Chapter 5

THE MACHINERY COMPONENT INDUSTRY IN INDONESIA : Emerging Subcontracting Networks

by
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1. INTRODUCTION

A team of Japanese experts in the component manufacturing technology, who conducted their study in Indonesia in 1983, wrote:
"Indonesia is now implementing *Repelita III*. The government set automotive components and diesel engine components as priority items and is promoting domestic production of these items toward the set targets. However, after we conducted a field study, we reached the conclusion that the targets would have to be moved back. We have to be pessimistic based on the fact that component supply does not meet any qualifications in terms of cost, quality and delivery and is evaluated as unreliable by users." (ECFA: 1983, p.67-68).

This frank statement represents the real state of affairs of the Indonesian component manufacture at that time from the viewpoint of Japanese technologists. After 15 years, we can see that consciousness of cost, quality and delivery has already spread to small-scale subcontractors in Jakarta, Bandung as well as Sukabumi. The stratums of component suppliers have come to be remarkably thicker than before.

The machinery component manufacturing industry constitutes a supporting base for the machinery assembling industry, just like the wide base of a mountain. Usually, industrial analyses are conducted commodity-wise like the automobile industry, motorcycle industry, electronic industry and so forth. However, the assembling industry and the component manufacturing industry need to be separately analyzed, because the nature of industrial organization is totally different. In the assembling industry, the economies of scale directly works so that the industrial structure tends to be an oligopolistic one. On the other hand, the component manufacturer produces a wide variety of items in small lots, which is more suited to the structure with accumulation of a large number of manufacturers closely connected

to each other in a chain of divided work of different processes. The thickness of accumulation and the quality of connection by subcontract—subcontracting network—among manufacturers are two of the crucial determinants of the strengths of this industry. At this point, the world's most populous countries like Indonesia have a great potential for this industry in nature. It is effective subcontracting networking that should be developed to be a source of technological capabilities in the national economy and that is why the government of Indonesia also has so far been willing to promote this networking.

The purpose of this chapter is to analyze the industrial structure of the Indonesian machinery component industry as separate from the assembling industry, with special focus on subcontracting networks and to examine the major features of networks, mechanism of generation and expansion of networks, and the possible key to exploring the possibility of further development of subcontracting networks in this industry.

2. THE STRUCTURE OF THE INDUSTRY: AN OVERVIEW

2.1 The Scope of Machinery Component Industry

Let me set the scope of machinery component manufacturing industry first. The industrial classification that this paper adopts is one based on the stream of manufacturing processes, that is, (1) the material industry, (2) the material process industry, and (3) the assembling industry. This classification does not necessarily coincide with industrial classifications by commodity like ISIC and SITC. The scope of machinery component industry fits the former classification more than the latter.

The material process industry functions as a bridge between the material industry (ex. basic metal, basic chemicals) and the assembling industry. In the metal industry, the material process industry can be defined as an industry to process materials (steel, aluminum etc.) to give form to products for assembling, by such work as casting, forging, heat treatment, pressing, welding, machining and so on. It also covers some accompanying work like making molds, coating and painting, sub-assembly, fabrication and construction. Machinery components are the most typical product of material process industry, produced through combinations of these processes. Some metal products of material process industry are also sold directly to consumers as final products, like agricultural tools, kitchenware and other tools like nails, screws and bolts.

A wide variety of products in the metal and machinery industry under ISIC 37 and 38 can be sorted into the above three classifications of material, material process, assembling industry and others. The composition of these four is shown in Table 1 (see Appendix I and II for 5-digit sub-groups of each type of industry). It is worth noting that the material process industry accounts for the largest share, approximately 37 percent, of the total value added produced by the metal and machinery industry, followed by the assembling industry and material industry, 35 percent and 26 percent respectively. Component manufacturing, which is a main sub-sector in the material process industry, accounts for 22 percent of the total. Components here include fabricated structural products, plate working products, welded products, pipes, components and parts of various machinery such as industrial machinery, electronic appliances and transport equipment (Appendix I). This is the segment on which this paper focuses as an object to be analyzed.

Table 1 Value Added by Types of Industry in Metal Industry (ISIC 37-38), 1995

Type of Industry	Value Added (Rp.billion)	Share (%)
1 Material Industry	5,571	26
2 Material Process Industry	8,105	37
Components	4,767	22
Metal final products	3,338	15
3 Assembling Industry	7,603	35
4 Others (repair/maintenance etc.)	204	1
Total Metal Industry	21,796	100

Note : 1) Total of large,medium,small and cottage scale establishments.
2) Material industry coincides with ISIC 37.
3) For components of other industries, see Appendix.
4) Total is more than the aggregate, because some individual data are not shown in the publication.
Source: Calculated from BPS data, Statistik Industri Besar, Sedang, Kecil dan Rumah Tangga 1995.

2.2 Development of Component Industry as a New Major Material Process Industry

In the history of the metal industry in Indonesia, the material process industry had started to develop prior to the assembling industry and the material industry. Traditional iron products, for example, swords as arms or for ritualistic use and agricultural tools had been the oldest products from the material process industry since the pre-colonial period. Cisaat (Sukabumi) and Ciwidey in West Jawa, Tugalrejo and Ceper (Klaten) in Central Jawa were developed to be production centers. In the colonial period, the assembling industry was brought to the East Indies along with expansion of Dutch-managed plantations in Jawa. Repair shops of steam locomotives, mainly for sugarcane transportation, ship repair shops and sugarmill repair shops were set up from the 1880s to the 1910s, which constitute the antecedents of machinery assembly. The first assembling industry was a *General Motors* truck assembly plant set up in 1927 in Sunter area of (then) Batavia. However it was after the 1970s in the New Order period that the assembling industry had a growth spurt of development, and the material industry started its production. Then the component manufacturing industry emerged as a new material process industry.

Table 2 summarizes development of the three types of metal industry/ material industry, material process industry, and assembling industry in the last three decades of the New Order, which shows the comparative position of the component industry. Out of these three types, the assembling industry shows relatively moderate growth rates over the period, because its growth started earlier than the others (see values of 1976). The growth of the assembling industry started with import substitution of automobile and motorcycle assembly, triggered by import restrictions of CBU (complete built up) automobiles and motorcycles in 1969. In the period of 1976 to 1985, the highest growth was recorded by the material industry, because two state-owned giants, namely *PT Krakatau Steel* and *PT Indonesia Asahan Aluminium*, started operation in the late 1970s. A growth leader after 1985, however, has been the material process industry, especially the component industry. It is evident from the table that the component industry has been quickly catching up to the assembling industry in the last decade in terms of the number of establishments, workers and the value of gross output[1].

[1] The growth rates of component industry in the period 1985 to 1995 are estimated as higher than those of the period 1990 to 1995 shown in Table 2. However, it is unfortunate that an accurate growth rate of component industry from 1985 to 1995 cannot be calculated, because BPS (Central Bureau of Statistics)'s Industrial Statistics in 1985 had more rough assortment of 5-digit ISIC than that of 1995.

The growth of the component industry has been accelerated partly by the deepening localization policies (the so-called Deletion Program) for four-wheel and two-wheel motor vehicle components since 1979 and 1980 substantially[2], and partly by the foreign and domestic investment boom in this sector after 1988. In this way, in the waves of growth of metal industry in Indonesia, the component industry has at last begun to emerge as a new major segment of the material process industry.

Table 2 Development of Component Industry as a Major Material Process Industry, 1976-1995 Compared with Material Industry and Assembling Industry

Industry	1976	1980	1985	1990	1995	Average Annual Growth Rate (%) 1976-85	1990-95
No.of Establishment							
Material Industry	18	23	30	95	169	5.8	12.2
Material Process Industry							
Components	72	93	155	398	766	8.9	14.0
Metal final products	232	270	393	570	812	6.0	7.3
Assembling Industry	327	448	735	561	716	9.4	5.0
No.of Workers (person)							
Material Industry	4,694	8,822	15,647	32,732	47,644	14.3	7.8
Material Process Industry							
Components	12,509	13,240	22,993	60,778	154,625	7.0	20.5
Metal final products	18,662	27,815	36,418	79,181	150,052	7.7	13.6
Assembling Industry	51,444	80,424	119,964	100,291	166,515	9.9	10.7
Gross Output (Rp.billion)							
Material Industry	61	354	1,010	3,319	5,339	36.6	10.0
Material Process Industry							
Components	178	269	686	1,771	5,920	16.2	27.3
Metal final products	118	154	232	1,408	3,710	7.8	21.4
Assembling Industry	816	1,298	1,994	3,191	7,737	10.4	19.4
Value Added (Rp.billion)							
Material Industry	21	102	464	1,338	2,355	41.0	12.0
Material Process Industry							
Components	61	71	212	650	1,989	14.8	25.1
Metal final products	36	45	77	366	1,413	8.8	31.0
Assembling Industry	257	459	696	1,152	3,221	11.7	22.8

Note : 1. Material industry is ISIC37 and other industries are as defined in Appendix I and II.
2. Assembling industry in 1976 to 1985 contains some component manufacturing that cannot be separated as independent 5-digit sub-groups.
3. Gross output and value added is deflated by GDP deflator.
4. Not include small and cottage scale establishments.

Source : Calculated from BPS, *Statistik Industri Besar dan Sedang, 1976, 1980, 1986, 1990, 1995*.

[2]For industrial policies of the motorcycle component industry including the deletion program, see Thee (1997).

2.3 Three Major Component Manufacturing Industries

What are the major profiles of typical component manufacturing industries? Table 3 shows the top seven sup-groups in terms of value added in the metal and machinery industry (ISIC 37-38) as of 1995. While the top group is the material industry and the next two are from the assembling industry, the material process industry occupies four out of the top seven sub-groups, of which three are component manufacturing industries. The three component industries are motorcycle components, four-wheel motor vehicle components and electronic component sub-assembly production.

Table 3 The Top 7 Sub-Groups of Metal and Machinery Industry (ISIC 37-38), 1995

Industrial Sub-Group	ISIC	Type of Industry	Value Added (Rp.billion)	Workers (person)	No.of Establishment
1 Steel rolling	37103	Material	4,304	24,846	59
2 Motor vehicles	38431	Assembling	2,161	14,181	14
3 Motorcycles	38441	Assembling	2,076	6,830	4
4 Motorcycle components	38442	Component	1,415	11,888	47
5 Electric and telephone cables	38396	Metal product	1,242	16,743	52
6 Motor vehicle components	38433	Component	1,015	29,185	121
7 Electronic component sub-assembly	38324	Component	838	44,922	110

Note : Total of large and medium scale establishments.
Source: BPS, *Statistik Industri Besar dan Sedang 1995*, Jakarta, 1997.

