailing out core manufacturing activities of the three automakers, it shows that all the automakers did final assembly of automobiles and sub-assembly of auto parts and components as well as manufactured individual parts in-house. Automakers A and B did various types of manufacturing processes, including stamping, painting, casting, forging, plating and testing.

All the automakers also had own manufacturing plants to perform final assembly of automobiles and sub-assembly of parts and components as well as to make individual auto parts. Automakers A had two plants with four production lines to

Table 6.9
Profiles of the Automakers

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
1.	Legal status of companies	Public Listed	Private Limited	Private Limited
2.	Types of automobiles produced	Passenger Cars	Passenger and Commercial Vehicles	Commercial Vehicles
3.	Core activities of the company			
	Final assembly	Y	Y	Y
	Sub-assembly of individual parts or components	Y	Y	Y
	Individual auto parts manufacturing	Y	Y	Y
	Processing	Stamping, Painting, Casting, Forging, Plating, Testing	Stamping, Painting, Casting, Forging, Plating, Testing	n.a
4.	Own manufacturing plants			
	Final assembly	Y	Y	Y
	Sub-assembly of individual parts or components	Y	Y	Y
	Individual auto parts manufacturing	Y	Y	Y
5.	Number of plant(s) to perform auto assembly	2	1	1
6.	Number of production line(s)	4	4	3
7	Status of vendors under the company (per cent)			
	Affiliated firms	< 5	20	0
	Independent firms	> 95	80	100
8.	Adopting multi-tier system to coordinate sub-contractors	Y	N	N

Note: Y – Yes, N – No, n.a - Not Answered, Not Available or Not Applicable.

Source: Based on the reseacher's survey.

perform auto assembly, whilst Automaker B had one plant with four production lines and Automaker C owned one plant with three production lines.

Each automaker had vendors or sub-contractors to out-source auto parts. Most sub-contractors were independent firms, i.e. more than 95 per cent for Automaker A, 80 per cent for automaker B and 100 per cent for automaker C. Less than 5 per cent of the sub-contractors was affiliated firms to Automaker A; 20 per cent affiliated to Automaker B; and none of the firms was affiliated to Automaker C.[4]

Only Automaker A organised its sub-contractors into a multi-tier system as practised in Japan, but it was rather shallow because it merely involved two tiers against at least three tiers in the Japanese sub-contractings. Based on personal interview, Automaker A also organised its sub-contractors into a synchronised system because different models were assembled in the same production line. The sub-contractors of bulky parts (for instance, auto seats and doors) were given tight schedules to deliver the items at the right quantity and the right time. This method enabled the automaker to save space and the cost of keeping inventories.

6.4.2 A Governing Mechanism of the Sub-contractings

Table 6.10 displays the details of governing mechanism of the sub-contractings among the three automakers. All the three automakers had purchasing departments to do outsourcing, but their roles were slightly different from one automaker to another. The roles of purchasing departments in Automakers A and B were to purchase materials or components, to monitor, assess and select sub-contractors, to control number of sub-contractors in operation and to inspect incoming parts, whilst its roles in Automaker C

Table 6.10
A Governing Mechanism of the Sub-contractings Among Three Automakers

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
1.	Roles of purchasing department			
	To purchase materials/components	Y	Y	Y
	To monitor, assess and select vendors from time to time	Y	Y	Y
	To control number of vendors in operation	Y	Y	N
	To inspect incoming parts	Y	Y	N
2.	Classifications of auto parts by purchasing department for out-sourcing			
	General purchasing/components (can buy from any vendor)	N	Y	Y
	Special purchasing (can buy from certain vendors)	Y	Y	N
	Specialty factory purchasing (can buy from special vendors only)	Y	N	N
3.	Types of support given to sub-contractors			
	Equity/Shares (at least in a few sub-cons)	Y	Y	n.a
	Directorship/Management	Y	Y	n.a
	Technical/Engineering	Y	Y	n.a
	Loans/Finance	N	N	n.a
	R&D facilities	Y	Y	n.a
	Consultants/Advisors	Y	Y	n.a
	Information Sharing	Y	Y	n.a

Table 6.10 (continued)

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
4.	Communication with sub-contractors in lieu of auto parts production			
	Price	Unilateral (Buyer to vendors)	Bilateral	Bilateral
	Quality	Unilateral (Buyer to vendors)	Unilateral (Buyer to vendors)	Bilateral
	Quantity	Bilateral	Unilateral (Buyer to vendors)	Bilateral
	Delivery	Bilateral	Unilateral (Buyer to vendors)	Bilateral
	Design/Specification	Bilateral	Unilateral (Buyer to vendors)	Bilateral
	Manufacturing Process	Bilateral	Unilateral (Buyer to vendors)	Unilateral (Vendors to buyer)
	Materials Composition	Bilateral	Unilateral (Buyer to vendors)	Bilateral
5.	Standardisation System and Quality Management in Coordinating Production System			
	Legal contract	Y	Y	Y
	ISO/MS 9000	Y	Y	Y
	Total Quality Management (TQM)	Y	Y	N
	Total Quality Control (TQC)	Y	Y	Y
	Bonus-penalty system for delivery	Y	Y	N
	Payment schedule	Y	Y	N
	Regular visits to subcontractors' plants	Y	Y	Y
	Consultations in managerial skills	Y	Y	N
	Regular meetings	Y	Y	Y

Table 6.10 (continued)

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
	Specific grading system for subcontractors	Y	Y	N
	Just-in-Time Delivery (JIT)	Y	Y	N
	Statistical Production Control (SPC)	Y	Y	Y
6.	Specified Items in Legal Contract			
	Price of parts	Y	Y	Y
	Quantity parts supplied	Y	Y	Y
	Quality of parts	Y	Y	Y
	Delivery of parts	Y	Y	Y
	Bonus for on-time delivery of parts	N	Y	N
	Penalty for late delivery of parts	N	Y	N
	Penalty for parts defects	Y	Y	N
	Subcontractor's obligation with automakers	N	Y	Y
7.	Sub-contractors' involvement in product development stages (at least certain vendors)			
	Study of new auto concept	Y	Y	N
	Developing basic concept	Y	Y	N
	Determining detailed desing/specification	Y	Y	Y
	Preparing first blueprints	Y	Y	N
	Completion of first trial automobile	Y	Y	Y
	Pilot production	Y	Y	Y
	Testing	Y	Y	Y
8.	Grading System to Grade Vendors in			
	Price of parts	N	Y	N
	Quality of parts	Y	Y	Y
	Engineering/System	Y	Y	N
	Precision (accurate specification)	N	Y	N

Table 6.10 (continued)

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
	Delivery Time	Y	Y	Y
9.	Quantified time orders for parts			
	Functional/specialised parts	One monthly	Three monthly	Three monthly
	General/standard parts	One monthly	Three monthly	One monthly
10.	Delivery frequencies for parts			
	Body	Hourly	Weekly	Weekly
	Engine & Emission	Hourly	n.a	Weekly
	Chassis & Brake	Daily	Monthly	Weekly
	Transmission, Steering & Clutch	Daily	Monthly	Weekly
	Electrical & Electronics	Daily	Monthly	Weekly
	Standard Parts	Daily	Weekly	Weekly
11.	Allowing for price adjustments in the future bidding due to unavoidable factors			
	Functional/specialised parts	n.a	Y	Y
	General/standard parts	n.a	Y	Y
12.	Types of price/cost items allowed for adjustments			
	Materials	n.a	Y	Y
	Tooling costs	n.a	Y	Y
	Gross margin (overhead + a profit margin)	n.a	N	N
	Direct manufacturing costs (e.g. energy, labour)	n.a	Y	N
	Costs of purchased parts/systems from other vendors	n.a	N	Y
13.	Rooms for rectifying default in parts supplied			
	Quantity (as scheduled)	Y	Y	Y
	Quality (as specified)	Y	Y	Y
	Delivery (as scheduled)	Y	Y	Y

Table 6.10 (continued)

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
14.	Aspects done for rectification of defaults			
	Giving the vendors an adjustment period	Y	Y	Y
	Sending technical expertise to vendors' plants	Y	Y	Y
	Providing advisory/consultancy services	Y	Y	Y
15.	Levels of strength of the following factors in governing and binding buyer-supplier networks			
	Contract (legal)	Very Strong	Strong	Strong
	Price & Quality Assurance	Strong	Strong	Very Strong
	Institution e.g. trade associations	Strong	Strong	Strong
	Government role (Power)	Strong	Strong	No Influence
	Trust (based on vendor's track records)	Weak	Strong	Strong
	Culture (social norms, obligation, religion, language, loyalty, ethics etc)	Weak	Strong	Very Weak

Note: Y - Yes, N - No, n.a - Not Answered, Not Available or Not Applicable.

Source: Based on the researcher's survey.

confined to the first two roles, i.e. to purchase materials or components and to monitor, assess and select sub-contractors.

For outsourcing, the purchasing department in Automaker A classified auto parts into special purchasing and specialty factory purchasing; Automaker B classified them into general purchasing and special purchasing; whilst Automaker C classified them into general purchasing only.

Except for Automaker C which did not provide the answers, the other two automakers had given certain support to their sub-contractors. Automakers A and B supported their sub-contractors (but to selected sub-contractors only) by holding equities in sub-contracting firms, assisting in directorship and management, sending technical or engineering as well as consultancy or advisory services and sharing information related to the automobile industry and parts production. Nevertheless, they did not provide any loan facility to their sub-contractors.

The three automakers had special communication in dealing with their sub-contractors in production aspects. Except for price which was determined bilaterally, Automakers B tended to source to authority in dealing with their sub-contractors due to its preference for unilateral (top-down) communication in determining quality, quantity, delivery, design or specification and materials composition of auto parts as well as manufacturing process of sub-contractors.

