The relationship between the primary producers and subcontractor firms is central to the subcontracting system if primary producers are to derive the advantage of substituting subcontracting in part, for formal integration. While the relationship is founded on sound economic reasons, it is further cemented through the linkages based on behavioural characteristics such as the 'we' feeling as seen in the Japanese automobile industry which enhanced the economic efficiency of the subcontracting network as a whole.\(^{1}\) Further, the empirical studies on subcontracting in the automobile industry are focussed on the linkages between the primary and subcontractor firms.\(^{2}\) Therefore it is necessary to study whether the primary producers in the automobile industry could help the subcontracting system to grow into an

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1) Odaka K et al (1988) ibid Chapter 3

2) The empirical studies have been discussed in Chapter II on Review of Literature.
effective supportive one, thereby reaping the benefit of both vertical integration and disintegration and at the same time remaining formally integrated. Accordingly in this chapter, the study of the development of the primary producers in Japan and India with reference to their respective approach to the subcontracting system is undertaken.

Owing to the complexity in the production of automobiles there is a pronounced tendency towards vertical integration in the industry. Such backward integration has in certain cases even transcended technological reasonings as in the case of Ford of USA. As in the case of any other machine tool industry, the automobile industry too, is traditionally regarded as one which would undertake vertical disintegration after the onset of diseconomies of scale. But in Japan the decision to subcontract was a conscientious choice made well before reaching such constraints of cost or technology. Although a late comer to the automobile industry the Japanese primary producers even from the initial stage evolved a unique system of subcontracting, which enabled the primary producers to grow, by
simultaneously fostering the growth of their subcontractors as well. The enormity of the task undertaken by the Japanese primary producers can be better appreciated through a brief account of the choice of integration vs disintegration in the automobile industry. This would serve to highlight how the Japanese primary producers succeeded in fashioning out a subcontracting system which could harmonise the two polar extremes of organisational form via subcontracting. This underlines the importance of the behavioural approach to development as opposed to institutional factors per se. The Japanese primary producers instead of approaching subcontracting in a pedestrian fashion, as a mere cost serving device, had evolved a dynamic mechanism for growth. The Indian experience, on the other hand, is a study in contrast.

The division of labour within an economy implies that most final products are generated by several stages of processing. These various stages of processing, owing to technological factors, may take place as a vertical sequence or alternatively the "various components or semi-processed materials are produced in parallel and
assembled or somehow mixed together at a later stage to form the final product".\(^3\) Basically, emanating from this technological property of consisting of discrete stages of production, the automobile industry can make a choice of organisational structure in terms of the degree and extent of integration. It is conceivable that the auto producer might be just an assembler of parts, all of them purchased from outside suppliers. In fact, in Japan and India the automobile industry was purely an assembly activity to begin with, based on imported kits. However, the drive for industrialisation had led these countries to embark on the domestic manufacture not only as a means of transport but for its linkage effect as well.\(^4\)


\(^4\) "There is an additional and strong reason why so many countries have chosen to foster domestic motor industry. The manufacture of motor vehicles require large amounts of materials—iron, steel, glass, plastics, textiles, rubber, chemicals—and a host of specialised parts and components not normally produced by vehicle manufacturer themselves. The presence of the latter, however serves to generate the growth of numerous suppliers to the motor industry and to the industry in general. And there are forward linkages as well, with distributors, garage and service stations. In the process, the general level of technology is raised and the prospects of continuing industrial development is enhanced". Maxcy G, (1981), ibid. pp. 113.
There are certain distinct advantages for integration in the automobile industry, but the complexity of task is enormous, which would result in diseconomies in scale of operation. This can be seen from the process chart given in Fig 3.1 and the basic sequence in car manufacture as shown in Fig. 3.2

Different manufacturers have adopted different techniques and system and as such the structure also vary widely between firms. Some manufacturers produce a very high proportion of the content of the cars, others buy a large proportion from outside suppliers. However, there are certain commonalities. Virtually all the large manufacturers make their own engines and transmissions and produce their own bodies from steel.

5) "The advantages of unified coordination and control extend beyond just one plant. The complex process of designing, producing, testing and modifying an automobile requires a high degree of coordination. Engine, transmission, frame, body, brakes, windshield and other components all have to perform well and with each other and have to be in the right place at the right time and in right quantities. A failure in the supply of any component can spell disaster".
FIGURE 3.1

PROCESS FLOW IN THE AUTOMOBILE INDUSTRY

RAW MATERIALS → MATERIALS PROCESSING → COMPONENTS → SYSTEM AND SUB ASSEMBLY → FINAL ASSEMBLY

Iron & Steel → Castings → Bearings → Engine → Complete
Aluminium → Forging → Batteries → Transmission → Automobile
Silicon → Glass Forming → Spark plugs → Axle
Plastics → Stamping → Shock Absorbers → Suspension
Fibres → Tyres → Steering
Alloy → Carburettor → Frame
Trim → Body
Wheels → Body
Brakes

THE BASIC SEQUENCE OF OPERATIONS IN CAR MANUFACTURE

PRESS SHOP
- Stamping of panels
- Body panels
- Sub assemblies
- Body assembly
- Body in white
- Clean, prime, paint body
- Painted body

BODY SHOP
- Steel sheet strip and coil

PAINT SHOP
- Trim lines
- Final assembly
- Test and rectification
- Finished car shipped to distributors/dealers

ASSEMBLY PLANT

FOUNDRY
- Casting of engine blocks, crank shafts, etc.
- Steel rod and bar stock

ENGINE PLANT
- Machining
- Engine assembly and test
- Engine

TRANSMISSION PLANT
- Machining
- Transmission assembly and test
- Transmission

SOURCE: Hartley J (1971) ibid pp 2
sheet. Power train manufacture involves castings, forgings, machinery, heat-treatment and assembly, while body manufacture involves pressing, welding, painting and assembly. These are some of the essential skills required in the industry. (6)

There are a number of reasons for backward integration in the automobile industry. "Almost all these reasons revolve around the problem of imperfect markets and imperfect forecasts of the future and the fact that to change suppliers is often very costly in terms of both time and money". (7) The foremost reason for backward integration in the automobile industry relates to economies of joint production of two vertically integrated items. These are mostly economies of entrepreneurial functions. Similarly the desire for product differentiation would favour integration. In the U.S.A., for instance, the automobile firms produce cars for different markets which are divided between low, medium and high class products and prices. The need for special, non-standardised design to maintain

uniqueness and also ensure secrecy would require close control and co-ordination. By undertaking in-house production, the uncertainty of dealing with outside suppliers is avoided.\(^8\)

The other reasons for vertical integration in the automobile industry would be to avoid exploitation by a monopolistic supplier, or avoiding risks of disruption in supply due to strikes in suppliers' plant. For instance in the USA many decisions to integrate into items like plastics, upholstery and electronic components appear to have been taken at least partly due to wide-spread strikes in suppliers' plants between 1946-48. There is also an advantage of a profitable field viz. selling parts in the replacement market

\(^8\) "- - - the problem is not just one of guaranteeing a future price which could be arranged simply through future contracts. Rather, it is one of guaranteeing future delivery of an item whose technical characteristics are somewhat uncertain. A suit for breach of contract would be cold comfort to a firm whose production lines were idle because a supplier at the last minute announced that he could not deliver a particular component."

under integration. This had influenced Chrysler and Ford to develop their own electrical equipment capabilities in the 1950's. Besides there are other reasons, such as developing the expertise of managers, better utilisation of basic and applied research etc. There are also certain differences between manufacturers of cars and trucks, with the tendency for integration being more pronounced in respect of the former. In developed countries, the truck manufacturers are basically assemblers. A peculiarity of this sector unlike passenger cars, is that producers depend on outside suppliers for important components like engines and gear boxes. Most commercial vehicles leave factories in chassis cab form without a