From this table, we can ascertain several significant features about these major component industries in comparison with other types of industry. First, the three major component industries have a relatively large number of establishments. The industry with the largest number of establishments in all the metal and machinery industries is the motor vehicle component manufacturing (121 establishments in large and medium scale[3] in 1995). In contrast, the major assembling industries are characterized by the limited number of establishments. Secondly, the major component industries tend to employ a relatively large number of workers. Electronic component industry is a sub-group with the largest number of workers (44,922 persons in 1995) in all the industry under ISIC 37-38.

[3] BPS defines the scale of establishments by the number of workers; the large scale is 100 persons and more, the medium scale is 20 to 99, the small scale is 5 to 19, and the cottage scale is less than 5. All the tables based on BPS's Industrial Statistics data in this paper follow this definition.

Thirdly, the largest component industry in terms of production value is motorcycle components (Rp.4,218 billion in gross output, Rp.1,415 billion in value added in 1995). Compared with the automobile industry, the production value of motorcycles surpasses that of automobiles in component manufacture. This is in contrast with the assembling industry where the production value of automobiles surpasses that of motorcycles. While in the automobile industry the value added of component manufacture is less than half that of assembly, the value added of motorcycle component manufacture is almost 70 percent of that of motorcycle assembly. The higher proportion of component manufacturing in the motorcycle industry is mainly due to its higher local contents than that of the automobile industry.

2.4 Indonesian Component Industry in the International Perspective

As described above, the Indonesian component industry has recorded a more rapid growth than either the assembling industry or the material industry in the 1990s. The automotive component industry has grown into the major material process industry in this country, with a relatively large number of manufacturers in the case of four-wheel motor vehicle components and with a relatively large value of production in the case of motorcycle components.

Table 4 The Number of Manufacturers of Major Automotive Component in Indonesia Compared with other ASEAN Countries

Name of Component	Indonesia	Thailand	Malaysia	Philippines
Engine component	51	106	79	25
Drive system / Tyre wheel	26	75	100	30
Body part	40	140	137	33
Body electrical component	47	78	90	26
Exhausting system component	10	11	16	9
Fuel system component	17	31	31	2
Brake system component	20	28	36	20
Suspension system component	12	19	26	9

Source : JAMA(Japan Automobile Manufacturers Association), "Overseas Automobile Industry, Market, Present Policies and Prospects in 1996" (in Japanese), Tokyo, 1997, p.24.

However the international perspective provides a different view. Table 4 shows a comparison of automotive component manufacturers among the four ASEAN countries. What is clear from this Table is the fact that Thailand and Malaysia have higher accumulation of manufacturers than Indonesia in every classification of components, although these two countries started domestic automotive component manufacturing in the 1970s, not so far ahead of Indonesia.

It should be noted that in both Thailand and Malaysia the rapid increase of automotive component manufacturers occurred in the last half decade. In the case of Thailand, drastic deregulation after 1991 (tariff reduction, lift of investment regulations, easing of local content regulations) and incentive policies (investment promotion and tax holidays for some designated components and industries) accelerated new investment in this sector. More new direct investment from Japan went to Thailand than any other ASEAN countries. Out of 84 Japanese investments in the Thai automotive component industry, 27 were concentrated during the period from 1993 to 1995 (JAMA, 1997: p.24). Meanwhile, in Malaysia, the automotive component industry was rigorously promoted by the "PROTON[4] Component Scheme" since 1988 and "Vendor Development Program by Tripartite Arrangements" since 1993. The latter program is to support component manufacturers by MITI's intermediation between PROTON, vendors and financial institutions (MITI: Ministry of International Trade and Industry of Malaysia). As a result, the number of *PROTON*'s vendors increased remarkably from 17 at the start of the scheme to 140 in 1996 (JAMA, 1997: p.87). The experiences of these neighbor countries indicate that the relatively low accumulation of component manufacturers in Indonesia is not because of the late start of growth, but because of other factors including policies, foreign investment inflow, and local (potential) manufacturers' capabilities to react.

Table 5 summarizes the economic size of the Indonesian component industry. The component industry contains 7,090 establishments, out of which 766 are large and medium scale ones that produce the great majority of output. The industry absorbs 178,176 workers, which account for 1.8 percent of the total workers in the manufacturing sector in 1995. Its gross output is US$6.3 billion (or Rp.14,165 billion), 6.6 percent of the total output of the

[4]*PROTON* (*Perusahaan Otomobil Nasional Sdn.Bhd.*), which is a joint venture of state-owned *HICOM* and *Mitsubishi Motor Co.* of Japan, is Malaysia's first national car assembler which started to produce Saga in 1985. The second national car is produced by *PERODUA* (*Perusahaan Otomobil Kedua Sdn.Bhd.*) with *Daihatsu Motor Co.* of Japan since 1994, and the third one is produced by *USPD* (*Usahasama Proton DRB Sdn.Bhd.*) with Citroen since 1996.

entire manufacturing sector. Out of this, the automotive component industry (both four-wheel motor vehicle and motorcycle) employs 41,627 workers and produces gross output of US$3.5 billion (or Rp.7,764 billion), accounting for 3.8 percent of the total manufacturing sector.

Table 5 The Economic Size of Indonesian Component Industry Compared with Japan

Industry / Scale of Establishment	Indonesia (1995) No.of Establishment	Indonesia (1995) No.of Workers (person)	Indonesia (1995) Gross Output (US$million)	Japan (1990) No.of Workers (person)	Japan (1990) Gross Output (US$million)
Component Mfg	7,090	178,176	6,301	n.a.	n.a.
(Share in Total Mfg)	(0.3%)	(1.8%)	(6.6%)		
Large & Medium	766	154,625	6,214		
Small	1,279	11,101	44		
Cottage	5,045	12,450	42		
Automotive component*					
Large,Medium & Small	228	41,627	3,453	543,028	72,853
(Share in Total Mfg)	(0.1%)	(0.7%)	(3.8%)	(4.9%)	(5.5%)

Note : 1. *Includes 4-wheel motor vehicle and motorcycle components. For Indonesia. all establishments with more than 5 workers, and for Japan, all establishments with more than 4 workers.
2. Output is calculated with US$1=Rp.2248.6 (1995) and US$1= 144.8 (1990).
Source : For Indonesia, same as Table 1. For Japan, Nissan Motor Co., *Handbook of Automobile Industry 1992 1993*, Tokyo, 1993.

The comparable international data is limited but Japan's data on automotive component industry is available. Since Japan has been the world's highest automobile producer/exporter since 1980, the indicators represent the world highest standard. Japan's automotive component industry is large both in the value of output and in its share of the total manufacturing sector. It employs 543,028 workers and produces gross output of almost US$ 73 billion as of 1990. The number of workers is 13 times as many as Indonesia and the value of output is 21 times more than that of Indonesia. This means that labor productivity is more than 60% higher in Japan than in Indonesia. A notable feature among other indicators is a high share of the industry in all manufacturing sectors: 5 percent of total workers and 6 percent of total value of manufacturing output. The automobile component industry is an important employer in Japan, while its labor absorption in Indonesia is less

than 1 percent of the total. This contrast indicates that the Indonesian component industry, despite its rapid growth in the last decade, is still shallowly rooted and of small size with limited labor absorbing capacity that could be potentially large.

2.5 The Structure of Producers

This section focuses on the structure of producers in the Indonesian machinery component manufacturing industry as of 1995. The major characteristics of this industry are analyzed from 3 dimensions of the production structure: spatial distribution, scale distribution and ownership distribution of producers.

Table 6 Spacial Distribution of Component Manufacturing Industry*, 1995

		Jabotabek			Bandung	Sukabumi	Jawa	Total
		Jakarta	Botabek					
No. of	(unit)	461	1,444	1,905	202	6	4,144	7,090
Establishment	(%)	6	20	27	3	0	59	100
Total Mfg	(%)	1	2	3	n.a.	n.a.	64	100
No. of	(person)	31,766	42,572	74,339	6,614	338	126,447	178,176
Workers	(%)	18	24	42	4	0	71	100
Total Mfg	(%)	6	10	16	n.a.	n.a.	74	100
Value added	(Rp.billion)	1,101	2,083	3,184	96	2	3,784	4,766
	(%)	23	44	67	2	0	79	100
Total Mfg	(%)	17	18	36	n.a.	n.a.	81	100

Note : * The total of large, medium, small and cottage scale.
Source: Calculated from BPS data, Statistik Industri Besar dan Sedang, Kecil, dan Rumah Tangga 1995.

Table 6 shows spatial distribution of producers in the component industry in terms of the number of establishments, workers and value added. The most prominent characteristic of component industry, as is shown here, is a notably high concentration to Jabotabek (an abbreviation of the extended Metropolitan area covering Jakarta-Bogor-Tangerang-Bekasi). The concentration is more conspicuous if contrasted with the distribution ratios of total manufacturing industry; 27 percent of establishments (only 3 percent of all manufacturing), 42 percent of workers (16 percent of all manufacturing), and as high as 67 percent of value added (36 percent of all manufacturing) of the component industry are concentrated into Jabotabek. Even Bandung and Sukabumi, which are known as component producing

centers, have quite small shares in term of value added. Producers outside Jabotabek in Java account for only 12 percent of value added and those outside Java account for 21 percent of total. Another feature derived from this table is that component producers in Jabotabek have a large value added per unit of establishment, namely Rp.1,671 million, more than 6 times as much as that of producers outside Jabotabek in Java. In other words, there is a distinct difference in production scale in terms of value added between producers inside and outside Jabotabek.

Table 7 Distribution of Scale of Establishment in Component Manufacturing Industry, 1995

(%)

	No. of Establishment	No. of Workers	Value Added
Component Mfg			
Large & Mediun	10.8	86.8	98.5
Small	18.0	6.2	0.9
Cottage	71.2	7.0	0.7
Total	100.0	100.0	100.0
Component Mfg in Jakarta			
Large & Mediun	27.4	94.3	98.8
Small	41.2	4.6	1.1
Cottage	31.5	1.1	0.2
Total	100.0	100.0	100.0
Total Manufacturing			
Large & Mediun	3.7	73.9	97.5
Small	13.9	10.0	1.2
Cottage	82.3	16.1	1.4
Total	100.0	100.0	100.0

Source : Same as Table 1.