Except for price and quality of parts which were determined unilaterally (top-down), Automakers A preferred to horizontal (bilateral or mutual) communication in deciding quantity, delivery, design or specification and materials composition of auto parts as well as manufacturing process of sub-contractors. Automaker C also preferred

bilateral communication in determining price, quality, quantity, delivery, design or specification and materials composition of auto parts; but preferred unilateral (bottom-up) communication in deciding manufacturing process of sub-contractors.

Automakers A and B were advanced in terms of the standardisation system and quality management being practised in coordinating its auto production system. These two automakers had or practised legal contract, ISO/MS 9000, TQM, TQC, bonus-penalty system for parts delivery, payment schedule, regular visits to sub-contractors' plants, consultations in managerial skills, regular meetings with sub-contractors, specific grading system for sub-contractors, JIT and SPC in coordinating their auto production systems. Automaker C merely had or practised a few coordination elements, such as legal contract, ISO/MS 9000, TQC, regular visits to sub-contractors' plants, regular meetings with sub-contractors and SPC (see Table 6.10 for acronyms).

Comparing between the three automakers, Automaker B was more particular about dealings with sub-contractors when it detailed out its legal contracts to cover all items listed in Table 6.10 (item no. 6). Automaker A specified only certain items, such as price of parts, quantity of parts supplied, quality of parts, delivery of parts and penalty for parts defects in its legal contracts; whilst Automaker C set items, such as as price of parts, quantity of parts supplied, quality of parts, delivery of parts and sub-contractors' obligation with automakers in its legal contracts.

All the three automakers made their sub-contractors involved (at least certain vendors) in their product development stages. Automakers A and B made their sub-contractors involved in all product development stages as listed in Table 6.10 (item no. 7), whilst Automaker C brought in their sub-contractors to be involved in several

product development stages, such as developing basic concept, completion of first trial automobile, pilot production and testing of automobiles.

Grading system was also practised by the three automakers to rank their sub-contractors into core or periphery sub-contractors. Automaker A graded sub-contractors based on quality, engineering or system, and delivery time of parts; Automaker B graded them based on price, quality, engineering or system, precision (accurate specification), and delivery time of parts; whilst Automaker C graded them based on quality and delivery time of parts.

To ensure efficiency of their auto production system, the three automakers had quantified order times for auto parts which were divided into functional and general parts. Order times for functional parts for Automaker A, Automaker B and Automaker C were one monthly, three monthly and three monthly respectively. For general parts, order times for respective automakers were one monthly, three monthly and one monthly.

Delivery frequencies for auto parts varied from one automaker to another and that of one auto parts to another. For Automaker A, its delivery frequencies for body and engine and emission parts were hourly; but daily for chassis and brake, transmission, steering and clutch, electrical and electronics and standard parts. Delivery frequencies for Automakers B and C were rather loose. For Automaker B, its delivery frequencies for body and standard parts were weekly, and for chassis and brake, transmission, steering and clutch, and electrical and electronics parts were monthly. All deliveries of auto parts for Automaker C were made weekly.

Except for Automaker A which did not provide its answers, Automaker B and C allowed their sub-contractors to adjust prices of functional and general parts in the future bidding due to unavoidable factors. Automaker B allowed its sub-contractors to adjust several price or cost items, such as material and tooling costs as well as direct manufacturing costs (e.g. energy and labour costs); and Automaker C allowed adjustments for material and tooling costs and the costs for buying products from other sub-contractors.

Furthermore, all the automakers provided room for their sub-contractors to rectify any default in parts supply (quality, quantity and delivery time). In this connection, all the automakers gave the sub-contractors an adjustment period, sent technical expertise to sub-contractors' plants and provided advisory or consultancy services (see Table 6.10).

All the automakers admitted that economic and social capital factors played their distinctive roles in the governing and binding of buyer-supplier networks (network relations between automakers and their sub-contractors). These automakers ranked the levels of strength of certain variables in the networks. To all the automakers, economic factors, such as contract, price and quality assurance and institution, were either strong or very strong in binding their network relations with sub-contractors.

However, their feeling about social capital influences on buyer-supplier networks were different from one automaker to another. To Automakers A and B, government's role (power) was strong in governing network relations; but this had no influence to Automaker C. To Automakers B and C, trust was strong in binding the networks; but it was weak to Automaker A. Culture was a strong factor to Automaker B

in binding the networks; but it was weak to Automaker A and very weak to Automaker C. By and large, social capital was not as strong as economic factors in governing or binding network relations between the automakers and their sub-contractors.

6.4.3 Auto-Parts Production and Sourcing

All the three automakers sourced auto parts from both in-house production and external firms. The difference between them was merely in the degree of their involvement in the two points of parts sourcing.

Table 6.11 and Table 6.12 provide the details of auto parts production and sourcing among the three automakers. All the automakers produced several individual auto parts in-house. In this respect, Automaker A made door, hood, fender and front deck; Automaker B manufactured hood, back door, under body, fender, intake manifold, exhaust manifold, camshaft, cylinder block, cylinder head, flywheel and chassis frame; and Automaker C made partitions, reinforcement bars, power steering and cooling tubes. This means that Automaker B tended to make parts in-house than Automakers A and C.

Besides making individual auto parts in-house, all the automakers performed sub-assemblies for auto components, such as body, engine and emission, chassis and brake, and transmission, steering and clutch. There were no answers provided for electrical and electronics and standard parts assemblies because these components were either assembled by their sub-contractors or imported. This proposition is reflected in Table 6.12 in which local outsourcing for electrical and electronics parts was substantial. For standard parts, local outsourcing and imports for these items were sizeable.

Table 6.11
In-House Production and Outsourcing for Auto Parts and Components

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
1.	Auto parts made in-house	Door, hood, fender, front deck	Hood, back door, under body, fender, intake manifold, exhaust manifold, camshaft, cylinder block, cylinder head, flywheel, chassis frame	Partitions, reinforcement bars, power steering, cooling tubes
2.	Auto components assembled in-house			
	Body	Y	Y	Y
	Engine & Emission	Y	Y	Y
	Chassis & Brake	Y	Y	Y
	Transmission, Steering & Clutch	Y	Y	Y
	Electrical & Electronics	n.a	n.a	n.a
	Standard Parts	n.a	n.a	n.a
3.	Reasons for making auto parts/performing sub-assembly in-house			
	Specialised parts	Y	Y	Y
	Cheaper to produce in-house	Y	Y	Y
	No vendors to produce the parts	n.a	n.a	n.a
	Other reasons (high technology items, to achieve higher local content points)	Y	n.a	Y
4.	Methods used to classify auto parts for outsourcing	By materials composition	By materials composition & particular types of parts	By particular types of parts
5.	Proportion of in- & out-sourcing based on total manufacturing costs of auto parts (%)			
	In-house making	n.a	75% (Passengers), 20% (Commercial)	1%
	Out-sourcing	n.a	25% (Passengers: 5% locals, 20% imports); 80% (Commercials: 5% locals, 75% imports)	99% (25% locals, 74% imports)

Table 6.11 (continued)

No.	Variants	Automakers		
		Automaker A	Automaker B	Automaker C
6.	Reasons for outsourcing			
	Specialist technology	Y	Y	Y
	Buffer against fluctuations	n.a	Y	Y
	Wage differential	n.a	Y	n.a
	Risk dispersion	n.a	Y	n.a
	Cheaper cost control	Y	Y	Y
	Division of labour	n.a	Y	n.a
	Work/task specialisation	Y	Y	n.a
	Experience and skills	Y	Y	Y
7.	Criteria for selecting subcontractors			
	Open tender	Y	Y	n.a
	Cost estimates to produce future parts	Y	Y	Y
	Government recommendation	n.a	Y	n.a
	Experience and skills	Y	Y	Y
	Manufacturing capacities and facilities	Y	Y	Y
	Technological capabilities	Y	Y	n.a
	Trust (reliability)	Y	Y	n.a
	Other (quality, delivery, development)	Y	n.a	n.a
8.	Chances for the existing subcontractors to be selected again in the next auto-model	Quite high	Quite high	High

Note: Y – Yes, n.a - Not Answered, Not Available or Not Applicable.

Source: Based on the researcher's survey.

Table 6.12
Out-Sourcing for Auto Parts

No.	Variants	Automakers											
		Automaker A				Automaker B				Automaker C			
		Passengers		Commercials		Passengers		Commercials		Passengers		Commercials	
		L	M	L	M	L	M	L	M	L	M	L	M
1.	Percentage value of outsourcing to total purchases of parts/components*												
	Body	> 90	< 10	n.a		80	20	0	100	n.a	n.a	0	100
	Engine & Emission	< 30	> 70	n.a		10	90	0	100	n.a	n.a	0	100
	Chassis & Brake	> 70	< 30	n.a		10	90	0	100	n.a	n.a	20	80
	Transmission, Steering & Clutch	< 30	> 70	n.a		10	90	0	100	n.a	n.a	10	90
	Electrical & Electronics	> 95	< 5	n.a		100	0	100	0	n.a	n.a	90	10
	Standard Parts	50	50	n.a		80	20	80	20	n.a	n.a	50	50

Note: Y - Yes, n.a - Not Answered, Not Available or Not Applicable, L – local outsourcing, M – Import.
* Total is 100 per cent.
Source: Based on the researcher's survey.

Automakers had their own reasons for making auto parts and doing sub-assembly in-house. All the automakers admitted that in-house production for certain parts was essential because these were specialised parts and were cheaper if made in-house. Two automakers provided other reasons for doing in-house production: Automaker A conceded that in-house production was important for high technology items; whilst Automaker C did in-house production in order to secure higher local content points.