9) This example has been given by White who cites the argument given by Robert Crandall that as "autos and spare parts are jointly consumed goods and that an oligopolist who produces both can juggle prices in the two areas, so that the combined profit is greater than if prices for autos and for parts were set independently. There are externalities to auto sales in that they set up a demand for replacement parts, there are also externalities to replacement part prices, since they affect the costs of car ownership and therefore the demand for cars". White L J, (1981), ibid. pp. 79.

full made body. This is generally true for light, medium and heavy trucks and for buses and coaches and a large number of medium weight cars and pick up trucks which are not fitted with bodies when they leave the factory. On the other hand all car derivates vehicles are produced as complete vehicles with bodies made by the vehicle producer.\(^{(11)}\) In so far as the passenger cars are concerned, where producers in developed countries make a range of models, there are correspondingly variations in the basic components used as well.\(^{(12)}\) However a manufacturer has to keep these variations in components to a minimum. There are wide variations among firms and countries regarding the extent of vertical integration. In the U.S.A., for instance, the industry is highly integrated. The larger size of the American


12) "In general there are a multitude of different specifications available for each model. This problem of variation affects basic components and assemblies as well. For example, there are 350 variations to the underframe of the Toyota Corona, since different brackets are needed in different markets and to suit different models. There are 12 different side body assemblies in the Ford Fiesta. The point is that throughout the stages of manufacture these variations must be taken into account and the correct parts made available".

market made the manufacture of their own components economically viable as the volume of cars produced was large enough for a single firm to gain most of the economies of scale available at each stage of production. Besides, the founders of the industry, Henry Ford and William Durrant (of General Motors) believed in a high degree of corporate self-sufficiency. Likewise, Fiat of Italy has a tradition of self-sufficiency, which was reinforced during its rapid growth in the 1960s. Fiat makes the majority of the components it used and also has the most elaborate establishment for metal making and shaping process.\(^{(13)}\) Generally, the auto industry assemble their own cars, produce their own bodies and most of their stampings and machine their own engines. However, integration, which reduces the risks of vertical disintegration, converts variable costs into fixed costs, thus increasing the financial penalties of losses. The well known example of an automobile firm, which carried backward integration to the extreme is Ford of U.S.A which tried to create a wholly self-contained empire, even mining their own coal, generating their own electricity, shipping their own

---

goods etc. However, it almost collapsed under its own weight. Here, it is important to identify the nature of the activities subject to integration. Firms, which had stepped far beyond the technologically related stages in the process of backward integration were naturally saddled with problems. (14) Even in technologically related areas, investing in different engines, gear boxes, suspension components and body panels would mean high investment and complexity in manufacture as well. (15) In such cases when a decision to disintegrate is taken the component suppliers in

14) "The elder Henry Ford saddled his company with a steel mill and a glass factory, beside the Brazilian rubber plantations and the soya bean processing factories. The latter projects were clearly not vital to auto manufacturing and the decision to sell them was an easy one.——."

15) "To keep his investment within bounds, a truck manufacture will build his cabs from a set of standard panels for wide and narrow cabs, and for short and long ones. He will use common engines, transmissions and chassis parts wherever practicable, even though these may be bought-in-items. The chassis frames themselves are normally made from a range of standard sections. The large manufacturer will normally use one body shell for all models of one size. Similarly, there is usually one engine family to cover one range of power outputs, often overlapping the model ranges. If this rationalised approach is not followed, the capital investment will be spread over so many components that it is not possible to use highly productive capital intensive plant".
order to survive need to have economies of scale. The volume of the supplier has to be far greater than what the manufacturer would reach if he were to supply himself. For instance due to the relatively low levels of production, the two auto producers of Sweden viz. Volvo and Saab-Scania could not afford to produce their own parts and had to buy them from outside sources.\(^{16}\) Alternatively the product has to be highly specialised such as injection equipments, brakes, clutches, dampers, electrical equipment, piston-rings, bearings etc.

A via media between vertical integration and disintegration is partial or tapered integration, whereby a firm produces a portion of its requirements and buys the fluctuating remainder. The advantage in this arrangement is that there is full utilisation of equipment with the supplier absorbing the risks of fluctuation in demand. However, in such cases the technology of production has to be such that the buyer can fully exploit the economies of scale of the process, and the left over demand for the supplier is

\(^{16}\) Rhys D G (1972), ibid. pp. 72
sufficient to allow him also to get close to minimum efficient scale of production. White, notes that Ford buys 50 percent of its steel, Chrysler buys 50 percent of its glass and all the automobile firms in the USA have bought varying percentages of their frames, wheels, brakes, gears, valves and clutches. Yet another alternative, is to have two or more suppliers for an item, which would reduce the uncertainties in supply but their economies of scale have to be small enough to permit multiple manufacture. For instance, General Motors buys its frames from four suppliers while Chrysler and Ford buy their crankcase ventilator valves from two suppliers. It is the existence of such wide range of choice in integration and diversification that had led White to conclude that, "Overall, it is hard to predict on a priori grounds exactly what the pattern of integration and suppliers relations will look like in the auto industry. In areas presenting extensive co-ordination and control problems, we should expect to find complete integration. Beyond that, it is difficult to tell whether a company should choose a single supplier, multiple suppliers, tapered integration or complete integration without knowing the price that a single supplier, is willing
to offer, the probabilities of supply disruption envisaged by the buying company, the economies of scale of the manufacturing process, and the utility function of the firm's management.(17)

In a complex industry like the automobile therefore, the choice of organisational form depends not merely on technology or capital but on the structure of control required for performing the stupendous task of coordination. This once again reinforces the importance of behavioural factors in making a choice along a continuum of organisational forms. The complexity in the building of the automobile industry has certain other dimensions as well in so far as developing countries are concerned. These relate to the immense problems associated with developing a complex industry like the automobile with a low level of industrialisation and a small domestic market. The smallness of the domestic market resulted in discouraging automobile production as seen in the case

of Japan and India. (18) Also because of the complexity of manufacture it was felt that a certain degree of industrialisation, especially in respect of engineering industries should precede automobile manufacture. (19) Even after permitting for scaling down of production for developing countries, the minimum efficient scale would seem to be high as may be seen from the following table:

<table>
<thead>
<tr>
<th>Country</th>
<th>Automobiles per 1000 persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.A</td>
<td>537</td>
</tr>
<tr>
<td>U.K</td>
<td>276</td>
</tr>
<tr>
<td>JAPAN</td>
<td>203</td>
</tr>
<tr>
<td>INDIA</td>
<td>1</td>
</tr>
</tbody>
</table>


(19) "--- vehicle assembly manufacture should not be undertaken by a developing country till suitable progress has been made in mechanical industrialisation and where appropriate in the development of a parts industry". UNIDO (1970), "Establishment and Development of Automotive Industries in Developing Countries".
Table 3-1
MINIMUM VOLUME PRODUCTION FOR DEVELOPING COUNTRIES
ANNUAL SALES

<table>
<thead>
<tr>
<th></th>
<th>Assembly</th>
<th>Manufacture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus Bodies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trucks &amp; bus Chasis</td>
<td>2500</td>
<td>6000</td>
<td>5 Tonners</td>
</tr>
<tr>
<td>Passenger cars (medium)</td>
<td>20000</td>
<td>50000</td>
<td>Excluding production of body panels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200000</td>
<td>Including production of body panels</td>
</tr>
</tbody>
</table>