The distribution of component producers by the scale measured by the number of workers is seen in Table 7. It shows that, first, in the component industry, large and medium scale producers have far greater power by any indicators than other manufacturing industry. Second, this tendency is more evident in producers in Jakarta, where as high as 27 percent of producers are large and medium scale. This fact reveals the notably low shares of cottage scale producers in the component industry in Jakarta. The above points are consistent with the findings about spatial distribution that producers with large-scale production in Jabotabek are the main players of the component industry. Thirdly, producers in Jakarta have another feature. The ratio weight of small-scale producers in terms of the number of producers is considerable (41 percent), which characterizes Jakarta's production structure of this industry. Actually, we can find accumulation of small-scale component producers as the first-, second- or third-layer subcontractors in East Jakarta, not far from the large assemblers of automobiles and motorcycles. We will see this point again in the case studies.

Table 8 Distribution of Ownership in Component Manufacturing Industry*, 1995

Industry	Private National	Foreign	State	Total
Total Component Mfg Industry	628	127	11	766
	(82%)	(17%)	(1%)	(100%)
Motor vehicle component	100	19	2	121
Electronic component	52	58	0	110
Bicycle component	70	7	0	77
Metal pipe/Pipe fitting	55	7	0	62
Industrial machinery component	57	1	3	61
Non-aluminium fabricated structure	50	6	0	56
Other machinery component	49	5	0	54
Motorcycle component	41	6	0	47
Total Metal Industry	2,163	345	48	2,556
	(85%)	(13%)	(2%)	(100%)
Total Manufacturing Industry	19,873	1,192	486	21,551
	(92%)	(6%)	(2%)	(100%)

Note : * Total of large and medium scale establishments.
Source : Same as Table 3.

The ownership distribution can be analyzed only by the number of producers due to data limitations. According to Table 8, private ownership is as dominant in the component industry as other industries. However, a conspicuous exception is electronic component industry. More than half of the producers (58 out of 110) in this industry are foreign companies and 42 out of these 58 are 100 percent foreign-owned. These pure foreign investments are an evident result of drastic foreign investment deregulation policy in May 1994 (*Peraturan Pemerintah* 20/1994) which allowed pure foreign ownership after the ban since 1974. These electronic component manufacturers, initiated by electronic multinationals, are a newly added segment of the Indonesian component industry. Most of them have common features: high export-orientation, relatively new and high technology for Indonesia, international complementary division of works in the East Asian region, and high spatial concentration in the new private Industrial Estates in the Botabek area. In contrast, the majority of the Indonesian component industry remains domestic-market-oriented with still low export performance.

2.6 Imported Contents and Export Performance

Imported contents in the Indonesian component industry compared with other types of metal industry are summarized in Table 9. The component industry in the aggregate shows relatively high levels of imported contents, though there is a variation in ratios of imported contents by commodity. Imported raw materials account for 67 percent of total raw materials and 38 percent of gross output in value in the component industry. These percentages are higher than both the material industry and the assembling industry. At the beginning of development, it was the assembling industry that contained high imported content ratios. For example, the share of imported CKD (complete knock-down) kits in the automobile and motorcycle assembling industry had once been quite large but has gradually declined, since domestically produced components were deleted one by one from the CKD kits. Over the years as the mandatory deletion program proceeded, the imported contents in the assembly industry have fallen on the one hand, and those of the automobile and motorcycle component industry have risen on the other hand. This is because steel,, special steel, special alloy and synthetic resin (raw materials for prime components) are still fully imported, due to quality specifications in case of steel and due to domestic unavailability in case of special materials. This fact of shallow domestic backward linkage is evident from the ratios of imported materials to total materials: as high as 89 percent for automobile components and 58 percent for motorcycle components, as shown in the table. Those ratios of bicycle

components and pipe fittings which do not need specific steel materials are only 30 percent. Thus, as far as the automotive component industry concern, the results are rather ironic — the more items which are domestically produced, the more the imported contents of the industry rise.

Table 9 Contents of Imported Raw Materials in Component Industry Compared with Other Types of Metal Industry, 1995

Type of Industry ISIC	Industrial Sub-Group	Imported Raw Material: Ratio to Total Value of Raw Material (%)	Ratio to Value of Gross Output (%)	Value of Imported Raw Material (Rp.billion)
Component Industry		67	38	5,325
38324	Electronic component	93	55	1,384
38433	Motor vehicle component	89	49	1,717
38442	Motorcycle component	58	37	1,557
38444	Bicycle component	30	17	53
38195	Pipe and fitting	30	16	231
Assembling Industry		55	29	5,311
38322	Communication equipment	94	61	507
38321	Radio and TV	82	59	2131
38292	Heavy equipment	50	35	309
38441	Motorcycle assembling	32	13	458
38431	Motor vehicle assembling	30	13	597
Material Industry		59	27	3,354
Metal Final Product Industry		46	24	2,059

Source : Same as Table 3.

In the industries that start with import-substitution and later transform to a more export-oriented focus, one of the key factors for such transformation is a decline of imported contents, supported by a deepening of industrial backward linkage. From this point of view, the Indonesian component industry as a whole is evaluated as weak in export competitiveness and still far from the turning point. The trade balances of automotive component industry, for example, show deficits of as much as US$ 2 to 3 billion (Table 10). However, the trend of imports seems to have reached its peak for the moment and are in decline after 1996, while the exports have grown at the

annual average rate of 28 percent during the period from 1993 to 1996. As the result, the magnitude of deficits began to decrease in 1996.

Table 10 Trade Performance of Automotive Components*, 1993-1997

(US$million)

	Import	Export	Balance
1993	1,733.3	124.4	-1,608.9
1994	2,898.5	162.7	-2,735.8
1995	3,535.7	221.0	-3,314.7
1996	3,009.7	262.9	-2,746.8
1997 **	1,493.1	160.5	-1,332.6

Note : *Includes 4-wheel and 2-wheel motor vehicle components.
**January to June.
Source : Directorate General of Metal, Machinery and Chemical Industry (1998).

As for the exports of automotive components, there are two types of exports with different motives; (i) exports with price competitiveness due to lowered imported contents, such as battery, filter, spark plug, shock absorbers and radiator and (ii) exports in the framework of regional complementation programs by principals regardless of imported content ratios, such as cylinder block, engine block, clutch system components and brake system components. Major exports of the automotive components and destinations are shown in Table 11. Most highly export-oriented electronic components also belong to the above second category. It indicates that, despite high imported content ratios, complementary procurement networks developed by automotive or electronics multinational companies can provide the expanding export opportunities.

What are the implications of the imported contents and trade performance before 1997 to the present monetary crisis? What impact does the crisis have on the trade performance of the component industry? First, the high imported content of the industry means that the drastic depreciation of Rupiah directly swells the import unit value of raw materials in Rupiah and impacts the cost structure of the industry. Input costs have jumped, while a

price hike of components is forced upon assemblers. The imported raw materials, besides the price jump, have come to be unavailable due to a reduction in activity by importers facing the fluctuations of the Rupiah, so that production of the industry has steeply fallen. The Ministry of Trade and Industry estimates that the production value of automotive components (including motorcycle components) will fall 30 percent from Rp.3.6 trillion in 1997 to Rp.2.5 trillion in 1998 (DGMMCI: 1998, p.7). This is a serious direct impact from the imports side in the short run. Second, exports of components with low imported contents have gained a big advantage of price cuts in dollars. This effect can be utilized to expand exports bound for the assembling industry of developed countries, as well as those bound for overseas after-markets. It is fairly possible that new exportable components may emerge by use of the reinforced price advantage, if such potential producers can take this opportunity. Third, trade deficits of the industry may tend to decrease more, due to a sharp drop of imports in the short term, and due to expansion of volume and a variety of component exports in the middle term.

Table 11 Major Automotive Component Exports, 1995

(US$million)

Component	Value of Export	Destination
Cylinder block	62,215	Thailand, Malaysia, Japan
Wiring harness	32,459	USA, Australia
Battery	19,591	Middle East, Africa, USA
Filter	11,422	Germany, Singapore, Saudi Arab Sudan, Phillippines, Vietnam
Radiator	8,627	Lebanon, USA, Nigeria, Japan Malaysia, Australia, Taiwan
Spark plug	5,490	Thailand, Singapore, Japan New Zealand, Australia, Taiwan

Source : GIAMM

3. SUBCONTRACTING NETWORKS IN THE INDUSTRY: CASE STUDIES

3.1 Subcontracting Networks in the Component Industry : Lessons for Indonesia

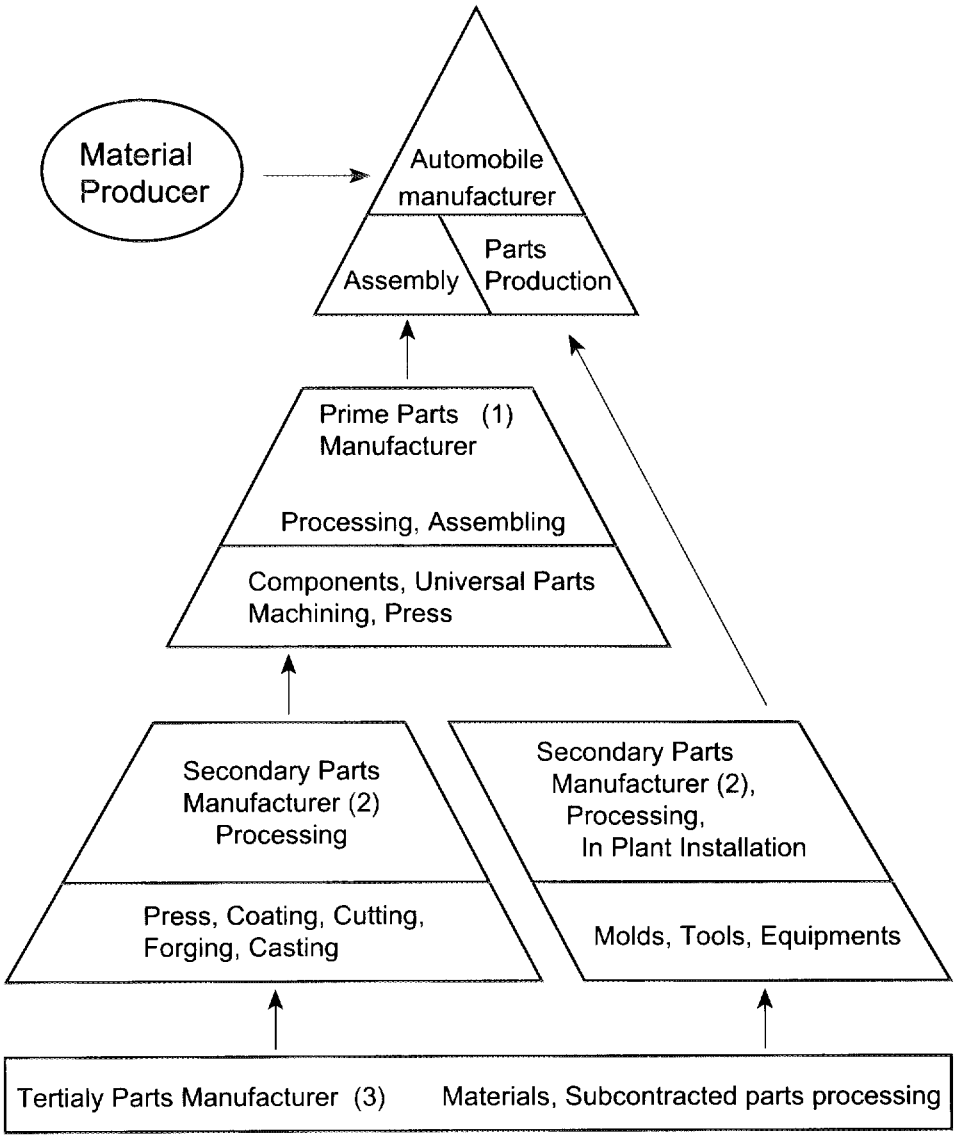
In the overview of the Indonesian component manufacturing industry in the preceding section, we have already mentioned that, although the industry has emerged to be a rapidly-growing major segment of the material process industry with notable accumulation of producers, particularly in the Jabotabek area, its economic size is still small with limited labor absorbing capacity and its structure is less competitive with shallow backward linkage in the international perspective.