With respect to out-sourcing, automakers classified auto parts into two broad categories, either based on materials composition, such as rubber, plastics, metal, electrical and electronics (Automaker A), or based on particular types of parts, such as body, engine and emission and chassis and brake and so on (Automaker C). Only Automaker B used both methods to classify auto parts for out-sourcing.

There was a certain proportion for every automaker to source auto parts, either in-house or externally. Automaker A did not provide the proportion, but Automaker B and Automaker C did. Since Automaker B produced passenger and commercial vehicles, the proportions were rather different. In the production of passenger cars, Automaker B was more dependent on in-house production. This is evident when it sourced 75 per cent of its auto parts (calculated based on total manufacturing costs of parts) from in-house production and 25 per cent from external firms (5 per cent from local sub-contractors and 20 per cent from import).

In contrast, Automaker B was more dependent on out-sourcing in the production of commercial vehicles. Based on Table 6.11, 20 per cent of auto parts was sourced in-house against 80 per cent was outsourced from external firms (5 per cent from local sub-contractors and 75 per cent from imports). Automaker C was also heavily

contingent upon external firms to produce commercial vehicles: producing only one per cent of its auto parts requirements (calculated based on total manufacturing costs of parts), while the remaining 99 per cent was outsourced from external firms, i.e. 25 per cent from local sub-contractors and 74 per cent from imports.

Percentage values of outsourcing for auto parts and components were mixed from one component and one automaker to another. As displayed in Table 6.12, Automaker A sourced a large majority of its body (more than 90 per cent), chassis and brake (more than 70 per cent), and electrical and electronics (more than 95 per cent) components from local sub-contractors; whilst its engine and emission (more than 70 per cent) as well as transmission, steering and clutch (more than 70 per cent) parts from imports.

In the production of passenger cars, Automaker B sourced a large amount of its body (80 per cent), electrical and electronics (100 per cent) and standard parts (80 per cent) from local sub-contractors. However, its engine and emission, chassis and brake, and transmission, steering and clutch parts were substantially imported. For the production of commercial vehicles, Automaker B had to depend totally on import sources (100 per cent) to obtain body, engine and emission, chassis and brake, and transmission, steering and clutch parts. However, electrical and electronics as well as standard parts were mostly outsourced from local sub-contractors, i.e. 100 per cent and 80 per cent respectively.

Automaker C also had to depend heavily on imported parts to produce commercial vehicles. Body as well as engine and emission parts were 100 per cent imported. Chassis and brake as well as transmission, steering and clutch parts were 80 per cent and 90 per cent imported respectively. Nonetheless, 90 per cent and 50 per cent

of its total purchases of electrical and electronics and standard parts were outsourced from local sub-contractors respectively.

The percentages shown in Table 6.12 are more reflective of net local content of the Malaysian automobile industry because they show low levels of average value of local sourcing for critical or functional parts. Obviously, all the automakers tended to import higher value-added (surely higher prices) functional parts: namely engine and emission; chassis and brake (with little exception for Automaker B); and transmission, steering and clutch.

This finding may be applicable to all automakers in Malaysia. The net local content of functional components is low, because materials and sub-parts for making them were substantially imported. The imported sub-parts in engine were rocker arm, cylinder head, delivery pipe, connecting rod, thermostat, insulator, valve, piston ring and o-ring, exhaust manifold cover, connecting bearing, injector and drain bolt (MITI 1996).

Another study conducted by MITI also found similar results in which the net local content for auto production in Malaysia ranged from as low as 11.1 per cent for commercial vehicles to as high as 47.5 per cent for passenger vehicles (MITI 1999). This was relatively much lower than that of reported gross local content which achieved as high as 75.5 per cent for passenger vehicles due to the fact that import value of critical components outstripped the value of locally-made non-critical components. Following MITI (1997), the import value of CKD kits (mostly imported from principal automakers in the home countries) in 1996 was RM956.1 million, or 13.1 per cent of the overall import value of automobile products (excluding motorcycles and cycles).

Referring to Table 6.11, the three automakers did outsourcing (turning to sub-contractors) because of several reasons. All the reasons were based on economic calculations. Except for Automaker B that cited all the proposed reasons as in Table 6.11 (item no. 6), Automaker A and Automaker C did outsourcing because of some selected reasons. Automaker A did outsourcing because of specialist technology, cheaper cost control, work or task specialisation and experience and skills of sub-contractors, whilst Automaker C made outsourcing because of specialist technology, buffer against fluctuation, cheaper cost control and experience and skills of sub-contractors.

In the selection of sub-contractors, all the automakers identified some criteria which were mainly based on economic calculations. Some social capital factors (government recommendation and trust, i.e. reliability based on track record) played their roles too. The involvement of auto-parts manufacturers in the sub-contracting arrangements through government recommendations is true under the Vendor Development Programme (VDP) organised by the Ministry of Entrepreneur Development.

Automaker A listed open tender, cost estimates to produce future parts, experience and skills, manufacturing capacities and facilities, technological capacities, trust (reliability) and other criteria (quality, delivery punctuality and development) on the part of sub-contractors as important criteria to select sub-contractors. Automaker B cited nearly all criteria as listed in Table 6.11 (item no. 7) to select sub-contractors. Automaker C listed cost estimates to produce future parts, experience and skills and

manufacturing capacities and facilities among sub-contractors as main criteria to select sub-contractors.

Table 6.11 also shows the chances for the existing sub-contractors to be reselected again in the next models of automobiles. All the automakers admitted that the chances were, either quite high, or high for the existing sub-contractors to be reselected in the next round of auto production. This is definitely true for the case of sub-contractors that had a high degree of economic capabilities and trustworthiness (based on the past reliability spelled out in the contracts).

6.5 Sub-contracting Arrangements: Evidence from Auto Subcontracting Firms

A detailed investigation into auto sub-contracting firms (sub-contractors) provides a clearer picture about the patterns, trends and performances of Malaysian auto sub-contracting arrangements; and hence the present position of this arrangement. In this connection, the following sub-sections highlight profiles of the sub-contractors, demonstrates factors that influence supplier-buyer networks in specific sub-contracting arrangements and elaborates factors that influence the patterns, trends and performances of auto parts production and specialisation and auto parts market.

6.5.1 Profiles of the Sub-contractors

This sub-section discusses in detail the profiles of the auto sub-contractors pertinent to their plants location, firm size, firm ownership, technical collaborators, auto parts production and auto parts market.

6.5.1.1 Plants Location

Table 6.13 shows that 72.9 per cent of the sub-contractors was located in Selangor, 7.2 per cent in Kuala Lumpur, 6.1 per cent in Penang and 5.0 per cent in Negeri Sembilan. The rest was scattered in some other states, particularly in West Coast of Peninsular Malaysia. In Selangor, the districts which had a significant portion of the sub-contractors were Shah Alam (28.3 per cent), Klang (15.8 per cent) and Petaling Jaya (10 per cent).

The sub-contractors preferred to locate their plants in the central region (Kelang Valley) because of two reasons. First, most of their buyers, mainly automakers were situated in this region. Following the information provided by MIDA, about 70 per cent of the total number of automakers (nine out of thirteen automakers) was operating here. Of the total, five automakers were operating in Shah Alam, Selangor; one in Petaling Jaya, Selangor; one in Serendah, Selangor; one in Kelang, Selangor; and one in Segambut, Kuala Lumpur. Second, industrial estates (Free Trade Zones and Licensing Manufacturing Warehouses) were well-established in this region, particularly in Shah Alam, Kelang, Petaling Jaya, and Kuala Lumpur.

6.5.1.2 Firm Size

Most of the sub-contractors were relatively large in their size. As shown in Table 6.14, irrespective of whatever definition is adopted, at least half of the sub-contractors were in the large size category. The small sub-contractors constituted a smaller portion from the total number of the sub-contractors, whilst the remaining was of the medium sub-contractors.

Table 6.13
Plants Location of the Sub-contractors

Variables	Number	Percentage
Spatial Distribution by States	**181**	**100.0**
Selangor	132	72.9
Kuala Lumpur	13	7.2
Penang	11	6.1
Negeri Sembilan	9	5.0
Perak	4	2.2
Johore	4	2.2
Malacca	3	1.7
Terengganu	3	1.7
Kedah	2	1.1
Spatial Distribution by District[1]	**95**	**100.0**
Shah Alam, Selangor	34	28.3
Klang (including Port Klang), Selangor	19	15.8
Petaling Jaya, Selangor	12	10.0
Sungai Buloh, Selangor	5	4.2
Nilai, Negri Sembilan	5	4.2
Bangi, Selangor	4	3.3
Prai, Penang	4	3.3
Batu Caves, Selangor	3	2.5
Kuala Langat, Selangor	3	2.5
Seri Kembangan, Selangor	3	2.5
Cheras, Kuala Lumpur	3	2.5

Note: - [1] Only the districts that had a significant number of sub-contracting firms are shown in the table.
- Figures in bold are total number or percentage of each variable.

Source: Based on the sample survey.