The narrow domestic market is often cited as a reason for the non-realisation of economies of scale in the automobile industry in a developing country. There is a strong correlation between the level of per capita and the demand for passenger cars (20) Table 3-2 while demand for commercial vehicles arise from the overall

20) "An automobile has some five thousand components which can be disassembled into over twenty thousand individual pieces. This complexity makes cars expensive and thus they do not sell well when per capita income levels are low"
development of the economy. (21)

Table 3-2

CORRESPONDENCE BETWEEN LEVEL OF INCOME AND OWNERSHIP OF AUTOMOBILES

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP per capita (dollars)</th>
<th>Automobiles per 1000 persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.A.</td>
<td>11,360</td>
<td>537</td>
</tr>
<tr>
<td>Japan</td>
<td>9,890</td>
<td>203</td>
</tr>
<tr>
<td>U.K.</td>
<td>7,920</td>
<td>276</td>
</tr>
<tr>
<td>U.S.S.R.</td>
<td>4,550</td>
<td>31</td>
</tr>
<tr>
<td>S. Korea</td>
<td>1,520</td>
<td>6</td>
</tr>
<tr>
<td>India</td>
<td>240</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: In centrally planned economies such as the U.S.S.R., demand is suppressed by the government.

Source: Altshuler, et al (1986) ibid Table 5-1. pp 108

The low level of the industrialisation, small domestic demand and the complexity in the manufacture of automobile would certainly be reflected in the structure of the automobile industry resulting in greater integration. In fact, once a decision to start the industry is taken, the government is faced with several contradictory decisions. For instance, the "economics of the motor industry calls for a protected market and a monopoly, or at most an oligopoly in such

countries. But these are industrial structures about which economists tend to be highly critical."(22)

One of the biggest problems encountered in developing countries is the difficulty in developing local suppliers. Branson notes that higher percentage of in-plant production intensifies the diseconomies of small-scale production, as the burden of developing industrial capabilities in basic materials, semi-finished parts (like castings and forgings) and the wide range of finished components required in an assembled vehicle falls heavily upon the vehicle manufacturers. The structure of the automobile industry in developing countries has been influenced by various factors. Unlike in the developed countries, where the industry had evolved through various technological developments in the machine tool and other related industries, there was a considerable technological lag.

If the automobile industry has to move from mere

assembly stage to manufacture, the initial stimulus has to be provided by the Government as it happened in India and Japan. However, Government policies alone cannot explain various other factors which influenced the industry. The role of the primary producers and subcontractors themselves in this regard is important. This would be evident from the early pioneering efforts of Japanese entrepreneurs. For instance in the 1930's Japan had no domestic industry of any consequence and apparently did not even have the capability to produce the steel and components that motor vehicles required. Yet in 1933, a Japanese engineer and entrepreneur, Aikawa Yoshisuke, initiated the development of the Japanese car industry by establishing Nissan to manufacture small vehicles that did not compete directly with the larger American imports. It was an admixture of nationalism and entrepreneurism which led the Japanese auto industry to

23) The role of the Japanese government in building this manufacturing system beyond assistance in building volume by completely protecting the domestic market from foreign products was negligible. MITI did not invent the industrial or conglomerate groups, the "just-in-time" manufacturing system or the concept of "total quality" - - - Thus the Japanese breakthrough would not have been possible without government nurture; however government aid alone was far from sufficient, -- --. Altshuler A M, et al, (1984), ibid. pp. 32.
take such a bold step. They were confident that Japan too like the U.S would undergo rapid motorisation. Such faith meant that they persevered.

In India until the end of World War I, motor cars were imported. After 1920, assembly of cars and trucks from imported components was started by Ford and General Motors.(24) But under the colonial rule, there were obstacles to the development of the industry.(25) Yet in 1935, selected leaders of Indian business and industry met under the guidance of Sir M. Visvesvaraiya who was lobbying in the Indian capitalist circles for starting an automobile industry. With the development of Tata's steel works at Jamshedpur and Bombay's metallurgical workshops, it was felt that India was technologically ready to take up the manufacture of cars. However, the initial enthusiasm of the Indian


25) "In the late 1930's the authorities refused to allow a group of enterpreneurs from Bombay to set up an automobile plant which they were planning to establish with American Chrysler Company". Shirokov G K, (1980), ibid, pp. 25.
business waned. Only Walchand Hirachand and Ganshyamdas Birla persisted and without any assistance from the Indian government set up car manufacturing plants.

This was a significant event in the Indian automobile industry and testimony to the inherent entrepreneurial ability of the Indian industrialists. But unfortunately this was not sustained. At that time it was felt that the limited market cannot sustain two manufacturers. Nevertheless, in 1942, the Birla group formed the Hindustan Motors Limited and Walchand Hirachand established the Premier Automobiles Limited in 1944. In the absence of the necessary import permit from the colonial government, production could not commence during the second world war. However, both the groups geared themselves to meet the anticipated increase in post-war demand for cars. Both the companies completed their works and commenced the operations for assembly of cars in 1947. Besides Hindustan Motors Limited (HML) also had a comprehensive programme for the domestic manufacture of parts. The Indian entrepreneurs it is significant to note were not
handicapped by lack of capital.\(^{26}\) In fact one of the reasons why Walchand Hirachand could not collaborate with Ford of U.S.A. was because of the latter's insistence on equity participation.\(^{27}\) But technical collaboration was inevitable. In the process, a number of concessions had to be made to the foreign principals. The Indian firms had to borrow machinery,

\(^{26}\) "The automobile industry required a large initial outlay, but this proved no hindrance because the industry by definition could only be undertaken by those who possessed the necessary capital and Birla and Walchand were big groups with large financial resources. Walchand initially relied on the support of the Congress Ministry in Bombay for raising the capital and later on looked to the Mysore State for financial support. These hopes did not materialize but the sum of Rs. 2.5 crores which he had set as the target was ultimately raised without any political support. The Tariff Commission stated later on that in the case of Premier Automobiles, the financial outlay was adequate. Premier Automobiles had no difficulty in incurring the necessary expenditure of Rs.17 lakhs for machinery under order. Still less was this a problem with the Birla group which possessed a much broader capital base than Walchand and invested a much bigger sum in their plant under a more comprehensive programme of assembly as well as manufacture of parts". Ray R K, (1982), pp. 177,178.

\(^{27}\) "Walchand was quite firm in rejecting the demand of foreign automobile interests for financial control over the projected car industry and it was on this issue that his earlier negotiations with Ford got stuck. But he could not avoid technological dependence and had to turn from Ford to Chrysler who agreed to sell the technology without demanding financial participation". Ray R K, (1982), ibid. pp. 178.
technical know-how and even skilled personnel from their foreign associates. Further, they were also obliged to get all the indigenous parts checked by their foreign principals.

The Japanese counterparts were having their own problems of capital but they had a certain reserve of technological capability. But after the Second World War, when the economy was ravaged with production facilities half-wrecked and a near absence of a market, the industry had to start from the scratch. The automobile producers suffered from serious deficiencies of just everything, capital, machines, experienced labour and parts and materials. Not surprisingly, therefore, there was reluctance in supporting this industry initially.

28) "Of the eleven firms that made motor vehicles in Japan during the early 1980s, all except Honda existed prior to World War II as manufacturers of cast iron components, textile machinery, multi-purpose engines, motor cycles, 3-wheel vehicles, trucks, aircraft and other precision machinery products". Cusumano M A, (1985), ibid. pp. 1.