The experience in Japan, however, has shown that the component industry has great potential to absorb a large number of establishments and workers with high productivity and to be a supporting base of technological competitiveness of the national economy as a whole. The industrial structure is featured by a wide variety of producers, another extreme of an oligopoly of a few giants, which is more suited for the conditions of populous countries like Japan and Indonesia. A key element of the nebulous structure of producers is networking; every producer undertakes a part of a long chain of processes to manufacture machinery and links by subcontracting with one another. The degree of subdivision of processes and the form of networking depends greatly on the nature of producers themselves and environmental conditions. A model of Japan's subcontracting networks is illustrated in Figure 1. This is based on an actual example of production structure for Japan's largest automobile assembler. The structure is a hierarchical triangle, comprising an apex of the assembler and three layers of component suppliers, as many as 47,308 companies in total.

The main characteristics of Japanese subcontracting networks can be simplified as follows[5]:

[5]For the Japanese subcontracting networks (*or Keiretsu*), there is an extensive accumulation of literature analyzed from various aspects. One of the recent works in the field of economics of organization is Asanuma (1997), which attempts an international comparative study on Japanese corporate networks based on his vast fieldwork.

Figure 1 : A Model of Japan's Subcontracting Networks : A Case of an Automotive Company



(1) Component Manufacturer (168 Companies)
(2) Subcomponent manufacturer (5437 Companies)
(3) Parts Manufacturer (41703 Companies)

Source: Prepared by JETRO Jakarta Center

1. Suppliers of every layer are featured by high technological capability in their specialties and by high discipline in management of cost, quality and delivery.
2. A network has a vertical and hierarchical structure with one-way streams of component supply from the bottom to top (or one-way streams of orders from the top to bottom).
3. The relations between suppliers are longstanding transactional relationship.
4. A network is of an exclusive nature in the sense that suppliers produce only for one assembler.
5. In the network, teamwork among members in all layers works in activities ranging from daily operations to new product development.

Such experiences in Japan firmly indicate that the development of subcontracting networks can be effective also in the Indonesian machinery component industry to expand the size and depth of the industry base. The system can also provide a chance to enhance technological capability and discipline for a number of potential suppliers, including small-scale producers.

Actually, subcontracting relationships between large-scale assemblers and small-scale component producers have so far been promoted in the framework of reinforcement of small scale industries, for instance, by the government-led "Forster Program (*Bapak Angkat Sistem*)" in *Repelita IV* and the "*kemitraan* (partnership)" policy proposed by the *Bali-Jimbaran Group* (a group of major business groups) after 1996. Also in the private sector, the *Astra Group* has long struggled to develop small-scale suppliers under guidance by the group's foundation, *Yayasan Dharma Bhakti Astra* (*YDBA*), since its establishment in 1980. The group's motivation is based on the group founder's original idea, and is designed to lay a firm foundation for the group's own core business in the machinery assembling and component manufacturing industry.

A precise assessment on effectiveness of each of the above policies on the development of subcontracting networks in Indonesia is beyond the scope of this paper. However, according to the author's field survey, it can be observed that not a few subcontracting suppliers have grown in the last decade, especially in the areas where business ties with the *Astra Group* and/or guidance by the *YDBA* were present. Maybe Indonesia is still in the germination stage of subcontracting network development, viewed from the machinery industry as a whole where "the industrial structure was essentially reflecting a 'dual sector' condition with obvious lack of

subcontracting linkages" (Goeltom: 1997, p.170-171). Nevertheless, it would be useful to focus on this germinant phenomenon and to try to extract some notable features, precisely a mechanism of generation and expansion of networks, key factors to effective work, in order to realize the possibility of further development of subcontracting networks in Indonesia. The rest of this section is devoted to analyses of case studies on emerging subcontracting networks.

3.2 The Structure of Subcontracting Network for the Honda Motorcycles

The case studies are selected from the Indonesia's motorcycle component industry under the business umbrella of Astra Group, that is, the Honda motorcycle component manufacture.

Table 12 Production of Motorcycles in Indonesia by Brand, 1992-1997

(1,000units)

Brand	1992	1993	1994	1995	1996	1997
Honda	264	365	426	521	695	888
	(59%)	(59%)	(55%)	(50%)	(49%)	(48%)
Yamaha	123	163	211	275	363	491
	(27%)	(26%)	(27%)	(26%)	(25%)	(26%)
Suzuki	87	78	128	204	299	387
	(19%)	(13%)	(16%)	(20%)	(21%)	(21%)
Kawasaki	-	-	-	22	51	80
				(2%)	(4%)	(4%)
Vespa	15	15	17	22	17	16
	(3%)	(2%)	(2%)	(2%)	(1%)	(1%)
Total production	449	621	781	1,043	1,425	1,861
% of total	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Growth rate		(38%)	(26%)	(34%)	(37%)	(31%)

Source : PASMI

The motorcycle industry, among a variety of machinery industries, may be one of the most advanced industries in terms of subcontracting network development in Indonesia. This is firstly due to its large production volume which has prominently expanded in the last five years at an average annual growth rate of 33 percent to reach 1,861 thousand units in 1997, which is

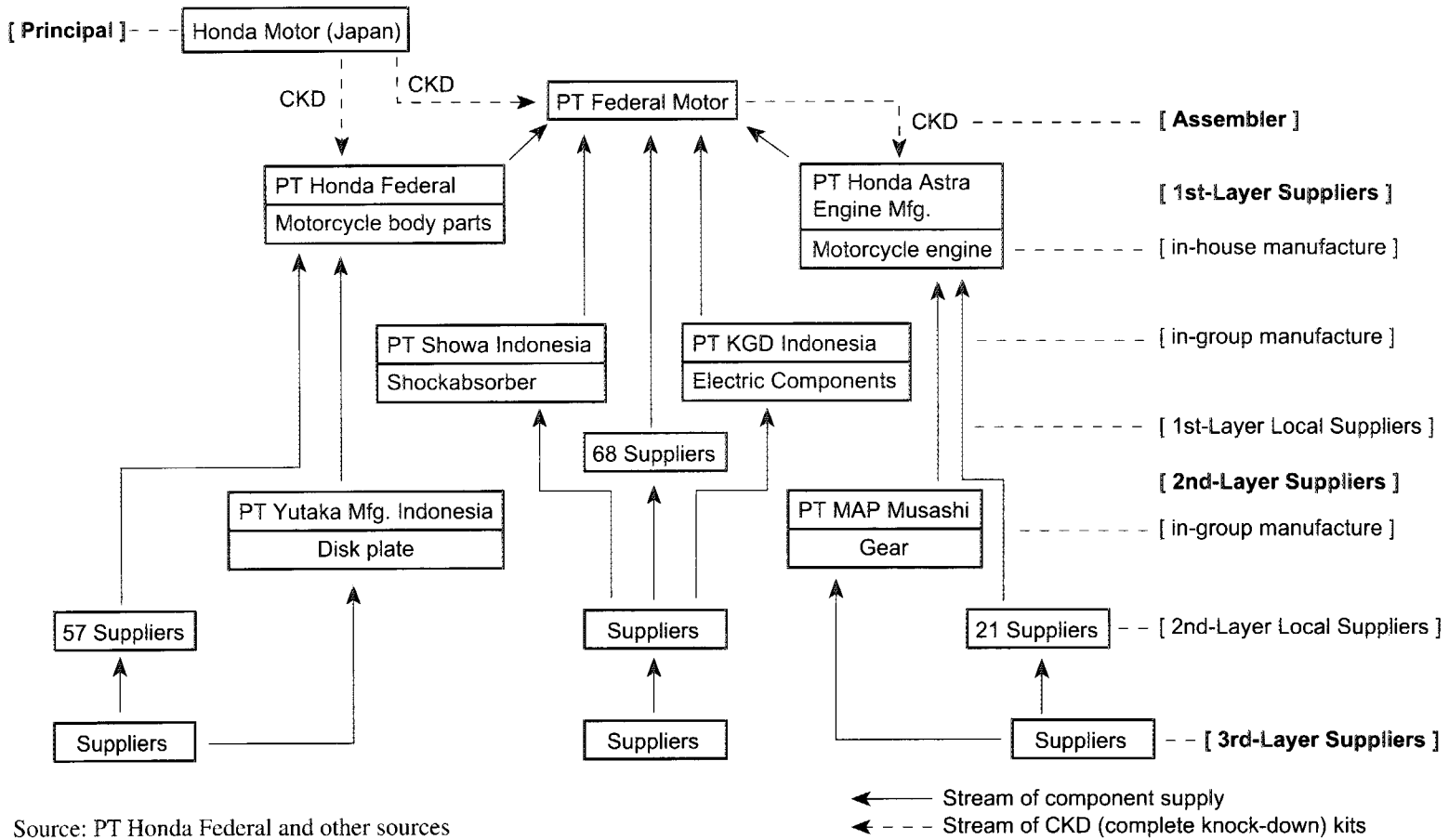
almost five times as many as that of automobiles (389 thousand units in 1997). The second reason is that a motorcycle is composed of thousands of components manufactured through a chain of various kinds of processes. The third reason is that the required technology is relatively simple, so that an entry barrier for potential producers in terms of technology is not high as long as they have access to markets. Honda is the top brand in the Indonesia's motorcycle market, accounting for 48 percent of the total market volume with 888 thousand units as of 1997 (see Table 12). This volume is the world's largest level of all of Honda Motor's global production sites, almost equal to the largest factory in Japan.