Table 6.14
Firm Size and Ownership of the Sub-contractors

No.	Variables	Number	Percentage
1.	Firm Size		
	By number of employees	**121**	**100.0**
	Small	18	14.9
	Medium	37	30.6
	Large	66	54.5
	By annual turnover	**122**	**100.0**
	Small	28	24.6
	Medium	29	25.4
	Large	57	50.0
	By paid-up capital	120	100.0
	Small	9	7.5
	Medium	40	33.3
	Large	71	59.2
2.	Firm Ownership		
	By Ethnic Groups	106	100.0
	Fully owned by Bumiputera (100% equity)	27	25.5
	Fully owned by Non-Bumiputera (100% equity)	6	5.7
	Fully owned by foreigners	10	9.4
	Joint-venture companies#	63	59.4
	By Ethnic Groups (individual majority shareholdings)	**106**	**100.0**
	Bumiputera	54	50.9
	Non-Bumiputera	27	25.5
	Foreigners	25	23.6
	By Nationality (collective majority shareholdings)	**106**	**100.0**
	Local	85	80.2
	Foreign	21	19.8
3.	Ownership with or without Foreign Shareholdings	**106**	**100.0**
	Firms without foreign shareholdings (0% equity)	60	56.6
	Firms with foreign shareholdings (up to 100% equity)	46	43.4

Note: - # A joint-venture company refers to a firm which is owned by more than one party. This joint venture may involve either Bumiputera and Non-Bumiputera locals or locals and foreigners.
- Figures in bold are total number or percentage of each variable.

Source: Based on the sample survey.

Judging from the paid-up capital, the parts industry is strictly capital intensive when 59.2 per cent and 33.3 per cent of the sub-contractors belonged to the large and medium size category respectively. The small sub-contractors formed only 7.5 per cent of the total number of the sub-contractors.

6.5.1.3 Firm Ownership

Table 6.14 demonstrates that most of the sub-contractors were joint-venture companies, i.e. 59.4 per cent of the total number of the sub-contractors. The remaining was owned by many types of entrepreneurs: 27 sub-contracting firms or 25.5 per cent of the firms were fully owned by Bumiputera; 6 or 5.7 per cent of the firms were fully owned by local non-Bumiputera; and 10 or 9.4 per cent of the firms were fully owned by foreigners.

Based on individual majority shareholdings, a large proportion of the sub-contracting firms belonged to Bumiputera (54 or 50.9 per cent of the sub-contractors). Quite strikingly, foreigners had significant shareholdings in many sub-contracting firms (in 25 or 23.6 per cent of the firms) which were nearly equivalent to non-Bumiputera ownership (having shareholdings in 27 or 25.5 per cent of the firms).

With regard to collective majority shareholdings, local entrepreneurs held majority shares in a large number of the sub-contracting firms (in 85 firms or 80.2 per cent of the firms). Foreign entrepreneurs held majority shares in 21 or 19.8 per cent of the sub-contracting firms. Thus, by and large, the sub-contracting firms were mostly owned by local entrepreneurs.

Firms ownership can also be identified based on foreign equity participation in a firm. As shown in Table 6.14, the sub-contracting firms without foreign ownership totaled to 56.6 per cent; whilst the ones with foreign equity participation amounted to 43.4 per cent of the total sub-contractors.

6.5.1.4 Technical Collaborators

As shown in Table 6.15 the sub-contractors obtained technical support from various sources. However, Japanese firms were the major technical collaborators to the sub-contractors, i.e. 49 or 53.8 per cent of the sub-contractors had access to this technical source.

The remaining 42 or 46.2 per cent of the sub-contractors obtained technical collaboration from various sources across the countries, i.e. a mixed combination of Japanese and European firms and/or local institutions, as for instance, SIRIM and Rubber Research Institute of Malaysia (RRIM).

6.5.1.5 Auto Parts Production

Table 6.15 reveals the patterns, trends and performances of auto parts production of the sub-contractors. Most of the sub-contractors have diversified their auto-parts production; more than 57 per cent of the sub-contractors produced more than two individual parts. A majority of the sub-contractors confined their production activities to individual parts making (a simpler level of parts making in the automobile industry), i.e. 72 or 59.5 per cent of the sub-contractors compared with 49 or 40.5

Table 6.15
Production Aspects of the Sub-contractors

No.	Variables	No.	Percentage
1.	Technical collaborators	**91**	**100.0**
	Japanese firms	49	53.8
	Mixed and other sources	42	46.2
2.	Number of auto-parts produced per firm	**122**	**100.0**
	1-2 parts	52	42.6
	3-5 parts	34	27.9
	> 5 parts	36	29.5
3.	Levels of parts making	**121**	**100.0**
	Individual parts making	72	59.5
	Individual parts making and sub-assembly	49	40.5
4.	Types of auto parts produced	**122**	**100.0**
	Functional	24	19.7
	General	55	45.1
	Mixed (Functional and General)	43	35.2
5.	Manufacturers Status	**102**	**100.0**
	Original Equipment Manufacturers (OEM)	60	58.8
	Own Design Manufacturers (ODM)	18	17.6
	Mixed (OEM & ODM) depend on parts types	24	23.5
6.	Sub-contractors' position in supply chain	**103**	**100.0**
	First-tier sub-contractors	75	72.8
	Second-tier sub-contractors	28	27.2
7.	Integrating with automaker's JIT system	**103**	**100.0**
	Yes	72	69.9
	No	31	30.1

Table 6.15 (continued)

No.	Variables	No.	Percentage
8.	Having legal contract with automakers	**103**	**100.0**
	Yes	98	95.1
	No	5	4.9
9.	Getting equity participation from automakers	**103**	**100.0**
	Yes	3	2.9
	No	100	97.1
10.	Obtaining directorship/management support from automakers	**101**	**100.0**
	Yes	7	6.9
	No	94	93.1
11.	Getting technical support from automakers	**103**	**100.0**
	Yes	31	30.1
	No	72	69.9
12.	Obtaining financial support from automakers	**101**	**100.0**
	Yes	3	3.0
	No	98	97.0
13.	Getting R&D facilities from automakers	**103**	**100.0**
	Yes	23	22.3
	No	80	77.7
14.	Receiving consultancy support from automakers	**103**	**100.0**
	Yes	37	35.9
	No	66	64.1
15.	Sharing information with automakers	**103**	**100.0**
	Yes	102	99.0
	No	1	1.0

Table 6.15 (continued)

No.	Variables	No.	Percentage
16.	Awarded with ISO/MS 9000	**102**	**100.0**
	Yes	71	69.6
	No	31	30.4
17.	Dealing in price, quantity, quality and delivery of auto parts	**103**	**100.0**
	Direct with automakers	86	83.5
	Indirect with automakers (e.g through other sub-contractors)	17	16.5
18.	Communication in determining price, quantity, quality and delivery of auto parts	**101**	**100.0**
	Vertical (determined by automakers)	19	18.8
	Horizontal (mutually determined)	81	80.2
	Both vertical and horizontal	1	1.0

Note: - Figures in bold are total number or percentage of each variable.

Source: Based on the sample survey.

per cent of the sub-contractors which involved in both individual parts making and sub-assemblies of auto parts.

Unfortunately, there was an insignificant number of the sub-contractors involved in the manufactures of functional parts, such as engine and emission, chassis and brake, and transmission, steering and clutch. Most of them tended to make general or standard parts, the parts that were least strategic in auto making. A total of 24 or 19.7 per cent of the sub-contractors manufactured functional parts against 55 or 45.1 per cent of the sub-contractors who made general parts, such as body and standard parts. There were 43 or 35.2 per cent of the sub-contractors diversified their production into making a mixed product, i.e. functional and general parts.

A general tendency to produce general parts than functional parts is rather easy to understand due to the fact the Malaysian automobile industry is dominated by foreigners, at least technologically. Hence these foreign partners prefer to import functional parts from their home countries than make locally. At the same time, they encourage local-operated sub-contractors to make general parts. By doing so, they would be able to ensure low levels of technology and knowledge transfer in auto making and to mitigate the impact of potential competition from foreign countries, such as Malaysia, on their own industry in the home country.

A majority of the sub-contractors were original equipment manufacturers (OEMs) in which they made auto parts based on designs developed by automakers or foreign collaborators. From a total number of 102 sub-contractors, 58.8 per cent was OEMs, 17.6 per cent was own design manufacturers (ODMs) and 23.5 per cent was both OEMs and ODMs.

Referring to the network relations in auto parts production with Proton, 75 or 72.8 per cent of the sub-contractors identified themselves as first-tier vendors and the rest (28 or 27.2 per cent of the sub-contractors) was second-tier vendors (Table 6.15, No. 6). This means that the sub-contractors in the Malaysian automobile industry were highly concentrated in top layer compared with the Japanese in which its sub-contractors were spread out toward the bottom lines of the supply chain.

There are certain trends in the coordination or governing mechanism in auto parts production between the sub-contractors and automakers. As displayed in Table 6.15, a large majority of the sub-contractors had legal contracts (95.1 per cent) and shared information (99.0 per cent) with automakers in dealing with auto parts production and transactions. A rather large number of the sub-contractors received support from automakers: 30.1 per cent received technical support, 22.3 per cent acquired R&D facilities, and 35.9 per cent obtained consultancy assistance. In contrast, an extreme minority of the sub-contractors obtained equity participation (2.9 per cent), directorship or management support (6.9 per cent) and financial support (3.0 per cent) from automakers.

A large majority of the sub-contractors achieved an outstanding performance in auto parts production when they were awarded with quality certifications, i.e. ISO/MS 9000 (69.6 per cent of the sub-contractors). A significant proportion of the sub-contractors dealt directly with the automakers pertinent to price, quantity, quality, and delivery of auto parts. In this regard, 83.5 per cent of the sub-contractors dealt directly with automakers, whilst 16.5 per cent of the sub-contractors dealt indirectly with automakers (e.g. through other sub-contractors). From the communication perspective, a large majority (80.2 per cent) of the sub-contractors admitted that they had horizontal

communication (mutual negotiation) with automakers in the determination of price, quantity, quality and delivery of auto parts; 18.8 per cent had vertical communication (top-down determination) and 1.0 per cent had both types of communication.