30) "--- officials at the Bank of Japan and the Ministry of Transport argued that Japan should use its cont.
However, the government remained steadfast in promoting the industry. (31) Earlier under the Automobiles Industry Act of 1936 an impetus to domestic manufacturing was given, which brought the industry under the government's control. (32) The fundamental aim was to promote local automobile industry to aid the growing militarization of the country. As a result, the foreign assemblers, left Japan as severe limited resources to develop other industries. Even if Japan continued to manufacture trucks and buses, they wanted to eliminate restrictions on car imports and leave the passenger car field to the Americans and Europeans".


(31) In Japan the government took the position that an "automobile industry would stimulate other sectors of the economy, especially machinery and steel manufacturing, therefore it should be promoted and protected".


(32) "The Automobile Industry Act of November 1936 introduced various restrictive conditions to be met by the industry (such as majority ownership and control by Japanese nationals, obedience to the government's operational orders etc.), while extending various economic incentives (such as five year income tax holiday, tariff exemption for the importation of specified machinery and materials etc.) to the officially recognised local manufacturers. Registered firms were required to buy as much as possible from domestic sources, something they were already committed to. Non-registered firms were allowed to continue their operations so long as they had no expansion plans".

restrictions were placed on their output and they failed in their attempts for a tie-up with local producers like Nissan and Toyota. The emphasis on developing local producers was obviously to hasten the manufacture of the various stages of automobile manufacture, which alone can provide the much needed linkage effect. The Japanese manufacturers were weak in respect of design, production, technology and performance. The government therefore concluded that technical tie-ups between domestic and foreign manufacturers was necessary to bridge the technological gap. As a result, the domestic producers achieved complete indigenisation of their particular models they were making and by 1958 were ready to develop their own license free models. The government recognised the industry together with machine building industries as a promising candidate for export-oriented industry. The 1956 Provisional Act for the Promotion of the Machinery Industry resulted in the rationalisation of production in the industry by reducing the cost of auto parts and components, technological upgrading, materials procurement, export promotion etc. Thus while extending full support to the industry, the government did not lose sight of the importance of making the
industry competitive in the long-run.

However the most significant form of government support to the fledgling industry come in the form of market support. After the second world war, the General Headquarters of the Occupation Army recognised the importance of the transportation industry and facilitated the resumption of truck production. With the outbreak of the Korean War in the early 1950s, military procurement demand for medium trucks expanded. Post-war motorization in Japan began with the popularisation of trucks and three wheelers catering to the needs of the military and small enterprises.

In India, the industry had to wait for the advent of independence for its development. Under the colonial rule, even when the local capitalists made attempts to establish the industry, their efforts were thwarted. The foreign government was not keen in

33) When Walchand turned to Mysore State for assistance, "the Government of Mysore took up the project with enthusiasm. This support was subsequently withdrawn when the Mysore Government was advised, on the Maharaja's inquiry, by the Government of India that contd.
encouraging the industry even during the war-time (34). In 1945, a Panel on Automobile and Tractor Industry was constituted by the government to make recommendations for the development of the industry. Although the domestic market was small and the supplier industry was not developed, the Panel recommended the establishment of the industry. It was felt that the process like forgings or foundries are to be developed in any case for engineering industries. The Panel did not want to postpone the establishment of the industry.

It was felt that the difficulties could be overcome by

the initiation of the automobile industry during the war would impede war efforts as it would mean release of dollars for machinery, tools, etc. To start the industry in India during Second World War, its inclusion in the list of war efforts was essential, because without this no permission could be obtained from the Government of India for the necessary foreign exchange of four million dollars and for bringing at least twelve American technicians. The unborn industry was thus deprived of the stimulus of the massive car orders placed by the defence authorities with Ford and General Motors for war requirements".

34) "--- the increased military demand after the outbreak of the Second World War might have quickly put an existing car industry on its feet. Under such hypothetical logic of developments, the car industry would have become a substantial industry by 1947, when operations for manufacture first commenced. The single most important factor which precluded this hypothetical development was the conservative policy of the Govt. of India before the war and its deliberate discouragement of automobile manufacturing during wartime".
careful planning for which the government should
device an efficient system of protection. To this end
the Panel made several recommendations in respect of
provisions of facilities like land, power, construction
materials, transport, free foreign exchange facilities
for acquiring upto date machinery, duty free import of
raw-materials, a graduated differentiated custom duty
on components etc. The Panel did not favour protection
in the form of total prohibition of imports as it was
felt that such a move would retard rather than advance
the objective of efficient production. Continuation of
protection to the industry was to be subject to a
review after five years (35).

In the recommendations of the Panel one can get a
strong flavour of Stigler's life-cycle hypothesis which
demonstrates the close link between the growth of the
firm and the industry. The presence of externalities
is especially significant in the automobile industry
which has to depend on various sources for supply of a
wide range of raw-materials, machinery and components.

35) Report of the Panel on Automobile and Tractors,
(1947), Govt. of India.
However, no action was taken on the recommendations of the Panel. The government took sometime before finally taking a decision on the establishment of the automobile industry.

Initially, in 1949 it was decided not to allow import of complete vehicles but only completely knocked down, (ckd) kits. (36) Later the Tariff Commission was asked to make recommendations for the development of the industry. While contemplating the development of the industry, two approaches were considered viz. development at one step or step by step. Under the one step method, the industry was to be protected against import of complete vehicles. Necessary assistance was to be provided to firms having a manufacturing programme. It was felt that the ancillary industry

36) "For CKD assembly the imports from the manufacturer are made up of separate body parts which must be welded together and painted, and mechanical parts of engines and other major components are built up, on sub-assembly lines. Line assembly is used, the vehicle or unit being transported from one assembly station to another by means of mechanically driven conveyor belts. Such a plant must have expensive welding, body building and paint shops, and requires more skilled workers than simple assembly. With CKD assembly the stage is set for the gradual incorporation of local materials, parts and components when these become available."
Maxcy G (1981) ibid pp.215
will develop in response to the growth of the primary industry. On the other hand, advocates of the step by step approach were opposed to protection. Instead, it was suggested that the customs duty on components be reduced to enable the rapid increase in volume of production. Maintaining that development should be evolutionery, it was felt that the secondary and ancillary industries should be established first, so that the components and parts manufactured by them could be put to use by the assemblers of motor vehicles. Otherwise it was feared that it would lead to the development of a high cost industry.

An automobile expert, Mr. Vorwig attached to the Tariff Commission also favoured the step by step approach. The report stated that barring one factory, the rest were only in an assembly stage. The ancillary industry was also in its infancy. The other industries were also not in a position to supply the important raw materials and semi-finished products in the required high and consistent quality at competitive prices. Supervisory personnel were also difficult to get. The current demand of about 15000 - 20000 motor vehicles was considered to be too low for the development of the
industry. It was therefore felt that at least ten years are necessary to build up an automobile industry. A sound development would require that a progressive manufacturing programme is implemented step by step.