Figure 2 illustrates the structure of subcontracting networks of Honda motorcycle manufacturing in Indonesia. The structure takes a hierarchical vertical form, composed of an apex of an assembler and three layers of component suppliers, just like Japan's model in Figure 1. The assembler is *PT Federal Motor*, a private domestic company owned by *PT Astra International Inc.*, a holding company of the *Astra Group.*

The first-layer suppliers who directly supply their products to *PT Federal Motor* totaled 72 as of 1996. Those include 2 in-house prime component manufacturers, jointly owned by *PT Federal Motor* and *Honda Motor*, Japan, and another 2 'in-group' (meaning within the *Astra Group*) manufacturers, also jointly owned by *PT Federal Motor* and respective Japanese partners. The second-layer suppliers are estimated to amount to around 130 (116 according to the study by Thee (1997, p.120)). Those include as many as 57 subcontractors of the first-layer body parts maker, *PT Honda Federal,* 21 subcontractors of *PT Honda Astra Engine Manufacturing*, and some more subcontractors of *PT Showa Indonesia*, a shock absorber manufacturer. In the second-layer, there also exist 2 in-group manufacturers, owned by *PT Federal Motor* and its respective Japanese partners. The third-layer suppliers contain a number of process subcontractors, (those who only subcontract one process of component manufacture, such as welding, tapping and painting). The number of suppliers is hard to specify but is roughly estimated as a little more than the number of second-layer suppliers, though some firms belong to both layers. The pure tertiary suppliers without double-counting are fewer than secondary suppliers in number.

Therefore, an obvious difference with the Japan's model lies in a shape of the hierarchy: while in the Japan model, the ratio of the number of first, second and third-layer suppliers is 1 : 32 : 248, that of the above Indonesia's case is 1 : 1.8 :1.3. It means that the Japan's model has a mountain shape with exceedingly wide skirts and Indonesia's case has a water vase shape

Figure 2 : The Hierarchical Structure of Subcontracting Network for the Honda Motorcycles in Indonesia, 1996



Source: PT Honda Federal and other sources

where the bottom is smaller than the middle. In other words, the degree of downward out-sourcing is extremely high in Japan, while the upper-layer manufacturer is of greater weight in Indonesia. This point is endorsed by the fact that, despite the world's largest level of production volume, the ratio of Honda's in-house manufacturing in Indonesia (by Honda's two prime component manufacturers in the first layer) is at the world's highest level. The in-house manufacture ratio by *PT Honda Astra Engine Mfg.* is 85 percent in terms of the number of items and that of *PT Honda Federal* (body parts) is 50 percent (more than 80 percent in terms of value). They do not place orders outside for most of their components, which would naturally be out-sourced in Japan or even in Thailand[6].

3.3 Major Characteristics of Subcontracting Network of the Honda Motorcycles

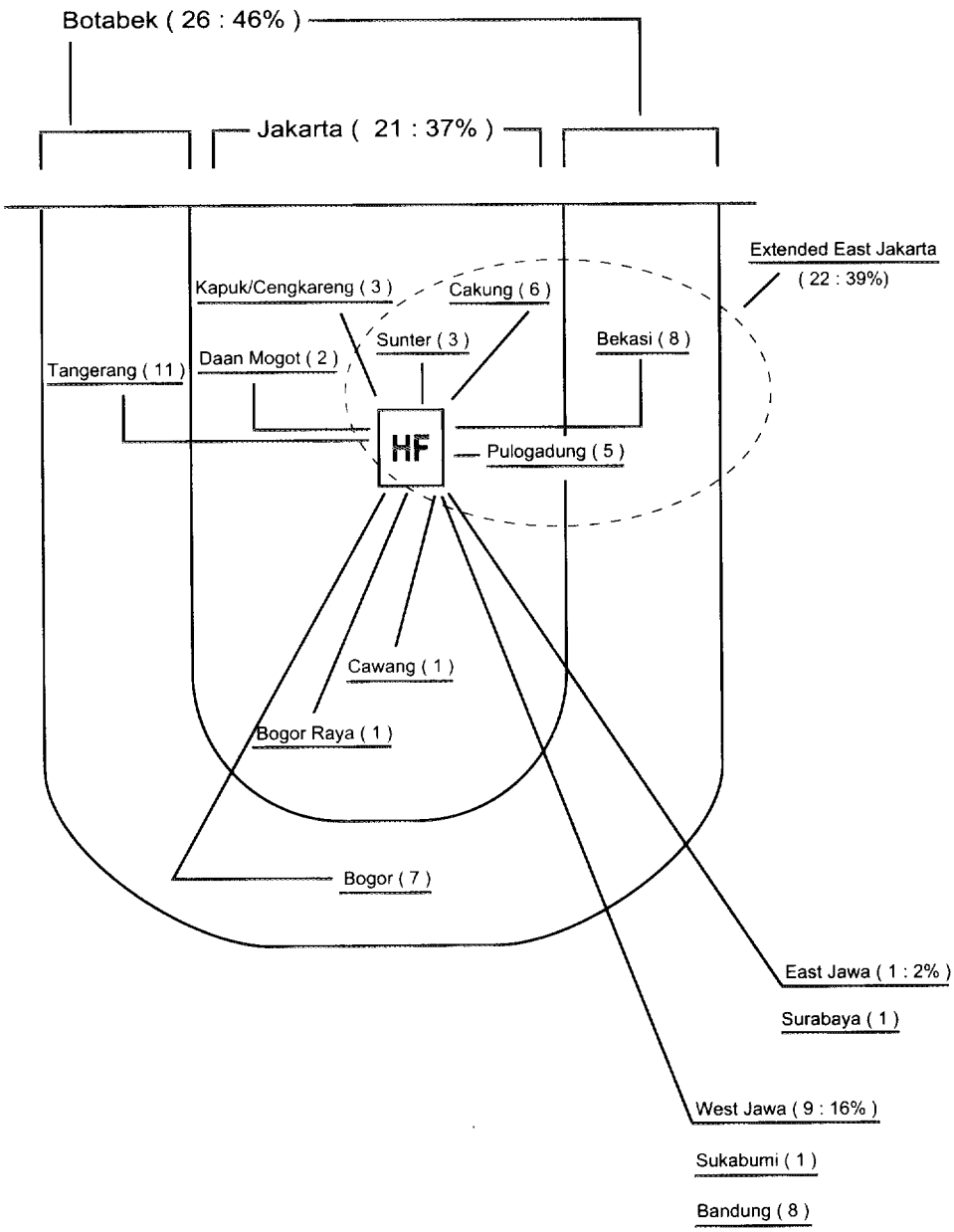
Even though the in-house manufacture ratio is still considerably high as stated above, it is also obvious that more than 200 suppliers comprising the subcontracting network of the Honda motorcycle manufacturer have already emerged. Therefore it is useful to look at major characteristics of the subcontracting network in order to examine the determinant factors for development of subcontractors.

Proximity or Spatial Concentration

The first characteristic of the subcontracting network is proximity, or spatial concentration of suppliers. Figure 3 is a schematic map of locations of suppliers to *PT Honda Federal*. This company is located in Sunter, East Jakarta, and is a first-layer supplier, possessing the largest number of the second-layer suppliers. Out of 57 suppliers, 21 suppliers are located in Jakarta (37 percent), of which 14 are in East Jakarta (25 percent), and another 26 are located in Botabek (46 percent), so that the Jabotabek in total holds 47 suppliers (82 percent). This concentration ratio to Jabotabek (82 percent) is extremely high compared with that of all component industry, 27 percent (Jakarta:6 percent + Botabek:20 percent) and that of all manufacturing industry, merely 3 percent (Jakarta:1 percent + Botabek:2 percent) (Table 6).

[6]Based on an interview the author conducted with a Japanese executive in *PT Honda Federal* in 1997.

Figure 3 : The Spacial Distribution of 57 Suppliers of Motorcycle Components for *PT Honda Federal*, 1997



Note: Figures in parentheses are the number of suppliers
Source: Prepared by the author based on information from PT Honda Federal

In Jabotabek, the center of concentration is "the extended East Jakarta area", that is, East Jakarta (Sunter, Pulogadung, and Cakung) plus Bekasi, which covers 22 suppliers (39 percent). The distance from *PT Honda Federal* in Sunter to Pulogadung and Cakung is 7 km, and Bekasi is within 20 km. The concentration in the extended East Jakarta area of the motorcycle component subcontracting network is closely related to the concentration of motorcycle assemblers in East Jakarta; *Honda* is in Sunter, *Yamaha, Kawasaki* and *Vespa* are in Pulogadung, and *Suzuki* in Bekasi, so that 79 percent (in terms of production volume) is assembled in East Jakarta and 100 percent in the extended East Jakarta area.

Since many subcontractors supply to plural motorcycle assemblers as is to be described later, the spatial concentration of assemblers naturally invite concentration of subcontractors. Proximity to assemblers/first-layer suppliers is crucial for the lower-layer suppliers due to increasing frequency of transportation of supplies (once a day). Proximity between suppliers is also important for mutual subcontracting of processes and exchanging information on markets and orders. As a result, proximity in the subcontracting network saves costs and provides external economies for the suppliers involved.

Non-Exclusive Supply Destination

When one observes the hierarchical structure of the subcontracting network from the apex, its shape is of a closed form of water vase, as stated before. Observing from the middle or the bottom stratum of the hierarchy, however, it is found that the structure is not a closed form but of very open nature in terms of supply destinations. The supply destinations are not necessarily limited to one group / one brand, and also not limited to one kind of industry. Thus the second characteristic is non-exclusiveness of supply destination in the network, which contrasts with Japan's model.