6.5.1.6 Auto Parts Market

Table 6.16 unveils the patterns, trends and performances of auto parts markets of the sub-contractors. A large portion of the sub-contractors sold their auto parts to local market, i.e. 82.8 per cent of the sub-contractors sold their products to this national market. Only 21 or 17.2 per cent of the sub-contractors were able to diversify their markets by selling their products to both local and export markets.

Focusing on local market, a majority of the sub-contractors (69 or 56.6 per cent) was able to diversify their parts market to various manufacturing industries, i.e. to automobile and non-automobile industries. The remaining 53 or 43.4 per cent of the sub-contractors confined their parts sale to the automobile industry.

In the automobile industry, a large proportion of the sub-contractors (84 or 69.4 per cent) sold their parts to a wider market, i.e. to automakers and other auto sub-contractors. The rest (37 or 30.6 per cent of the sub-contractors) marketed their parts to automakers only. A majority of the sub-contractors (73 or 59.8 per cent) sold their parts to more than five automakers. Only 8 or 6.6 per cent of the sub-contractors sold their products to less than three (1-2) automakers. Combining these figures, it could be seen that 49 or 40.2 per cent of the sub-contractors marketed their products to less than five automaker buyers.

Table 6.16
Marketing Aspects of the Sub-contractors

No.	Variables	No.	Percentage
1.	Broad auto parts markets	**122**	**100.0**
	Local	101	82.8
	Local and export	21	17.2
2.	Local parts market in the manufacturing industry	**122**	**100.0**
	Automobile industry	53	43.4
	Automobile and non-automobile industries	69	56.6
3.	Local parts market in the automobile industry	**121**	**100.0**
	Automakers	37	30.6
	Automakers and other auto sub-contractors	84	69.4
4.	Number of automaker buyers		
	1-2 buyers	8	6.6
	3-5 buyers	42	33.6
	> 5 buyers	73	59.8
5.	Number of automaker buyers (combined)	**122**	**100.0**
	Not more than 5 buyers	49	40.2
	More than 5 buyers	73	59.8
6.	Local parts market for automakers	**121**	**100.0**
	National	38	31.4
	National and non-national	83	68.6

Note: - Figures in bold are total number or percentage of each variable.

Source: Based on the sample survey.

Most of the sub-contractors sold their auto parts to both national and non-national automakers. A total of 83 or 68.6 per cent of the sub-contractors sold their parts to this market. The remaining 38 or 31.4 per cent of the sub-contractors marketed their products to national automakers only. A small domestic market for automobiles has forced the sub-contractors to diversify their markets by relying not only on the national automakers but also on non-national automakers.

Due to the fact that foreign sub-contractors have more experience, skill, technology, and market connections to produce auto parts, these sub-contractors would have more chances to sell their products to a wider range of buyers (local and export). Tariff and non-tariff barriers, the local content policy and the mandatory deletion programme (as elaborated in Chapter 5) offered by the Malaysian government would benefit not only the local sub-contractors but also the foreign counterparts since the latter could broaden their market segments in the local parts market.

Hypothesis 7: Foreign sub-contractors are expectedly more able to conquer a broader market segment than local sub-contractors.

Based on the researcher's observation, sub-contractors with foreign equity participation would be able to dominate broader market base since they have better connections with local and international markets. This proposition is made because all automakers (national and non-national automakers) in Malaysia have entered collaboration with foreign firms in the areas of technology, design, production system, management and entrepreneurship.

Hypothesis 8: Sub-contractors with foreign equity participation tend to dominate a broader market base than sub-contractors without foreign equity participation.

6.5.2 Influential Factors in Binding Network Relations

This sub-section illustrates how influential factors, such as economic calculation and social capital, that bind supplier-buyer networks in the Malaysian auto sub-contracting arrangements may or may not vary from one firm size and firm ownership to another.

6.5.2.1 Influential Factors in Binding Network Relations by Firm Size

Table 6.17 shows no special relationships between economic and social capital factors and firm size, since a large majority of both the SMSCs (70.8 per cent) and large sub-contractors (74.5 per cent) admitted that their networks with automakers were influenced by economic calculations rather than social capital.

This finding proves that irrespective of firm size, economic calculation is the most influential factor in binding network relations between the sub-contractors and automakers. This is similar to the West in which network organisations existed because their rational economic pursuits rather than to fulfill social obligations (see Chapter 3). In the Malaysian context, sub-contractors would have had business opportunities with automakers primarily because of the existence of automobile production activities. For automakers, they turned to sub-contractors mainly because of their aims to minimise business risks and save in-house production costs. In addition, they would gain economies of scale and economies of scopes through organisational specialisation.

When the sub-contractors were requested to rank the most influential factors among social capital variables that bound their network relations with automakers, both firm categories had the same feelings. A small majority of the SMSCs (56.3 per cent) and the large sub-contractors (56.6 per cent) admitted that trust and culture were more

Table 6.17
Influential Factors in Binding Network Relations by Firm Size

Factors	Firm Size	
	Small and Medium	Large
Economic	34	41
	(70.8)	(74.5)
Social Capital	14	14
	(29.2)	(25.5)
Total	48	55
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p > 0.05$.
Source: Based on the sample survey.

Table 6.18
Influential Social Capital Factors in Binding Network Relations by Firm Size

Factors	Firm Size	
	Small and Medium	Large
Power	21	23
	(43.8)	(43.4)
Trust and Culture	27	30
	(56.3)	(56.6)
Total	48	53
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

influential factors than power in binding their networks with automakers (Table 6.18). Hence, there is no conclusive evidence that the SMSCs were more influenced by power (government role) than trust and culture in their networks with automakers.

The insignificant differences between firm size in terms of social capital influences were probably due to the fact that the sub-contractors, irrespective of their size, were already long in the industry, so they felt that trust (reliability based on track records) and culture (such as group-belonging and mutual obligation) were more important than power in binding their networks.

A detailed examination into power factors reveals no significant differences between the two firm size categories. As shown in Table 6.19, a majority of the sub-contractors, irrespective of their firm size, felt that protective measures were more influential than stimulatory and investment measures in binding their networks with automakers. However, the table also shows that a larger percentage of the SMSCs (59.6 per cent) than the large firms (50.9 per cent) agreed with protective measures as the more influential factor in governing their networks with automaker.

6.5.2.2 Influential Factors in Binding Network Relations by Firm Ownership

Economic calculations were dominant in binding and/or governing network relations between the local and foreign sub-contractors and automakers; 72.0 per cent of the local firms and 73.7 per cent of the foreign counterparts expressed their agreement with this factor (Table 6.20). On the other hand, only a small proportion of the local (28.0 per cent) and foreign sub-contractors (26.3 per cent) agreed with the importance of social capital in binding their networks with automakers.

Table 6.19
Influential Power in Binding Network Relations by Firm Size

Power Factors	Firm Size	
	Small and Medium	Large
Protective Measures	28	27
	(59.6)	(50.9)
Stimulatory and Investment Measures	19	26
	(40.4)	(49.1)
Total	47	53
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.20
Influential Factors in Binding Network Relations by Firm Ownership

Factors	Firm Ownership	
	Local	Foreign
Economic	54	14
	(72.0)	(73.7)
Social Capital	21	5
	(28.0)	(26.3)
Total	75	19
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

With respect to social capital, most of the local sub-contractors (58.1 per cent) and foreign counterparts (63.2 per cent) conceded that trust and culture were the more influential factors than power in binding their network relations with automakers (see Table 6.21). On the contrary, a smaller percentage of the local sub-contractors (41.9 per cent) and the foreign ones (36.8 per cent) felt that power factor was more influential in binding their networks with automakers.

In other words, there were no specific trends between firm ownership in terms of social capital influences on their networks with automakers. This unspecific pattern of networks existed probably because the sub-contractors, irrespective of their ownership, were already long in the industry, so they felt that trust (reliability based on track record) and culture (such as group-belonging and mutual obligation) were more important than power in binding their networks.

As displayed in Table 6.22, the Chi-Square value is highly significant at $p = 0.03$ to prove that power factors are mostly influenced by firm ownership. In this connection, a majority of the local sub-contractors (61.6 per cent) agreed that protective measures were more influential than stimulatory and investment measures in binding their network relations with automakers. On the other hand, most of the foreign sub-contractors cited stimulatory and investment measures were more influential in binding their networks with automakers.

6.5.3 Auto Parts Production and Specialisation

This sub-section shows how the patterns, trends and performances of auto parts production and specialisation are influenced by several factors, such as firm position in sub-contracting arrangements, firm size, firm ownership, the levels of foreign

Table 6.21
Influential Social Capital Factors in Binding Network Relations by Firm Ownership

Factors	Firm Ownership	
	Local	Foreign
Power	31	7
	(41.9)	(36.8)
Trust and Culture	43	12
	(58.1)	(63.2)
Total	74	19
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p < 0.05$.
Source: Based on the sample survey.

Table 6.22
Influential Power in Binding Network Relations by Firm Ownership

Power Factors	Firm Ownership	
	Local	Foreign
Protective Measures	45	6
	(61.6)	(33.3)
Stimulatory and Investment Measures	28	12
	(38.4)	(66.7)
Total	73	18
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

participation in sub-contracting firms, and technical collaborators of the sub-contracting firms. All the evidences in this sub-section are compared with the hypotheses set in the earlier chapters and parts.