The Indian Government decided to develop the industry by the one step approach rather than adopt an evolutionary approach. (37) The step by step approach

37) "We consider that if reliance is placed on evolutionary process, it may take decades before the manufacture of motor vehicles becomes possible in India. At the present stage of development of the industry, positive measures are required to accelerate its establishment on a sound basis. We are aware that some risk is involved in stimulating the manufacture of motor vehicles by such measures but it would be faced in view of the encouragement hitherto given to the industry by the government, the progress made so far by the firms which have embarked on a manufacturing programme, the large investment made by the public in their concerns and above all, the national benefits accruing from the establishment of the automobile industry. Firstly, there will be considerable earning of foreign exchange - ---. A large portion of the foreign exchange could be saved if components and parts are manufactured in India and the saving utilised for purchase of capital goods and machinery required for the industry. Secondly, the automobile industry will open up new avenues of employment and provide skill and technical knowledge for the establishment of other allied industries such as tractor manufacture, internal combustion engine manufacture etc. Thirdly, it will create a demand for products of a large number of industries and accelerate the process of industrialisation. Lastly, in the time of national emergency, the industry could be switched over to contd.
may appear to be a more pragmatic solution given the small market, complexity of automobile manufacture and the low technological base, which would enable component manufacturers to progress from sub-assembly to final assembly. But for developing countries which have embarked on a speedy industrialisation programme, this may appear to be a slow process and the one-step approach would be preferred form of development. However, the success of this approach depends on both supply and demand side factors. Protection alone which creates a captive market cannot provide the demand in a nascent economy and this was realised in Japan where the government was the major customer. This stimulus of demand, helped the industry to grow by accelerating their domestication programme. This could be achieved by developing an extensive network of affiliated suppliers (ancillary firms). According to Odaka, this was "the most effective, and perhaps the only, strategy they could pursue for their own survival and growth."

37) contd.

production of vehicles required for the defence. The automobile industry in short, could be described as a vital industry of strategic importance which would reflect the economic prosperity of the country *- Tariff Commission (1953) "Report on the Automobile Industry" pp. 45 - 46.
under the circumstances." (38)

Although it was decided to establish the industry in India, this was not attempted through a comprehensive and systematic programme. The most neglected component was demand and its composition. Under the approved domestic manufacturing programme, the Government gave recognition to five firms for production of trucks and cars. Besides HML and PAL, the other firms were the Standard Motor Products of India (SMPI), Automobile Products of India (API), Ashok Motors (later to become Ashok Leyland). Besides Mahindra and Mahindra and Dewar's Garage and Engineering Works were permitted to make Jeeps and Land Rovers respectively. The remaining who were pure assemblers curtailed their operations by stages and eventually closed down their assembly shops. However, API & Dewar could not proceed with its programme, later Tata Engineering & Locomotive (TELCO) was given approval for a manufacturing programme. HML was given sanction to make passenger cars, besides trucks; so also PAL. Standard Motors was to make two models of cars, Ashok Leyland and Telco

38) Odaka K et al (1988) ibid pp.283
were to manufacture trucks and Mahindra & Mahindra, Jeeps (Annexure 3-1).

In Japan it was not until the 1970's that the car production outstripped the production of two wheelers vehicles. Car sales were initially restricted to the more affluent members of the community. Upto 1960's, over 40 percent of car sales were classified as non-private, purchased mainly to equip taxi fleets or as official transport vehicles for Japanese firms. With increasing affluence came the development of a relatively inexpensive basic car and a growing demand for a more comprehensive range of commercial vehicles to meet the transport requirements of a developing industrial nation. This had an important implication for the development of the industry in a small market as scale is a critical factor in the automobile industry and the importance of scale is much more pronounced in the case of passenger cars than trucks. (39) Furthermore, the engineering specifications

39) "The importance of economies of scale means that profitability of motor production depends crucially upon the intensity of demand for the product. At given prices the higher the volume of sales, the greater is the margin of profit on each unit sold".

for trucks were not as stringent as those for passenger cars. This was to be a decisive factor in the mobilisation and upgrading of the technological potential of the ancillary firms in Japan. This was also facilitated by the fact that the automobile firms in Japan especially Nissan and Toyoto were making both passenger cars and commercial vehicles, there are no independent truck or bus manufacturers.

In India, such evolutionary approach was missing. Under the import substitution strategy, domestic production was interpreted as replacement of imports. Even in respect of military equipments, the Government had ignored the Tariff Commission's (1953) recommendations to merge civilian and defence demand. Instead, defence production was taken up separately in the Public Sector. Fragmentation of capacity in a small market resulted in excess capacity. Considering the small size of the market, the government created excess capacity, which was fragmented among the various producers. Thus while the total annual capacity of the approved production was 49,800 numbers, the actual
production was less than 50 percent at 22,153 in 1955.\(^{(40)}\)

Instead of providing direct support via demand, the government fruitlessly pursued other options. One of these related to the production of a cheap car which would be more suitable in terms of price and quality due to the low domestic incomes and low technological capability. The Tariff Commission (1956) had held the view that rather than concede to the demand for a baby car, it would be better to channelize such investment for production of essential components for trucks and buses. However, the Government had asked the Pande Committee to examine the feasibility of manufacturing a small car and although it was found feasible, and time and again the Government gave assurance to the Parliament about starting a Public Sector project, it often retracted its position. A joint venture with the French company Renault had almost been decided but the project did not materialise. Due to the foreign exchange shortages in the Third Plan (1961-65) the project had to be shelved.

Later licences were issued to some private entrepreneurs for starting a totally indigenous project. One of these was later converted into a prestigious public sector project with Japanese collaboration. This project paved the way for not only the technological upgradation of the obsolete automobile manufacturing system but hastened the liberalisation process in the entire economy. Thus for several years the government did not have a well defined policy.\(^{41}\)

The government policy had placed emphasis on domestic production but the logistics of the programme was not spelt out. The domestic manufacturing programme proceeded at a slow pace. The primary producers were handicapped by their lack of technology which had therefore led Hindustan Motors and Premier Automobile and later others to enter into foreign

\(^{41}\) "As far as the automobile policy is concerned, I do admit that till recently, I should say, it has not been possible for us to have a definite policy with regard to the development of the industry". (Reply given by C Subramaniam, Minister of Industries while replying to a motion regarding policy of Government to manufacture of car in the Lok Sabha 22-12-72).
collaborations. Foreign collaborations proved to be restrictive due to frequent changes in specifications with every change in model introduced abroad. This slowed down the indigenisation effort. Besides there was uncertainty regarding the deletion allowance that the domestic producer will receive. The deletion allowance was the amount deducted by the foreign collaborator for the component deleted from the imported kit. Thus the extent of deletion allowance

42) "The weakness of these two bigger houses in India lay not in their financial resources, but in their technical know-how. It was this crucial technological weakness that dictated in the case of the two most aggressively nationalistic business houses in India to resort to collaboration with foreign manufacturing interests. Precisely these nationalistic groups which had fought strenuously against foreign interests for India's transition to a technologically sophisticated manufacturing stage found it necessary to make large concessions to their opponents in order to obtain access to extremely complex technology". Ray R K, (1982), ibid. pp. 178.

43) The Tariff Commission (1956) noted that the agreement with the foreign collaborator had "evolved out of the kind of agreement which normally exists between the assembler and his principal and the modifications made in it to provide for progressive manufacture in India are often not such as would guarantee the fullest backing and collaboration of the foreign firm in carrying out the progressive manufacture — — One of the objectives of the agreement is to ensure that the Indian manufacturer of the availability of the component needed by him to supplement his own production but this is subject to any change in design and specifications — — many of cont."
received would be a measure of the extent of progress made by the domestic manufacturers in indigenisation. However, due to a government policy which reduced the import duties on components,\(^{44}\) there was considerable delay in implementing the indigenisation programme.

Under the domestic manufacturing programme for the automobile industry the government directed that by 1961 imported parts should account for not more than 20% of manufactured cars and trucks.\(^{45}\) But due to these restrictions in technological collaborations the difficulties of the Indian manufacturer during the past three years have been due to changes in design and specifications. Secondly, the deletion allowance obtained by the Indian manufacturer have an important bearing on his cost and it is very necessary that a detailed schedule showing the allowance to be received of each component to be deleted should be established at the time of the agreement. Some agreements do not contain even the obvious provision that deletion allowance granted for individual components should be such that their sum total would be equal to the value of the CKD pack”.
Tariff Commission (1956), ibid, para 17.17.