A good example is a case of a middle-stratum supplier, named *PT Adhi Wijayacitra,* a company known as a manufacturer of Honda motorcycle components (Figure 4). The company's major customers are *PT Honda Federal* and *PT Federal Motor,* accounting for 45 percent of the total order received by the company in value. This means that the majority of orders is directed to destinations other than the main customers. While another 17 percent are also for the *Honda* motorcycles, the company is concurrently a first-layer supplier for *Kawasaki* motorcycles (22 percent of total orders) and for *Vespa* scooters (6 percent). Besides, it also supplies some components for non-motorcycle industry, not only machinery component industry within the *Astra Group* but also non-*Astra*, non-motorcycle component industries,

such as manufacturing of metal boxes for electric control equipment for the *Nasional Gobel Group*. In sum, the degree of non-exclusiveness of the company's supply destination is measured by such percentages as 55 percent as non-main customers, 38 percent as non-Honda motorcycles, 36 percent as non-Astra, and 10 percent as non-motorcycle supply.

As is illustrated in Figure 4, *PT Adhi Wijayacitra* has its own 34 subcontractors, 17 of which supply components or provide subcontracted processing exclusively to *PT Adhi Wijayacitra*. As a result, viewed from the standpoint of *PT Adhi Wijayacitra*, the structure of subcontracting network is just an inverted triangle, unlike the triangle of the original Japan model.

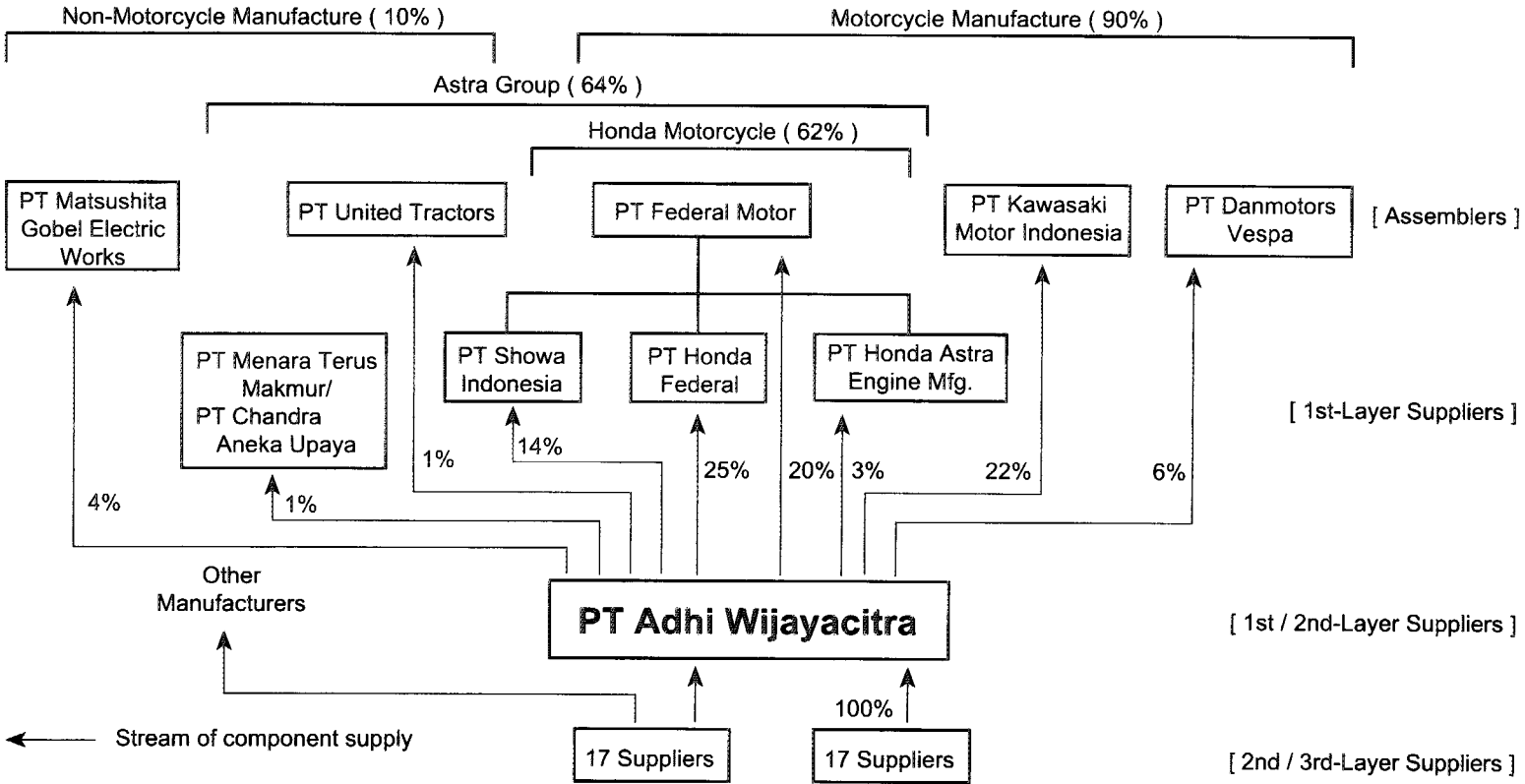
Why are subcontracting networks not exclusive in the case of Indonesia? What are the determinants on the degree of non-exclusiveness of supply destination? One of the factors to explain the non-exclusiveness in Indonesia is a limited volume of orders from one customer. This is closely related to a limited ratio of out-sourcing, a limited ratio of local procurements, and in the case of non-motorcycle machinery, the limited size of the available markets. When suppliers are of cottage scale or in the infant stage, exclusive supply to one destination is rather common. However, as suppliers upgrade their production capacity, quality of work, or variety of production facilities, orders from one customer become not enough to optimize their capability to realize the economies of scale and scope. There is a tendency that the higher the capability of a supplier becomes, the higher the degree of non-exclusiveness of his supply destinations becomes.

Flexibility in Stratum Positions

The structure of subcontracting networks observed in the Indonesian motorcycle component industry is flexible, not only in terms of supply destinations but also in terms of suppliers' position in stratums. The flexibility in stratum positions is the third characteristic.

Let us analyze an example. Figure 5 is a subcontracting network from the viewpoint of the bottom stratum. Our example is a manufacturer of Honda motorcycle components at the bottom stratum, supplier R. R has two main routes of supply for its 4 main customers, all related to Honda motorcycles. The first route is a direct supply to the first-layer suppliers, *PT Honda Astra Engine Mfg.* and *PT Showa Indonesia*. The second route is supply through a joint marketing device among small-scale suppliers including R, namely *PT Usbersa Mitra Logam*, to the first-layer supplier, *PT Honda Federal*, and the assembler, *PT Federal Motor*. In the first route, R is the second-layer supplier. In the second route, R is the third-layer supplier and second-

Figure 4 : The Subcontracting Network Viewed From the Middle Startum : A Case of *PT Adhi Wijayacitra*, 1997



Note: Percentage is the shares to total sales

Source: Prepared by the author based on information from PT Adhi Wijayacitra

layer supplier. Other than these main customers, R also supplies to several first-layer component makers within the *Astra Group* as well as outside the Group. R's position in these businesses is the second-layer supplier in most cases. But this is not always so. After R successfully gained orders from the above-stated *PT Honda Astra Engine Mfg.*, R enthusiastically devoted as much as 8 months to marketing his firm as a direct supplier to *PT Indomobil Suzuki International,* an assembler of the Suzuki motorcycles under the *Salim Group*, a rival of the *Astra Group* in the Indonesia's automotive industry. At last, R successfully gained orders for one item of the Suzuki motorcycle components. As the result, R, the second-layer and the third-layer supplier in the existing subcontracting network of the Honda motorcycles, has leapt to be a first-layer supplier for Suzuki motorcycles. The flexibility beyond stratums and beyond the group boundary causes no problems, as long as the supplier has sufficient capability and capacity.

According to the author's observation based on field studies, the majority of subcontractors in the motorcycle component industry has similar flexibility to R in their positions in stratums, except for the first-layer uppermost segment (foreign-joint prime component manufacturers, for example), and the third-layer lowest segment such as very new suppliers. The majority can be third-layer suppliers, second-layer suppliers, and concurrently first-layer suppliers, which is a phenomenon hardly seen in Japan's subcontracting networks.

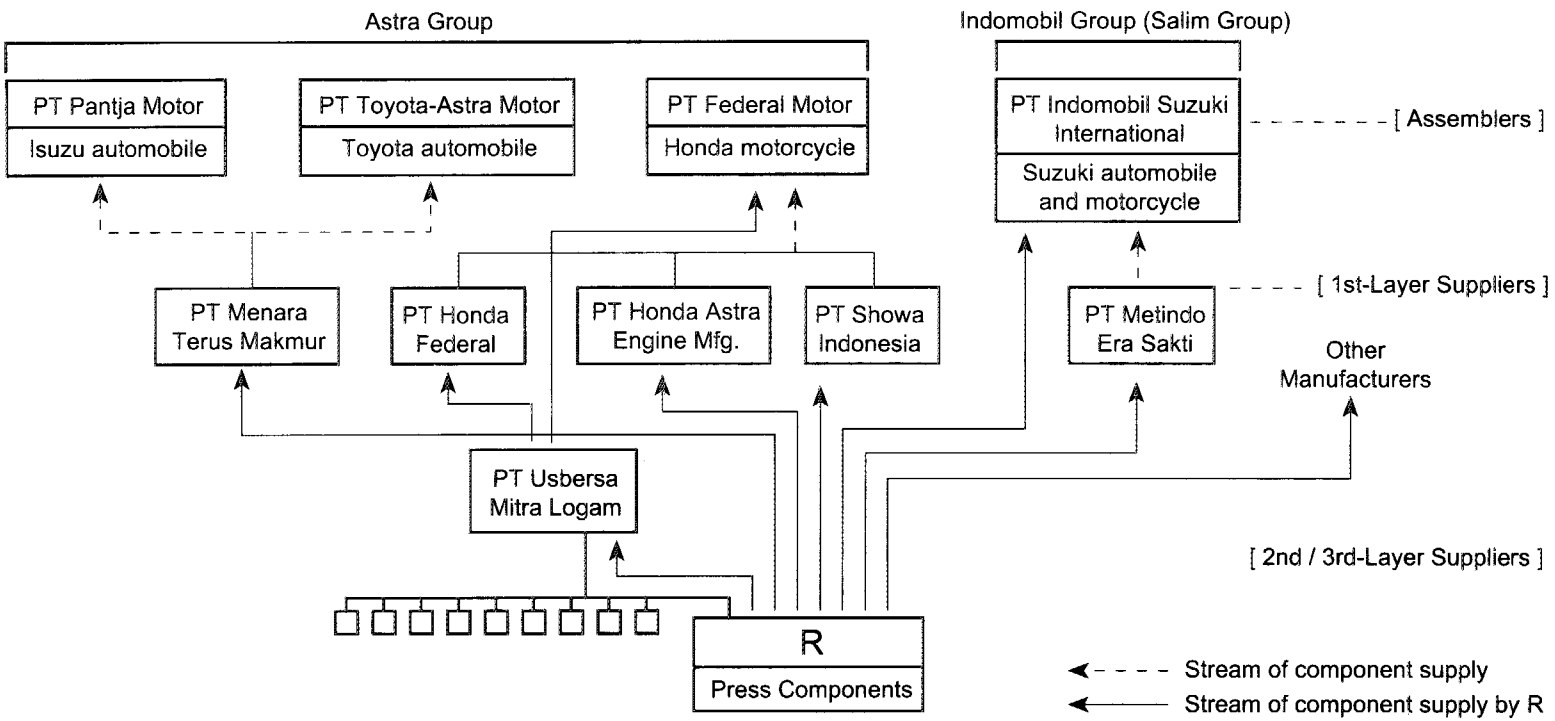
3.4 Developing its own Subcontractors : The Case of PT Adhi Wijayacitra

The two case studies are introduced with a view to searching for a mechanism of generation and expansion of subcontracting networks in Indonesia.