6.5.3.1 Auto Parts Production and Specialisation by Firm Position

Table 6.23 reveals that the first-tier sub-contractors were given more important production tasks, i.e. to make individual parts and to perform sub-assembly of auto parts than the second-tier ones (Chi-Square test is highly significant, p = 0.002 as to confirm Hypothesis 1). Most of the first-tier sub-contractors (51.4 per cent) undertook both individual parts making and sub-assembly of auto parts. On the contrary, a large majority of the second-tier sub-contractors made individual parts.

Table 6.24 also shows that the first-tier sub-contractors were given more important tasks in auto parts production by making functional parts and a mixed combination of functional and general parts (Hypothesis 1 is confirmed with a highly significant Chi-Square value, p = 0.028). With respect to functional parts, 22.7 per cent of the first-tier sub-contractors was given by automakers to perform this important production task compared to 10.7 per cent second-tiers. In contrast, most of the second-tier sub-contractors (60.7 per cent) were involved in less important production tasks, i.e. to make general parts. With regard to the mixed combination of parts, 45.3 per cent of the first-tier sub-contractors was involved this parts production against 28.6 per cent for the second-tiers.

Table 6.23
Levels of Parts Making by Firm Position

Levels of Parts Making	Firm Position	
	First-tier Sub-contractors	Second-tier Sub-contractors
Individual Parts	36	23
	(48.6)	(82.1)
Individual Parts and	38	5
Sub-Assembly	(51.4)	(17.9)
Total	74	28
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, p = 0.002.
Source: Based on the sample survey.

Table 6.24
Types of Auto Parts Produced by Firm Position

Types of Auto Parts	Firm Position	
	First-tier Sub-contractors	Second-tier Sub-contractors
Functional	17	3
	(22.7)	(10.7)
General	24	17
	(32.0)	(60.7)
Mixed Parts	34	8
	(45.3)	(28.6)
Total	75	28
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, p = 0.028.
Source: Based on the sample survey.

6.5.3.2 Auto Parts Production and Specialisation by Firm Size

As shown in Table 6.25, there seems to be no relationships between auto parts production and firm size since Hypothesis 2 is tested with insignificant Chi-square value, $p \leq 0.05$). It shows that a majority of the SMSC's and large sub-contractors were involved in individual parts making.

Nevertheless a closer examination into percentage values in the table, it shows slight differences between the two firm size categories. A higher percentage of the large sub-contractors (47.0 per cent) than the SMSC's (33.3 per cent) was involved in both levels of auto parts production, i.e. individual parts making and sub-assembly of auto parts.

Although the findings did not show special patterns, trends and performances of specialisation in auto parts production between the two firm sizes as in Japan, at least, the large sub-contractors were more able to undertake more production tasks, i.e. to be involved in the two levels of auto parts production than the SMSC's.

The large sub-contractors were also more capable of undertaking more production tasks than its counterparts, the SMSC's, by looking at the types of auto parts produced. As shown in Table 6.26, Hypothesis 2 is tested with a significant Chi-Square value, $p = 0.047$ confirming that the types of auto parts produced were largely influenced by firm size. In this respect, a larger proportion of the large sub-contractors (21.2 per cent) than the SMSCs (18.2 per cent) produced functional or specific parts. In contrast, a greater percentage of the SMSCs (56.4 per cent) than the large counterparts was more inclined to make general or standard parts. In the production of a mixed combination of functional and general auto parts, 43.9 per cent of the large sub-contractors undertook this production task compared with 25.5 per cent SMSCs.

Table 6.25
Levels of Parts Making by Firm Size

Levels of Parts Making	Firm Size	
	Small and Medium	Large
Individual Parts	36	35
	(66.7)	(53.0)
Individual Parts and Sub-Assembly	18	31
	(33.3)	(47.0)
Total	54	66
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p < 0.05$.
Source: Based on the sample survey.

Table 6.26
Types of Auto Parts Produced by Firm Size

Types of Auto Parts	Firm Size	
	Small and Medium	Large
Functional	10	14
	(18.2)	(21.2)
General	31	23
	(56.4)	(34.8)
Mixed Parts	14	29
	(25.5)	(43.9)
Total	55	66
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, $p = 0.047$.
Source: Based on the sample survey.

6.5.3.3 Auto Parts Production and Specialisation by Firm Ownership

Based on the levels of parts making and the types of auto parts production as in Table 6.27 and Table 6.28 respectively, statistical tests fail to support Hypothesis 3 as the Chi-square values are insignificant, $p \leq 0.05$.

However, in terms of percentages, a large majority of the local sub-contractors (58.3 per cent) was involved in individual parts making. On the other hand, most of the foreign counterparts (52.4 per cent) were involved in more important production jobs by producing individual parts and performing sub-assembly of auto parts (Table 6.27). Hence, it can be concluded that the local sub-contractors tend to undertake less important production jobs, i.e. to involved in individual parts making, a simpler job in auto parts production, than the foreign ones.

Table 6.28 also shows that a smaller proportion of the local sub-contractors (18.8 per cent) against the foreign ones (28.6 per cent) produced functional parts - the critical parts in automobile production. A smaller percentage of the local sub-contractors (38.8 per cent) also produced general parts vis-à-vis 47.6 per cent for the foreign sub-contractors. By and large, the local sub-contractors actually undertook less important production jobs than the foreign sub-contractors.

6.5.3.4 Auto Parts Production and Specialisation by the Levels of Foreign Equity Participation

Table 6.29 displays insignificant differences between the two sub-contracting firms with foreign equity participation and those without the foreign resources in relation to job specialisation in auto parts production. This is revealed by the insignificant Chi-square value, $p \leq 0.05$ of the tested Hypothesis 4.

Table 6.27
Levels of Parts Making by Firm Ownership

Levels of Parts Making	Firm Ownership	
	Local	Foreign
Individual Parts	49	10
	(58.3)	(47.6)
Individual Parts and Sub-Assembly	35	11
	(41.7)	(52.4)
Total	84	21
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.28
Types of Auto Parts Produced by Firm Ownership

Types of Auto Parts	Firms Ownership	
	Local	Foreign
Functional	16	6
	(18.8)	(28.6)
General	33	10
	(38.8)	(47.6)
Mixed Parts	36	5
	(42.4)	(23.8)
Total	85	21
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.29
Levels of Parts Making by Foreign Equity Participation in the Firms

Levels of Parts Making	Level of Foreign Equity	
	Firms without Foreign Equity (0% equity)	Firms with Foreign Equity (up to 100% equity)
Individual Parts	35	24
	(59.3)	(52.2)
Individual Parts and Sub-Assembly	24	22
	(40.7)	(47.8)
Total	59	46
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.30
Types of Auto Parts Produced by Levels of Foreign Equity Participation

Types of Auto Parts	Level of Foreign Equity	
	Firms without Foreign Equity (0% equity)	Firms with Foreign Equity (up to 100% equity)
Functional	7	15
	(11.7)	(32.6)
General	26	17
	(43.3)	(37.0)
Mixed Parts	27	14
	(45.0)	(30.4)
Total	60	46
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, $p = 0.027$.
Source: Based on the sample survey.

In terms of percentages, it was found that most of the sub-contractors with foreign equity participation (52.2 per cent) and the sub-contractors without foreign equity participation (59.3 per cent) were involved in the simple level of auto parts production, i.e. to make individual parts.

A higher percentage of the sub-contractors with foreign equity participation (47.8 per cent) compared to 40.7 per cent those without foreign equity participation was involved in more important jobs, i.e. to make individual parts and perform sub-assembly. This slightly shows that the sub-contractors with foreign equity participation tend to perform more important jobs in auto parts production than their counterparts, the sub-contractors without.

A detailed investigation into the production jobs based on the types of auto parts produced provides a clear dichotomy between the two firm categories. The sub-contractors with foreign equity participation tend to perform more important jobs by making functional parts than those without foreign equity participation. This confirms Hypothesis 4 with a highly significant Chi-Square value, $p = 0.027$.

As shown in Table 6.30, 32.6 per cent of the sub-contractors with foreign equity participation made functional parts compared to 11.7 per cent those without foreign equity participation. In contrast, 43.3 per cent of the sub-contractors without foreign equity participation made general parts against 37.0 per cent those with foreign resources. This evidence shows that the sub-contractors with foreign equity participation tend to perform more important jobs in the auto parts production, i.e. to make functional parts.

6.5.3.5 Auto Parts Production and Specialisation by Technical Collaborators

The results in Table 6.31 and Table 6.32 offer no differences between the two sub-contracting firms which entered technical collaboration with Japanese firms and those which obtained technical support from the mixed and other sources in their responsibilities to auto parts production (Hypothesis 5 is tested with the insignificant Chi-square values, $p \leq 0.05$).

Nevertheless, from the perspective of percentage analysis, there were some differences between the two categories of the sub-contracting firms. It is clear that the sub-contracting firms which entered technical collaboration with the Japanese firms were able to take greater responsibilities in auto parts production by making functional parts and a mixed combination of functional and general parts. With respect to functional parts, 24.5 per of the sub-contractors that obtained technical collaboration from the Japanese firms made this type of parts compared to 19.0 per cent those which had technical support from the mixed and other sources (see Table 6.32).

On the contrary, 52.4 per cent of the sub-contractors that obtained technical collaboration from the mixed and other parties produced general parts in comparison with 30.6 per cent those that sourced technical support from the Japanese firms. About 44.9 per cent of the sub-contractors that obtained technical collaboration from the Japanese firms was involved in greater production responsibilities (producing the mixed combination of parts) vis-a-vis 28.6 per cent those which had technical support from the mixed and other sources (Table 6.32).

Table 6.31
Levels of Parts Making by Technical Collaborators

Levels of Parts Making	Technical Collaborators	
	Japanese Firms	Mixed and Other Parties
Individual Parts	28	24
	(57.1)	(57.1)
Individual Parts and Sub-Assembly	21	18
	(42.9)	(42.9)
Total	49	42
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p < 0.05$.
Source: Based on the sample survey.