\(^{44}\) “The reduction in import duties on automobile components which was effected in 1953 has further widened the disparity between the domestic cost of production and import costs”.

\(^{45}\) Shirokov G K (1980), ibid, pp 236.
primary producers could not make much headway. Added to this was the low technological capability which resulted in the primary producers taking up for production such items which though an integral part of an automobile were typically ancillary in nature.\(^\text{46}\) As a result significant products of an automobile continued to be imported. \(^\text{47}\) A rather peculiar situation arose, whereby instead of importing the entire completely knocked down (CKD) kit each of the components were imported separately and assembled. This defeated the very purpose of the domestic manufacturing programme besides resulting in higher outgo of foreign exchange, the conservation of which

46) "When the automobile industry began to develop in the country the main automobile producers were engaged in assembly work. When they started developing actual manufacture of components, many of them not unnaturally turned to somewhat simpler items not forming an integral part of the vehicle and which were taken up by ancillary producers such as radiators and bumpers". Ad hoc Committee on Automobile Industry (1960), Jha committee, Govt. of India, Chapter V.

47) "While each manufacturer should be expected to carry out the manufacturing programme adopted by him, the long term interest of the industry requires priority to be given for the purpose of protection to certain groups of components such as engines, transmissions, rear axle, suspension and chassis members without the production of which the manufacture of the automobile cannot be said to have been established on a sound footing". Tariff Commission (1956), ibid, para 12.2.1.
was one of the objective of the domestic manufacturing programme. (48) The primary firms' slow progress towards manufacturing would signify absence of opportunity for subcontracting.

Despite the grant of a protected market by the government, the primary producers in India unlike in Japan did not quickly proceed towards indigenisation. The government therefore had to shift the emphasis from the final product to the intermediary products.

Instead of a well thought out long term policy, the government's strategy was akin to 'fire fighting' operations. This emphasis itself was triggered off by shortage of foreign exchange. At the time, domestic manufacturing commenced the ancillary industry's base

48) "In some cases while the engine is deleted from a CKD pack, practically all its components are imported separately in finished form and assembled into an engine and in this way more foreign exchange is spent than would have been if the engine had not been deleted. This was the case with the Studebaker engine produced by Hindustan Motors for sometime. We see no material advantage to the country in a manufacturing activity of this kind". Tariff Commission (1956), ibid. pp. 22.
was very small.\(^{49}\) In order to encourage the production of components, starting from the Second Plan (1956-61), the Government issued licences to many large firms (ancillaries). This was part of the programme for encouraging ancillary development within the Indian industry, and a number of concessions were given for their development like credit facilities, supply of scarce raw-materials, sites in industrial estates etc. Some of the ancillary items in the automobile industry were also given protection for a few years.\(^{50}\)

Further, in order to promote ancillary development in the small sector a separate division for ancillary development as such was set up within the Small

\(^{49}\) "In India only a nucleus of ancillary industries existed in the beginning of the fifties. Premier Automobiles had to set up their own ancillary industries unit, a costly proposition. The following ancillary industries had started in the early fifties: Pistons (India Piston started production in 1952). Cylinder liners (started by India Pistons in 1952). Leaf Springs (started by Metropolitan Springs in 1951). Electric bulbs (started by Pradip Lamp Works in 1951). Fuel Pump Diaphragms (undertaken by United Trading Co. in 1944) for the Defence Department."


\(^{50}\) These items were piston assembly (1955-56), auto leaf springs (1955-66), Spark Plugs (1954-66), auto hand tyre inflators (1954-61), nozzle and nozzle holders (1955-68).

Tariff Commission (1968), "Continuation of protection to Automobile Industry", Govt. of India.
Industries Development Organisation of the Government of India. In the large scale sector many firms were established for automobile components in collaboration with reputed foreign companies like Bosch, Lucas, KLG etc. (51)

The growth of large ancillary firms in India therefore was not on evolutionary lines as in Japan, with the primary producers encouraging their subcontractors to grow as specialists in product. In fact the important link with the primary industry was missing in India. On the other hand, the development of the ancillary industry in the automotive sector in India was largely in response to the growth of the replacement market. The government's encouragement of the ancillaries was not intended for subserving the requirements of the primary producers but to cater to the growing

51) "In some industries ancillary units were set up by big companies including foreign companies. Typical in this respect is the automobile industry where such big international companies such as Lucas, Bosch, KLG and others set up units for the manufacture of electrical equipments, injectors, spark plugs etc". Shirkov G K (1980), ibid. pp. 247.
replacement demand. Such a development resulted in duplication of capacity in the primary and ancillary sectors. Under normal conditions, without

52) Referring to the demand for establishing new firms for manufacturing vehicles, the Tariff Commission (1956) noted that "sometimes the analogy of certain recent decisions to establish additional units for production of spare parts (e.g. pistons and piston rings) is cited in support of the claim for additional units for certain types of vehicles. This analogy however is inapplicable because the market for spare parts is much higher than for vehicles ——.

"The ancillary manufacturers undertake the production of components for various makes and models in which they are specialised both for O.E., as well as replacement while the vehicle manufacturers are normally inclined to restrict their production of components to their own make and requirements. The manufacturer of ancillary items can cater to bigger market because of his large volume and can achieve high degree of specialisation even if it may be in a comparatively important function regarding the maintenance of vehicles by supplying components to replacement".

53) "Under the phased manufacture programme development of the automobile industry approved by the government in 1953, the vehicle manufacturers produced as many components as they could in order to improve the indigenous content of these vehicles. At that time the ancillary industries was not developed. Slowly the ancillary sector came into existence mainly in response to the replacement demand particularly for fast moving parts. Thus some duplicate capacity was built up in the vehicle factories as well as in the ancillary sector for the manufacture of some components. According to the All India Automobile Ancillary contd.
government intervention, the industry would have grown into a vertically integrated structure, by moving backwards to various stages of manufacture. But an inept government policy and the behavioural characteristics of the primary firms instead resulted in penalty of vertical integration and this in an industry which has a pronounced predilection towards vertical integration. Typically ancillary items were produced by the primary firms also creating duplicate capacity. Belatedly the government decided to restrict this tendency, by introducing a demarcation of items that were to be produced in the ancillary sector, and for which no further expansion in capacity will be allowed in the primary firms. The primary producer were asked to purchase from the ancillary industry subject to considerations of cost and quality (54).

However, by 1965 most of the ancillary firms now in

53) contd.
Industry Association, the items manufactured both in the automobile and ancillary sectors are pistons, valves, radiators, shock absorbers, silencers, propeller shafts, universal joints, suspension leaf springs, spring U-bolts, centre bolts, shackle bolts, shackle pins and some items like castings and forgings. Tariff Commission (1968), "Automobile Ancillary", para 7.2.

54) Tariff Commission (1968), "Automobile Ancillaries" ibid. para 10.3.
existence had already been established. These large firms were also oligopolistic in structure. Annexure 3-2 gives details of these prominent ancillary firms in India. The tendency for in house production by the primary producers and the orientation of the auto parts (ancillary) manufacturers towards the spares market implied that subcontracting as an effective supportive system for the primary producers could not be evolved. Thus the opportunity for making a decision along an array of organisational forms itself was pre-empted.