The first case is *PT Adhi Wijayacitra* (hereafter *AW*), the first- and second-layer supplier for Honda motorcycle components, illustrated in Figure 4. *AW* has so far established itself as one of the most successful small-scale subcontractors in the local mass media and by the *Astra Group itself* (YDBA, 1996a, p.20-21). But the reason *AW* received a *Upakarti* prize[7] from the Government in 1992 was not its own growth performance but its efforts to develop its own subcontractors. AW's subcontractors have increased from 6 in 1992 to 34 in 1997 as a result of its efforts to nurture subcontractors.

[7] *Upakarti*, that means "do a favor" in Sanskrit, is a prize for small-scale or handicraft industrialists who explore their own fields including pioneering exports, creating employment opportunities and so forth.

Figure 5 : The Subcontracting Network Viewed From the Bottom Stratum : A Case of Supplier R, 1997



Source : Based on the author's interview at R, and UIUKK Jakarta under Yayasan Dharma Bhakti Astra

In 1997, *AW* earned Rp.6 billion while employing 163 workers. According to AW's founder-president, H.Linggo Suprapto, the number of workers would reach 400 and overhead costs would be far higer if *AW* had no subcontractors[8]. During the last 4 years when the total value of orders for *AW* rapidly increased at the annual average rate of 53 percent, *AW* has directed the increased orders toward subcontracting, rather than increasing AW's in-house production capacities and workers. AW's profit ratio declined from 15 percent before *AW* began to promote subcontracting to less than 10 percent, because of necessary costs of guiding some subcontractors. Despite the decline in this profit ratio, the value of AW's profit has continued to rise over the years. Even though the profit ratio may decline in the short term, effects of subcontracting should be viewed on the long-term basis, Linggo said.

AW's 34 subcontractors vary widely. Out of 17 subcontractors which have plural customers other than *AW*, some are large manufacturers with a certain speciality; turret lathe, carbureting and coating. The others subcontract a certain process such as pressing, boring, plating and tapping in accordance with blueprints provided by *AW*, 3 of which are capable of making press dies by themselves. The remaining 17 subcontractors which supply exclusively to *AW* are young and of small scale in general. Out of this segment, there are some that AW has assisted in their formation.

One extreme case is an 'in-house subcontractor' led by a former *AW* employee. *AW* allowed him to use *AW*'s in-house lot, machinery and electricity and let 14 workers spin-off for him. What he has to do is only to pay for the workers. This first 2 years' subsidy was under the agreement that he should have his own factory after 2 years; if he cannot construct one, he has to pay back the subsidy costs. With no set-up costs, the subcontractor started operations, and has used subsidized profits to prepare land and facilities. Another interesting case is a subcontractor making use of side jobs at home by the wives of AW's employees. At the employees' houses behind the *AW*'s factory, they can do the work — a simple tapping of components — in spare moments, while taking care of their children. With this device, *AW* can effectively utilize idle labor of the lowest opportunity costs in the proximity. These examples reveal Linggo's unique innovation for deriving subcontractors.

[8]This section is based on the author's interviews with H.Linggo Suprapto, managers and subcontractors and written data prepared by them at *PT Adhi Wijayacitra* and at SUIK, Pulogadung in 1997.

For the purpose of promoting subcontractors' capabilities, *AW* has started programs. The first is an apprentice program for two weeks in such fields as die making and accounting. The second is a QC (quality control) guidance course for subcontractors once a month, taught by *AW*'s president and managers. The third is an evaluation system on subcontractors' performance. *AW*'s team of 5 person conducts surveys, using a unified evaluation form which covers such aspects as QC, purchase, delivery, control system, human resources and so forth.

The efforts to develop its subcontractors by *AW* are based on Linggo's own experiences as a subcontractor. He himself was a spin-off from *PT Federal Motor* after his 15 years service and began with 2 machines, 6 workers including himself, an order of 12 items with a value of Rp.4.5 million, in a small lot at SUIK (Facility for Small Industries) in the Pulogadung Industrial Estate. The initial capital was covered by a Rp.34 million loan from *Bank Dagang Negara* (a state bank), guaranteed by *PT Federal Motor.* However, the first 3 years were a severe period for him, he said. While his motivation to develop subcontractors is basically rooted in his moral and social thoughts that one should grow together with one's surroundings and assist the small, which agrees with the *Astra Group*'s philosophy, a key of his policy is that "subcontracting is a pure business, not charity, that benefits both"; the benefits of pure business is realized by smaller overhead costs, cheaper prices, larger profits in the long run, and smaller tax payments for both.

3.5 An Attempt at Suppliers' Grouping : The Case of *PT Usbersa Mitra Logam*

The second case is an unique attempt at grouping of suppliers, *PT Usbersa Mitra Logam* (hereafter Usbersa), of which supplier R (illustrated in Figure 5) is one of the members. Usbersa was established in 1992 by joint and equal shareholding of 10 small-scale metal processing firms located adjacently in SUIK, Pulogadung in East Jakarta. This is an attempt in the framework of promoting capabilities of *Astra Group*'s subcontractors under the guidance of UIUKK (Small Scale Enterpreneurship and Cooperatives Information Unit) Jakarta in SUIK under the *Yayasan Dharma Bhakti Astra (YDBA)*[9].

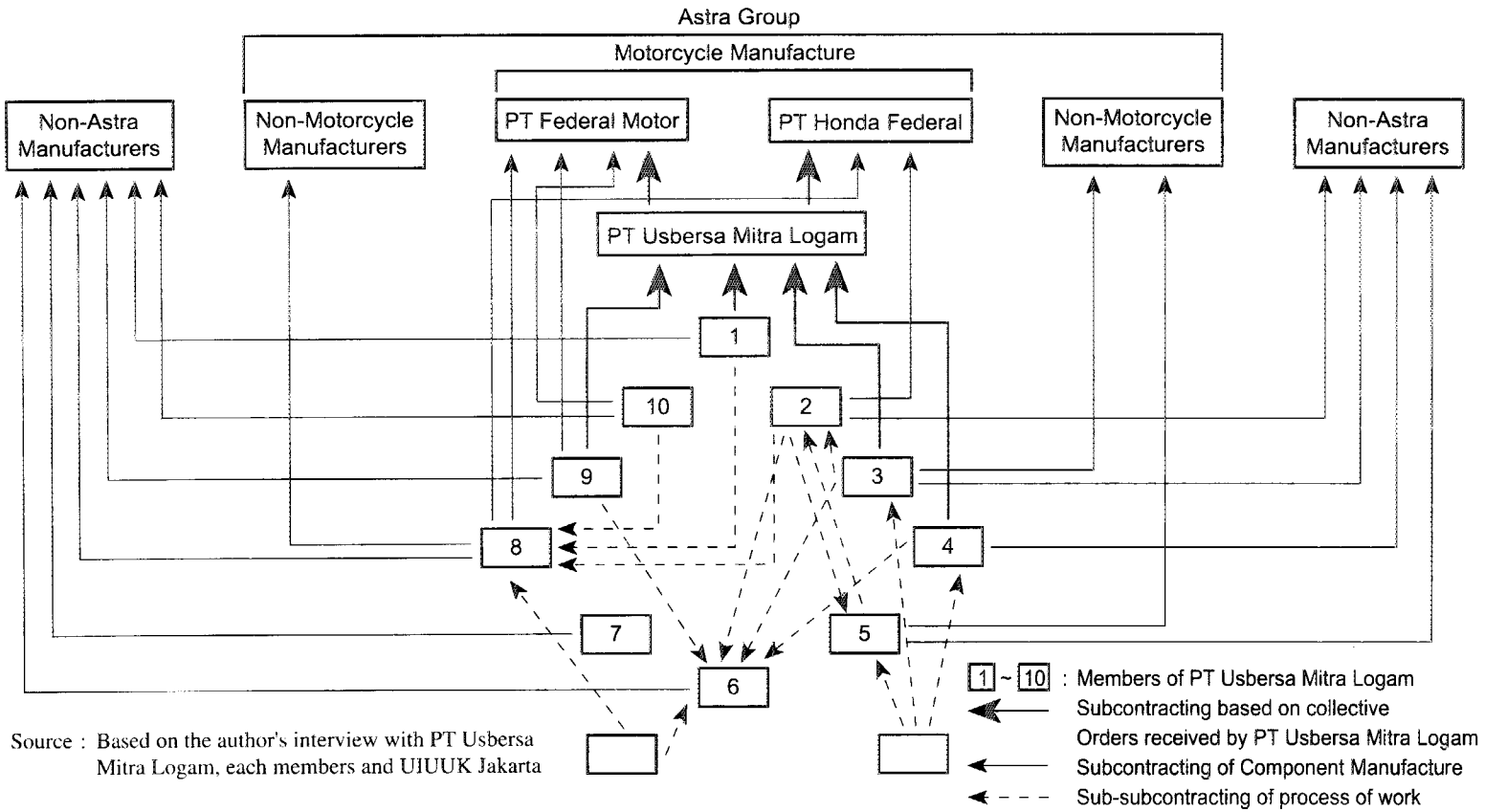
[9]This section is based on the author's interviews at *PT Usbersa Mitra Logam,* each member of the company, and a facilitator in UIUKK in SUIK, Pulogadung in 1997, and written data prepared by them.