Table 6.32
Types of Auto Parts Produced by Technical Collaborators

Types of Auto Parts	Technical Collaborators	
	Japanese Firms	Mixed and Other Parties
Functional	12	8
	(24.5)	(19.0)
General	15	22
	(30.6)	(52.4)
Mixed Parts	22	12
	(44.9)	(28.6)
Total	49	42
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Greater responsibilities in auto parts production were undertaken by the sub-contracting firms which had technical support from the Japanese firms is understandable due the existence of a large number of Japanese automakers operating in Malaysia. Even the so-called national automakers, Proton and Perodua, had to collaborate with the Japanese automakers, namely Mitsubishi and Daihatsu respectively. Since the Japanese automakers were reluctant to transfer technology directly, they would have recommended their suppliers to use imported technology from their home country, amongst others, through collaborations with the Japanese firms.

6.5.4 Auto Parts Market

This sub-section shows the patterns, trends and performances of auto parts market and how this market is influenced by several factors, such as firm size, firm ownership and the levels of foreign equity participation in the sub-contracting firms. To strengthen the analysis, all the evidences in this part are compared with the hypotheses set in the earlier chapters and parts.

6.5.4.1 Auto Parts Market by Firm Size

It is rather surprising when there is a slight difference between the SMSCs and large sub-contractors in terms of auto parts market. In this regard, Hypothesis 6 is tested with the insignificant Chi-square value, $p \leq 0.05$.

Instead of expanding their market base at the international level, the large sub-contractors tended to market their auto parts to the local market, whilst the SMSCs were more able to export their products. On percentage analysis, Table 6.33 shows that 84.8

Table 6.33
Broad Auto Parts Market by Firm Size

Auto Parts Markets	Firm Size	
	Small and Medium	Large
Local	43	56
	(78.2)	(84.8)
Local & Export	12	10
	(21.8)	(15.2)
Total	55	66
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.34
Local Parts Market in the Manufacturing Industry by Firm Size

Parts Markets	Firm Size	
	Small and Medium	Large
Automobile Industry	22	31
	(40.0)	(47.0)
Automobile and Non-Automobile Industry	33	35
	(60.0)	(53.0)
Total	55	66
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

per cent of the large sub-contractors and 78.2 per cent of the SMSCs sold their auto parts to the local market. In contrast, more SMSCs (21.8 per cent) than the large sub-contractors (15.2 per cent) marketed their auto parts locally and abroad. In this broad market context, the findings go against Hypothesis 6 because it was not the large sub-contractors, but the SMSC's had a broader market base.

Focusing on the local market in the manufacturing as well as automobile industries, it is once again saw the domination of the SMCSs and not the large sub-contractors in this market. As displayed in Table 6.34, a majority of both the firm size categories was able to diversify their local markets. However, a larger percentage of the SMSCs (60.0 per cent) than the large counterparts (53.0 per cent) that was able to have a broader market base, i.e. to sell their products to both automobile and non-automobile industries.

Narrowing the focus on the automobile industry itself, Table 6.35 demonstrates that a larger majority of the SMSCs (75.9 per cent) against the large sub-contractors (63.6 per cent) had a broader market base, i.e. to market their auto parts to both automakers and auto sub-contractors.

On the contrary, Table 6.36 and Table 6.37 are able to support Hypothesis 6 that the large sub-contractors are more capable of broadening their market base (particularly in the local markets) than the SMSCs (Chi-Square tests on Hypothesis 6 are significant, $p = 0.04$ and $p = 0.026$ respectively). Table 6.36 shows that a large proportion of the large sub-contractors (71.2 per cent) sold their auto parts to more than five buyers (automakers) compared to 45.5 per cent SMSCs. On the other hand, 54.5 per cent of the SMSCs marketed their products to a smaller number of buyers (less than five buyers) vis-a-vis 28.8 per cent for the large sub-contractors.

Table 6.35
Local Parts Market in the Automobile Industry by Firm Size

Auto Parts Buyers	Firm Size	
	Small and Medium	Large
Automakers	13	24
	(24.1)	(36.4)
Automakers & Other	41	42
Auto Sub-contractors	(75.9)	(63.6)
Total	54	66
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.36
Auto Parts Sold to a Number of Automakers by Firm Size

Auto Parts Buyers	Firm Size	
	Small and Medium	Large
Not more than 5 Buyers	30	19
	(54.5)	(28.8)
More than 5 Buyers	25	47
	(45.5)	(71.2)
Total	55	66
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, $p = 0.04$.
Source: Based on the sample survey.

Table 6.37 reveals the ability of the large sub-contractors to broaden their market base with the nationality status of automaker-buyers since 78.8 per cent of these sub-contractors was able to market their products to both national and non-national automakers against 55.6 per cent for the SMSCs. In contrast, 44.4 per cent of the SMSCs sold their auto parts to the national automakers compared to 21.2 per cent for the large ones. This trend is probably related to the government's policy which promoted the involvement of Bumiputera SMSC's in the national automobile projects, amongst others, through the Proton and Perodua's Vendor Development Programmes.

6.5.4.2 Auto Parts Market by Firm Ownership

Table 6.38 shows that a larger percentage of the local sub-contractors (87.1 per cent) sold their auto parts to the local market compared to the foreign counterparts (66.7 per cent). On the other hand, the foreign sub-contractors were more able to conquer a broader market segment, i.e. both local and export markets, since 33.3 per cent of them sold their products to this market category vis-a-vis 12.9 per cent for the local counterparts. This evidence is in line with Hypothesis 7 which is tested significant at the Chi-square value, $p = 0.026$.

Referring to Table 6.39, a larger proportion of the local and not the foreign sub-contractors marketed their auto parts to both automobile and non-automobile industrial markets; 57.6 per cent of the former against 52.4 per cent of the latter sold their products to this broad local market category. This small difference is denoted by the Chi-Square test on Hypothesis 7 which demonstrates the insignificant value, $p \leq 0.05$.

Table 6.37
Auto Parts Sold to Automakers with Nationality Status by Firm Size

Nationality Status of Automakers	Firm Size	
	Small and Medium	Large
National	24	14
	(44.4)	(21.2)
National and Non-National	30	52
	(55.6)	(78.8)
Total	54	66
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, p = 0.006.
Source: Based on the sample survey.

Table 6.38
Broad Auto Parts Markets by Firm Ownership

Auto Parts Markets	Firms Ownership	
	Local	Foreign
Local	74	14
	(87.1)	(66.7)
Local and Export	11	7
	(12.9)	(33.3)
Total	85	21
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, p = 0.026.
Source: Based on the sample survey.

Table 6.39
Local Parts Market in the Manufacturing Industry by Firm Ownership

Parts Markets	Firm Ownership	
	Local	Foreign
Automobile Industry	36	10
	(42.4)	(47.6)
Automobiles and Non-Automobile Industry	49	11
	(57.6)	(52.4)
Total	85	21
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.40
Local Parts Market in the Automobile Industry by Firm Ownership

Auto Parts Buyers	Firm Ownership	
	Local	Foreign
Automakers	26	6
	(30.6)	(28.6)
Automakers & Other Auto Sub-contractors	59	15
	(69.4)	(71.4)
Total	85	21
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

In contrast, a slightly higher percentage of the foreign sub-contractors (71.4 per cent) than the local counterparts (69.4 per cent) was able to sell their auto parts to both automaker and auto sub-contractor markets (Table 6.40). Table 6.41 also shows that a slightly higher proportion of the foreign sub-contractors (61.9 per cent) against the local sub-contractors (60.0 per cent) marketed their products to more than five automaker-buyers. The same trend can be seen in Table 6.42 in which 71.4 per cent of the foreign sub-contractors and 67.1 per cent of the local sub-contractors sold their products to both national and non-national automakers. Generally, despite the inability of the Chi-square tests to confirm Hypothesis 7, percentage analysis reveals that the foreign sub-contractors were more able than the local counterparts to conquer a broader market segment.

6.5.4.3 Auto Parts Market by Foreign Equity Participation

The sub-contractors with foreign equity participation tend to dominate a broader market base than their counterparts, the sub-contractors without foreign equity participation. As evident in Table 6.43 (confirmed by the Chi-Square test on Hypothesis 8 which has significant value, $p = 0.05$), 26.1 per cent of the sub-contractors which sold their auto parts to local and export markets was the sub-contractors with foreign equity participation against 10.0 per cent for those without foreign equity resources. On the contrary, 90.0 per cent of the sub-contractors without foreign equity participation sold their auto parts to the local market compared to 73.9 per cent for those with equity participation.

Table 6.41
Auto Parts Sold to a Number of Automakers by Firm Ownership

Auto Parts Buyers	Firm Ownership	
	Local	Foreign
Not more than 5 Buyers	34	8
	(40.0)	(38.1)
More than 5 Buyers	51	13
	(60.0)	(61.9)
Total	85	21
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.42
Auto Parts Sold to Automakers with Nationality Status by Firm Ownership

Nationality Status of Automakers	Firm Ownership	
	Local	Foreign
National	28	6
	(32.9)	(28.6)
National and Non-National	57	15
	(67.1)	(71.4)
Total	85	21
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.43
Broad Auto Parts Markets by Foreign Equity Participation

Auto Parts Markets	Levels of Foreign Equity	
	Firms without Foreign Equity (0% equity)	Firms with Foreign Equity (up to 100% equity)
Local	54	34
	(90.0)	(73.9)
Local and Export	6	12
	(10.0)	(26.1)
Total	60	46
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is significant, p = 0.029.
Source: Based on the sample survey.