An important distinction in the development of ancillary industry between Japan and India was the role of the primary producers, in making a deliberate choice to subcontract. In Japan, in the early stages until World War II, there were attempts made at manufacturing automobiles, but they were not successful owing to low level of technology. With the establishment of assembly plants by Ford and General Motors based on imported kits the Japanese Government started to insist on the manufacture of locally made parts and components. This had helped in the development of a
full-scale domestic industry in later years.\(^{55}\) Later when local manufacturing of automobile was started, the primary producers not only started to produce some parts and components within their own plants but also "sought to increase the subcontracting of parts and components by forming a network of subsidiary or cooperative ancillary firms".\(^{56}\) In this effort, the fact that the Japanese producers had started off with the manufacture of small trucks was an important factor. This made it easier for the primary producers to mobilise ancillary firms. The domestic producers of trucks like Toyota and Nissan devoted considerable effort to domesticize the procurement of parts and components. Both internal production and subcontracting was attempted simultaneously as they were under heavy pressure to meet the requirements of

\(^{55}\) "Not long after they opened their plants, Ford and GM were asked by the Japanese government to use more locally made parts and components ——. The "Buy Japanese" campaign led to the growth of some 30 subcontractors, who had achieved standards acceptable to the two American companies. These firms in turn fostered a second tier of subcontractors in such specialised fields as casting, forging, sheet metal processing and plating. The development of this subcontracting network laid the foundation for the development of a full scale domestic industry in the 1930s".

war. This resulted in the primary producers forging stable and exclusive relationship with the ancillaries. The development of subcontractors was a response to restrictions imposed on imports due to foreign exchange shortage and the limited financial and human resources available with the primary producers. (57)

The primary producers gave extensive financial and technical support to their subcontractors, many of whom were initially small producers of simple components. (57) "A main reason for the primary firms choice of domestic supply rather than imports in the post war period may be ascribed to the strict foreign exchange control and high tariff barriers imposed not only on the auto parts, but also on many other commodities because of the meagre foreign currency held by Japan. The rationale of the primary firms' second choice (heavier dependence on subcontracting) as well as their third (stable relationship with the ancillary firms) and fourth (exclusive relationship) policy decisions may be explained as follows: The post war developments of the industry was characterized by the remarkable growth of the market and the intensifying competitions among primary firms. These firms vied in introducing improved models, resulting in the expansion and modernisation of their production systems, especially after the Korean War (1950-51). Begining around 1955 the manufacturers of passenger cars made strenuous efforts to excel others in the diversification of car models and the expansion of their dealership network. Given their limited financial and human resource, they sought desperately to find efficient ways to expand production capacity to capture the ever-growing market of increasingly diversified products". Odaka, K., et al, (1988), ibid. pp. 269.
Subcontractors who were to be given extensive assistance were carefully chosen and the choice was adhered to. These subcontractors, due to the extensive support from the primary producers and also their own efforts, were transformed into large corporations. These subcontractors specialized in a narrow product line. The primary producers, relaxed the condition of exclusiveness in respect of these subcontractors who were now in a primary-first tier ancillary relationship by allowing them to supply other customers. This was intended to give the benefit of economies of scale to the ancillary firms, which advantage could also be reaped by the primary producers. At the same time the primary firms counterbalanced the policy change by increasing their equity participation in the ancillary firms thus strengthening their relationship. With the ancillary producers acquiring an oligopolistic power over the market, the primary firms' heavy dependence on subcontractors was even more firmly established. In fact it was the relationship with the first-tier ancillaries which resulted in a vertical integration, Japanese style.
The Japanese industry's policy towards subcontractors was also spurred on indirectly by government policies viz. mounting pressure for army vehicles and the imminent liberalisation of trade and capital. In brief, shortage of capital and the government policy of providing a market for vehicles, besides exposing the industry to external competition, forced the industry to seek avenues for cheaper but efficient sources of production and subcontracting proved to be an effective solution. As a result, the Japanese automobile industry has a very high degree of reliance on its suppliers. Subcontracting, by permitting the Japanese automakers to specialise in a few key functions, contributed immensely to improving productivity within the industry besides reducing labour costs and lowering capital and inventory requirements.\(^{58}\) All this was of

\(^{58}\) "Much of the apparent productivity increase at Nissan and Toyota after 1960 come from declining levels of vertical integration from 50 percent during the 1950s to 30 percent or less -- by the 1980s -- Subcontracting to subsidiaries or other firms reached these high levels in the Japanese automobile industry after demand expanded rapidly beginning around 1955. Managers decided that it was cheaper, safer and faster to recruit supplier rather than to hire more employees or invest directly in additional equipment for making components. Subcontracting lowered fixed costs, contd."
course facilitated by a rapid improvement in demand. Subcontracting was thus one of the important methods by which the Japanese industry could overcome their historical disadvantage arising from backward technology and low demand, into competitive advantages in the international market place.\(^{(59)}\)

\(^{58}\) contd.
required less operating capital, and made it possible to cut production levels simply by reducing outside procurement, passing on the risk of over capacity to subsidiaries and other suppliers."

\(^{59}\) "As the domestic industry grew, the Japanese turned historical disadvantages stemming from the initially backward state of their technology, and the low level of demand for cars prior to 1960, into competitive advantages in the marketplace. While overcoming inefficiency made managers acutely aware of cost and productivity, Nissan, and especially Toyota, devised policies for subcontracting, production management, quality control and other areas of operation, that by the early 1980, had persuaded the managers around the world to rethink some of their most basic assumptions."
In India the development of the automobile industry in a protected environment has bred inefficiencies (60). It was this fact more than its oligopolistic structure which resulted in inefficiencies in terms of price and quality. The overriding importance of scale economies in the industry results in concentration of production. In fact the world over the industry is oligopolistic in structure as may be seen from Table 3-3 below. But in India, such inefficiencies had resulted from a captive domestic market.

60) "There is reason to believe that due to a variety of policy measures such as restricted entry, price and distribution controls, capacity restrictions, MRTP regulations etc., the incentive for technical change has been seriously eroded by the Government of India. Thus limited competitive threat and poor incentives for gain have frozen technical change in the Indian Automobile Industry". Gumaste, V.M., (1988), "Technological Self-Reliance in the Automobile and Ancillary Industries in India", Institute of Financial Management and Research, Madras, pp. 83.
## Table 3-3

### Concentration of Production in the Automobile Industry

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of producers allocating for 80% or more of production</th>
<th>Companies</th>
<th>Approximate historical % of total production</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S</td>
<td>3</td>
<td>G.M., Ford, Chrysler</td>
<td>90</td>
</tr>
<tr>
<td>JAPAN</td>
<td>3</td>
<td>Nissan, Toyota, Toyokogyo</td>
<td>80</td>
</tr>
<tr>
<td>W. GERMANY</td>
<td>4</td>
<td>Volkswagen, Ford Daimler Benz, G.M.</td>
<td>80</td>
</tr>
<tr>
<td>FRANCE</td>
<td>2</td>
<td>Renault, Peugeot Citroen</td>
<td>80</td>
</tr>
<tr>
<td>ITALY</td>
<td>1</td>
<td>Fiat</td>
<td>85</td>
</tr>
<tr>
<td>U.K.</td>
<td>3</td>
<td>B.L., Ford, Chrysler</td>
<td>85</td>
</tr>
<tr>
<td>SWEDEN</td>
<td>1</td>
<td>Volvo-Saab</td>
<td>100</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>3</td>
<td>V.W., Ford, G.M</td>
<td>90</td>
</tr>
<tr>
<td>INDIA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

i) Cars

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>Maruti Udyog Ltd., Hindustan Motors, Premier Automobile</th>
</tr>
</thead>
</table>

ii) Commercial vehicles (medium & heavy)

| 2                        | Telco, Ashok Leyland     |

Note: Maruti Udyog is a recent entrant but has now the largest share.