There are 3 formal purposes in this grouping. The first is to collectively and effectively receive guidance in technology as well as management provided by the *YDBA* and *PT Federal Motor* in the *Astra Group*. The second purpose is to collectively gain orders from companies within the Astra Group. The customers find it easier to place order to *Usbersa* rather than to individual small-scale member firms, partly because the order volume becomes larger, and partly because local UIUKK personnel can supervise manufacturing and delivery by members. The third purpose is to collectively receive loans from banks. *Usbersa* members can receive loans based on the recommendation of *YDBA*. Instead of receiving these benefits, the members of *Usbersa* have to pay 2.5 percent of sales from the joint order to finance administration and marketing costs, wages for 2 staff members and taxes. In this way, *Usbersa* started as a device for receiving guidance, orders and financing collectively.

Figure 6 depicts actual streams of subcontracted component supply and processing by the 10 member firms of *Usbersa*, as of 1997. The component supply through *Usbersa* to *PT Federal Motor* and *PT Honda Federal* is the main stream of subcontracting based on the lump orders that *Usbersa* has collectively received. It is evident from the diagram, however, that only 4 out of 10 member firms supply through *Usbersa* and the streams through *Usbersa* are a merely minor part of the whole network. The diagram shows a flexible network where the following streams of supply exist other than those through *Usbersa* : 1)component supply by individual member firms not through Usbersa to the same Honda motorcycle manufacturers, 2)non-motorcycle component supply by individual member firms to *other Astra* companies, 3)component supply by individual member firms to non-*Astra* companies, 4)mutual subcontracting of processes among member firms, and 5)subcontracting of processes by member firms to non-member firms.

Major characteristics of this network as a whole are as follows. First, non-exclusiveness to the *Astra Group* is clear because all the member firms have customers outside the Group, though Usbersa was formed with the guidance of the *Astra Group*. Second, the shares of the *Astra Group* in the total value of order of each member have a wide variance, ranging from almost 100 percent in case of firm 1 and 4 to below 5 percent in the cases of firm 5,6 and 7. Third, the member firms have flexibility in their stratum positions, which is indicated by plural arrows from each firm (solid arrows indicate their status as first- or second- layer suppliers to assemblers, and dotted arrows indicate their status as second- or third- suppliers to other member firms). Fourth, crucial factors to generate and maintain a subcontracting network among members (dotted arrows) are proximity and

Figure 6 : The Network of Subcontracting and Division of Work : A Case of *PT Usbersa Mitra Logam*, 1997



Source : Based on the author's interview with PT Usbersa Mitra Logam, each members and UIUUK Jakarta

communication. Member firms with many orders tend to be providers of subcontracts and member firms with idle or specific production facilities tend to be receivers of subcontracts. Daily close contacts among adjacent members with the exchanging of information promote such networking.

Then the question is why member firms try to diversify supply destinations outside *Usbersa* / the *Astra Group* and what are the motivations. One of the deteminate motivations to diversify to customers outside is profitability. Some member firms implicitly stated that some regular as well as temporary orders from outside *Astra* can be more profitable, while orders through *Usbersa* or within the *Astra Group* have advantages in stability and continuity of receiving orders. In the case of company R mentioned before, high profitability is regarded as one of the crucial reasons to explain why R has been so motivated to receive direct orders from the major assemblers outside *Astra*. Then, the next question is why member firms are still willing to belong to *Usbersa* despite the diversification of supply destinations outside Astra, and despite the lack of major business ties with *Astra* in some cases; or, in other words, what are the benefits from Usbersa for the member firms.

The first benefit from joining *Usbersa* is guaranteed access to the market, through regular order from *PT Federal Motor* and *PT Honda Motor*. But this benefit is not for all member firms and also is not regarded as advantageous in terms of probitability. The second benefit is access to bank credits. A Rp. 200 million loan from *Bank Universal* (a private bank affiliated in the *Astra Group*) was provided to *Usbersa* and allocated to member firms. But it is also not for all members, because some did not need new credit and some already had access to other bank loans. Based on the author's interviews, the third benefit from *Usbersa* that most member firms regard as important is accessibility to information in a wide sense. Information inflows gained by joining *Usbersa* include formal guidance and training courses on technology, QC and management in UIUKK or under YDBA, market and product information through daily informal conversations among members, and other various information from the government, private and banking sectors because of the reputation of *Usbersa*. This fact indicates that the network of *Usbersa* has functioned as external economies in terms of information flows for each of the member firms.

3.6 Findings from Case Studies

To sum up this section, major findings from the above case studies on subcontracting networks of the Honda motorcycle components in Indonesia are summarized as follows:

1. The spacial distribution of subcontracting networks shows prominent concentration in the extended East Jakarta area, which indicates that the proximity to assemblers and among suppliers is one of the determinate factors for developing the networks.
2. The structure is a hierarchy with an assembler at the apex and the three layers of suppliers, but supply destinations are not exclusive to one assembler, possibly to the rival assembler, unlike Japan's model. As a result, the shape of the streams of subcontracting in the whole network forms an inverted triangle.
3. In the network, a suppliers' position in stratums is flexible. One supplier can be a second-layer, a third-layer subcontractor as well as a first-layer subcontractor concurrently.
4. In fostering subcontractors, it can be observed that set-up costs are subsidized in the initial stage by deriving 'in-house' subcontractors and that housewives' side jobs at home — labor with the lowest opportunity costs — can be effectively utilized for subcontracting.
5. Some cases show that spin-off of employees from an assembler or its subcontractors constitutes a good impetus to create new lower-layer subcontractors.
6. As prerequisites for development of subcontracting networks, rapid increase of orders is necessary to absorb the initial costs of building new networks, and pure business sense is necessary to maintain and expand mutually beneficial (cost-saving) relationship between providers and receivers of subcontracts.
7. There is an attempt by small-scale suppliers' grouping to facilitate gaining orders, guidance, bank loans and various information collectively. This grouping has become a core of expansive subcontracting networks, motivated by higher profitability. The networks include mutual subcontracting of processes among adjacent member firms of the group.
8. In the non-exclusive subcontracting network, subcontractors tend to balance 2 kinds of orders: stable, regular (or recurrent), but less profitable orders from main customers and more profitable orders, either temporary or regular, from outside the main customers.
9. In case of small-scale suppliers' grouping, what the members regard as the most important benefit of joining the network is information inflows including guidance, market information on markets and so forth, which constitute external economies for each member firm's business.

4. CONCLUSION

In the Indonesian machinery industry as a whole, there still exists a dual economy composed of large-scale assemblers of large-sized machinery on the one side and small-scale metal processing firms for traditional equipment, spare parts, or machine repairing and overhauling on the other side. However, in some types of machinery products such as motorcycles, automobiles, electronic appliances and agricultural machinery, component manufacturers to fill the gaps in the long-existing dual economy have grown rapidly in the last decade. Although the relative economic size of the component manufacturing industry is still small with limited labor absorption compared to Indonesia's potentials in the international perspective, the accumulation of large, medium and small component manufacturers centering in the extended East Jakarta area has emerged and subcontracting networks among them have started to develop.

Case studies in this chapter have shown mainly two things. First, the emerging subcontracting networks in the Indonesian component industry are of very flexible nature—— no strict brand exclusivity, plurality of supply destinations, and a supplier's possible position in plural stratums. This makes Indonesia's networks quite different from Japan's model, despite the seeming similarity. This flexibility may be partly because of limited volume of orders or uncertainty that force suppliers to diversify customers, and partly because of limited highly-qualified suppliers to force assemblers to concentrate such sources, but also may be related to Indonesia's flexible socio-cultural relationships. The latter possibility has to be studied separately.

The second point shown by the case studies is that the generation and expansion of subcontracting networks now going on in Indonesia is purely business-oriented. As an owner/manufacturer said, subcontracting is not a charity but a pure business that benefits both sides by smaller costs, cheaper prices, larger profits in the long run. Deriving subcontractors by making use of effects of proximity, spin-off momentum of experienced employees and labor with the lowest opportunity costs is economically rational. Each of member in the suppliers' grouping is making use of the networks as external economies in terms of information flows. It is higher profitability that motivates aggressive suppliers to expand their supply destinations. The fact that the development of subcontracting networks is business-oriented can explain the limited effects of linkage-promotion policies as a social policy that the government has so far supported. It also explains why the prime mover of developing subcontractors at present in Indonesia is the private sector—especially some large business groups in the machinery

industry and also some subcontractors in the middle stratum themselves—not the government sector or foreign economic assistance. Unfortunately, foreign economic assistance, despite the alleged purpose of promoting medium and small firms, has so far rarely reached to the level of second-layer and third-layer subcontractors which have started developing in the last decade.

Based on these implications from case studies, what are the key conditions to realize the possible further development and enhancement of subcontracting networks in Indonesia? First, the study indicates that market growth is a prerequisite for effective work of the existing networks as well as for new generation of subcontractors. Second, for the foreign part, especially Japan's part, it is necessary for assemblers and prime component manufacturers to move their in-house manufacturing toward domestic out-sourcing. In this context, a new wave of foreign investment inflow to middle-stratum component manufacturers will encourage momentum. The existing schemes of foreign economic assistance, concerning the above-stated limitations of scope and depth, are needed to be revised. For the government role, it is needless to say that it has to be effective, but it was not the focus of this study.

Fourth, for the newly emerging subcontractors themselves, the most crucial task is to enhance their competitiveness. Under the condition of expanding markets, they can easily satisfy this need with quantitative expansion of volume of orders without any efforts for cost saving or technological innovation. However, the industrial environments are moving toward trade liberalization so that the competition with imported components cannot be avoided, in addition to the fact that the domestic industrial structure is going to be more competitive among domestic suppliers. Therefore, it is crucial that individual component manufacturers should develop their respective advantages in any aspects as a source of their own competitiveness—— lower prices due to cost-saving management, lower reject ratio due to innovative process improvements, more frequent and punctual delivery than others, specific technological capabilities, wide scope of processing and so forth—— so as to reinforce the reliable relationship in the existing subcontracting network and further to expand new networks. Economic crisis after mid 1997 has suddenly forced to stop accelerated growth of subcontractors in the recent years. In the short run, stagnation cannot be avoided in the development of subcontracting networks and technological enhancement in this industry. However, the long-term trend of development will not be collapsed and the capital accumulation of manufacturers is not to be disappeared. It is at this stagnant moment that industrialists in every

stratum should foresee the opportunities to come in this industry in Indonesia and prepare for the coming competitive environments.

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