Table 6.44
Local Parts Market in the Manufacturing Industry by Foreign Equity Participation

Parts Markets	Levels of Foreign Equity	
	Firms without Foreign Equity (0% equity)	Firms with Foreign Equity (up to 100% equity)
Automobile Industry	23	23
	(38.3)	(50.0)
Automobiles and Non-Automobile Industry	37	23
	(61.7)	(50.0)
Total	60	46
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Once the focus is given on the local markets, the sub-contractors with foreign equity participation were not able to surpass their rivals, the sub-contractors without foreign equity participation. The former was less able to dominate broader market base than the latter. This proposition is crystal clear when Table 6.44, Table 6.45, and Table 6.47 are examined. The Chi-square tests on Hypothesis 8 show insignificant values, $p \leq 0.05$, which are not in favour of the hypothesis.

Based on Table 6.44, a larger portion of the sub-contractors without foreign equity participation (61.7 per cent) than those with foreign equity (50.0 per cent) dominated a broader market base (automobile and non-automobile industrial markets). In contrast, more proportion of the sub-contractors with foreign equity (50.0 per cent than those without the foreign resources sold their auto parts to a narrower market base, i.e. the automobile industry.

Table 6.45 shows that a higher percentage of the sub-contractors without foreign equity participation (73.3 per cent) was more able to dominate both automakers and auto-sub-contractors market base category than those with foreign equity (65.2 per cent). Table 6.46 in turn reveals the domination of the sub-contractors with foreign equity in the local market when 63.0 per cent of these sub-contractors was able to sell their products to more than five buyers compared to 58.3 per cent for those without foreign equity. Table 6.47 re-consolidates the previous findings with which more sub-contractors without foreign equity (68.3 per cent) tend to dominate a broader market base (national and non-national automakers market category) than those with foreign resources (67.3 per cent).

Table 6.45
Local Parts Market in the Automobile Industry by Foreign Equity Participation

Auto Parts Buyers	Levels of Foreign Equity	
	Firms without Foreign Equity (0% equity)	Firms with Foreign Equity (up to 100% equity)
Automakers	16	16
	(26.7)	(34.8)
Automakers & Auto Sub-contractors	44	30
	(73.3)	(65.2)
Total	60	46
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.46
Auto Parts Sold to a Number of Automakers by Foreign Equity Participation

Auto Parts Buyers	Levels of Foreign Equity	
	Firms without Foreign Equity (0% equity)	Firms with Foreign Equity (up to 100% equity)
Not more than 5 Buyers	25	17
	(41.7)	(37.0)
More than 5 Buyers	35	29
	(58.3)	(63.0)
Total	60	46
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

Table 6.47
Auto Parts Sold to Automakers with Nationality Status by Foreign Equity Participation

Nationality Status of Automakers	Levels of Foreign Equity	
	Firms without Foreign Equity (0% equity)	Firms with Foreign Equity (up to 100% equity)
National	19	15
	(31.7)	(32.6)
National and Non-National	41	31
	(68.3)	(67.4)
Total	60	46
	(100.0)	(100.0)

Note: Figures in parentheses are percentages.
Chi-Square is not significant, $p \leq 0.05$.
Source: Based on the sample survey.

6.6 Conclusion

The increase in income levels and prosperity of the Malaysian population has generated an encouraging market demands for national and non-national automobiles, particularly for small and medium passenger cars. With the launch of the national car projects (Proton and Perodua) initiated by the government, production for passenger cars has increased unprecedentedly since the mid-1980s. Higher protection in the form of tariff and non-tariff barriers offered by the government made these national cars more affordable for Malaysians. Therefore, these two national cars were able to dominate the local auto market, but unable to compete internationally due to relatively higher costs of production. As a result of its inability to compete internationally, Malaysia is the net importer of automobiles and auto parts (reflected in her trade deficits in CBU and CKD accounts respectively).

A deeper investigation into the automakers and sub-contractors operating in Malaysia provides more valuable information. From the three automakers surveyed, it was found that they had special production networks (sub-contracting arrangements) with their sub-contractors. This special relationship was heavily bound by economic calculation rather than social capital. Whatever it is, this network would benefit both sides: the automakers were able to ensure constant flows of auto parts from the sub-contractors; the sub-contractors were in turn able to obtain supports from the automakers in terms of market assurances and other forms, such as equity participation, directorship and management, technical and engineering, R&D facilities, consultancy and advisory services and information flows. As could be traced from the governing mechanism, the three automakers, in many cases, preferred a two-way communication

in dealing with their sub-contractors, particularly in making decisions about auto parts production.

All the automakers had a certain proportion of parts sourcing to their total manufacturing costs of auto parts. Besides making auto parts and doing sub-assembly of the parts in-house, all the automakers outsourced auto parts from external firms, either locally or abroad. Unfortunately, most of the functional parts (the parts that enable an automobile to move and control), such as engine and emission, chassis and brake as well as transmission, steering and clutch were imported. In contrast, body, electrical and electronics and standard parts were mostly outsourced from local sub-contractors.

This study found that a majority of the sub-contractors located their production plants in the central region of Peninsular Malaysia (particularly in Selangor and Kuala Lumpur), was large in their size, owned by local entrepreneurs, original equipment manufacturers and first-tier suppliers. Most of the sub-contractors had technical collaboration with Japanese firms, produced individual and general parts and diversified their market segments, particularly in the local markets.

The sub-contractors had an intimate relation with automakers through certain governing mechanisms which tied their networks. A large proportion of the sub-contractors had legal contracts and shared information with automakers. A rather large percentage of the sub-contractors received support or assistance from automakers, including technical support, R & D facilities and consultancy assistance. Nonetheless, only a small portion of the sub-contractors received equity participation, directorship or management, and financial support from automakers.

Most of the sub-contractors dealt directly and had horizontal communication with automakers in deciding issues pertinent to price, quantity, quality and delivery of auto parts. This shows that the automakers realised the importance of mutual decision making in auto parts production.

Irrespective of firm size and ownership, a large majority of the sub-contractors agreed that their networks with automakers were mostly bound by economic calculation rather than social capital factors. With the focus on social capital, most of the sub-contractors believed that trust and culture were more important factors than power (government role) in binding their network relations with automakers. Pertinent to power, a majority of the small and medium sub-contractors and the local ones agreed with protective measures as the most influential factors than stimulatory and investment measures in maintaining their networks with automakers.

The results of this study show the patterns, trends and performances of auto parts production which was influenced by the firm position in a network, firm size, firm ownership, the levels of foreign equity participation in the sub-contracting firms and technical collaborators among the sub-contractors.

The first-tier sub-contractors were given more important production tasks than the second-tiers as evident in their higher involvement in both individual parts making and sub-assembly of auto parts as well as in the manufacturing functional parts and a mixed combination of functional and general parts.

The large sub-contractors were more able to diversify their auto parts production and to undertake more production tasks than the small and medium sub-contractors. This is evident when a larger portion of the former than the latter was involved in both

individual parts making and sub-assembly of auto parts as well as in functional parts and a mixed combination of functional and general parts production.

The local sub-contractors tend to undertake less important production jobs than their foreign counterparts since they tend to produce individual parts and involve less in the production of functional parts. On the other hand, the foreign sub-contractors tend to involve in more important production jobs, i.e. individual parts making and sub-assembly of auto parts as well as functional parts production.

The sub-contractors with foreign equity participation tend to perform more important jobs in auto parts production than those without the foreign resources. This is a fact when the percentages of the former involved in both individual parts making and sub-assembly of auto parts as well as in functional parts production were higher than the latter.

The sub-contractors which had technical collaboration with Japanese firms were able to take greater responsibilities in auto parts production by involving in more important levels of parts production (functional and the mixed parts).

The findings of this study also reveal the patterns, trends and performances of auto parts market which was influenced by firm size, firm ownership and the levels of foreign equity participation in the sub-contracting firms.

This study found that the relationship between auto parts market and firm size was rather mixed. Instead of confirming the hypothesis that the large sub-contractors had a broader market base, the study found that the SMSCs and not the large counterparts were more able to broaden their market base on international basis and in the local manufacturing and automobile industries.

However, the study found that the large sub-contractors were more able than the SMSCs to broaden their market base in two areas. They were more able to sell their products to more than five automaker buyers and to both national and non-national automakers.

With little exception for the local manufacturing market, the foreign sub-contractors were more able than the local counterparts to conquer a broader market segment. This proportion is true when a larger percentage of the foreign sub-contractors was able to sell their products to both local and export markets, automakers and auto sub-contractors, more than five automaker buyers, and national and non-national automakers.

The sub-contractors with foreign equity participation tend to dominate a broader market base than those without foreign equity participation. A larger percentage of the former was able to market their products to the local and export markets and to more than five automaker buyers in the local market.

On the contrary, the sub-contractors without foreign equity were more able to dominate the local markets based on their domination in the local parts market (in both automobile and non-automobile, automakers and auto sub-contractors as well as national and non-national automakers market categories).

Endnotes

[1] The Malaysian currency depreciated drastically during the economic crisis from US$1.00=RM2.50 prior the crisis to the highest US$1.00=over RM4.00 before it was pegged at US$1.00=RM3.80 during the crisis. Thus, the export value certainly increases when the export earnings in the U.S dollar is converted to the Malaysian currency.

[2] A well-illustrative literature on several existing auto-producers from historical perspective can be seen in Torii (1997).

[3] Most automobile components were gazetted as promoted products under the 1986 Investment Promotion Act and hence qualified to apply for various investment incentives.

[4] An affiliated firm is defined as a firm in which an automaker had at least 20 per cent of the firm's outstanding shares.