Source: 1) Bhasker K, (1980) ibid pp 57
2) Automotive Industry of India, Facts & Figures, 1988
The quality of the product also depends on the users. In India due to low levels of income, the demand for cars was restricted and as such vehicles were also maintained for a very long period as the age

61) "... ultimately the demand for quality derives from the consumer and in particular from the nuisance the consumer experiences when a product is treated as though it were good and it turns out unexpectedly to be bad. The intensity of the consumer demand for getting quality influences the standards imposed by the final producers upon his own suppliers, and so on down the chain of supply."
This was exemplified by the Japanese case.
"The keen quality consciousness observed in both ancillary and primary firms under study may be ascribed also to the specific historical circumstances surrounding their industry. At the very early stage of its development, the market was occupied by a limited number of wealthy people who vied with each other in driving a better car, but cared little for the cost. The development of the local automobile industry was afterwards directed and supported by the Army, which perpetually acted as the patron of the industry in the pre-war decades. What this generous buyer wanted was a better (or more durable) vehicle even if at a higher cost".

62) INDIA'S PER CAPITA NET NATIONAL PRODUCT (NNP)

<table>
<thead>
<tr>
<th>Year</th>
<th>At 1970-71 prices Rs.</th>
<th>Index number of per capita NNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-51</td>
<td>466</td>
<td>100</td>
</tr>
<tr>
<td>1960-61</td>
<td>558.7</td>
<td>119.9</td>
</tr>
<tr>
<td>1970-71</td>
<td>632.8</td>
<td>135.8</td>
</tr>
<tr>
<td>1980-81</td>
<td>698.3</td>
<td>149.8</td>
</tr>
</tbody>
</table>

composition of the vehicles would reveal. So both demand and supply factors were compounded together in keeping the passenger car sectors at obsolete levels of technology.

In India, problems of both quality and cost emerged soon after the grant of protection. There were several complaints arising out of failure of inspection at the works. The problem was more severe in respect of quality in the case of the firm which had gone for extensive indigenisation. Such quality related

<table>
<thead>
<tr>
<th>Age category</th>
<th>Public sector</th>
<th>Private sector</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3 years</td>
<td>21</td>
<td>43</td>
<td>34</td>
</tr>
<tr>
<td>4 - 9 years</td>
<td>51</td>
<td>39</td>
<td>44</td>
</tr>
<tr>
<td>10 - 14 years</td>
<td>18</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Above 14 years</td>
<td>10</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

100 100 100

Source: Automobile Statistical People (1985), Table 19.38

Commenting about the HML, the Tariff commission (1956) noted "the company had begun to make fuller use of castings from its own foundry. No other firm had got on to the state of using indigenous castings. The complaints are unfortunate especially as this company has been pioneering in auto manufacturing in India and has established the largest measure of indigenous manufacture in passenger vehicles". Para 16.3.
problems however, were not merely a part of 'teething problems' of an infant industry. Instead it got built into the industry. Such poor quality was not the result of absence of equipment or other wherewithals to ensure better standard and quality. On the contrary with the facility available with the manufacturers they could have produced cars of good quality. Poor quality consciousness among the primary producers meant that it would permeate ancillary / subcontracting activities as well. This again differs from the Japanese experience, where further vertical disintegration took place after having reached international standards in respect of quality. (65) For extensive subcontracting to take place as in Japan a high quality consciousness on the part of the primary producers is essential. Otherwise subcontracting for mere reduction of cost, cannot bring about the close linkages as obtained in Japan.

65) "It was only in early and mid 1960s, when the product quality of the first-tier ancillary firms approximated contemporary international standards and customer grew cost-conscious that many of the firms shifted emphasis from quality to cost. More specifically, it was around this period that many first-tier ancillary firms resumed diversification and began to be more active in utilising second-tier subcontractors". Odaka K, et al, (1988), ibid. pp. 277.
In Japan precedence was given to quality over cost in the beginning. This concern towards quality was spurred by the desire to achieve international competitiveness. However, in India, the provocation for the Tariff Commission enquiry in 1956 was due to the all round increase in costs that had taken place. The domestic manufacturing programmes was slow, yet the price was rising. Instead of attempting to cut costs the manufacturers were attempting to make more than one vehicle. The manufacturers did not make attempt to draw upon the resources of ancillary manufacturers for the supply of a variety of finished and semi-finished components, which would have enabled them to reduce costs and develop the industry.

In India the realisation about the need for improving the efficiency in the automobile sector came with the establishment of the public sector project for
passenger cars. (66) This is primarily being attempted by infusing imported technology. But without a substantial effort at raising the technological capability, the industry can move only in discrete steps in a state of continuous technological dependence. There are certain basic limiting factors operating in the industry. The market constraint is the important factor in India. The Japanese industry could overcome the market problem not only via exports but also by increasing domestic sales, as a result of the improvements in the overall economy. This can be seen from the following table.

66) "The models of the car manufactured by M/S Hindustan Motors Ltd. and M/S Padmini Automobiles have remained practically unchanged for 25 years. It was only in 1977 that these companies were given permission for import of designs, drawings and specifications manual for improving the design of the body. Further, no new license were issued nor was permission accorded to the existing production units to increase their capacity. Only recently Government have come to realise the importance of the passenger car industry in the economic growth of the country and in the generation of employment opportunities - both direct and indirect". Estimates Committee (1983-84), Seventh Lok Sabha, 83rd Report.
Table 3-4

DOMESTIC SALES OF VEHICLES

<table>
<thead>
<tr>
<th>Year</th>
<th>Cars</th>
<th>Commercial Vehicles</th>
<th>All Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MCV &amp; HCV</td>
<td>LCV</td>
</tr>
<tr>
<td>1950</td>
<td>2221</td>
<td>1891 *</td>
<td>63654 @</td>
</tr>
<tr>
<td>1960</td>
<td>18937</td>
<td>25162 *</td>
<td>2355 *</td>
</tr>
<tr>
<td>1970</td>
<td>35728</td>
<td>36354 *</td>
<td>4619 *</td>
</tr>
<tr>
<td>1980</td>
<td>31048</td>
<td>48889</td>
<td>19503</td>
</tr>
<tr>
<td>1984</td>
<td>62220</td>
<td>59046</td>
<td>31744</td>
</tr>
</tbody>
</table>

Note: @ relates to 1951, * refers to production

Source:
2) The Automobile Industry Statistical Profile (1985)

In Japan the industry overcame the problems of a small market for cars and the complexity in automobile manufacture in a small market by concentrating on the production of trucks. (67) It is the passenger car

67) "The history of the automobile industry in Japan is full of innovations - not so much in product technology, where they were largely unnecessary due to the advanced state of the industry elsewhere, as in manufacturing strategy, productive management and quality control. But even in vehicle design it took imagination to make a truck into a car after World War II, a time when foreign automakers treated trucks and cars as totally separate products. This was a simple but practical response to the situation Japanese automakers found in the 1950s. They had accumulated experience in making trucks for the military, but not in making cars, and they had little money to design or manufacture components for separate car and truck lines".

sector where there has been rapid technological developments. Hence the technological gap has been much wider in the case of the passenger car sector in India. However, technological improvements are basically a response to demand conditions and this has been a major drawback in the industry. However, the state of technology in the commercial vehicle sector is better than that of passenger cars even though this sub-sector has also been facing a stagnant market in recent years.

In the Indian automobile industry, the primary producers who were having the benefit of a protected market did not face the kind of compulsions that the Japanese industry had for improving cost and quality. While capital shortage had resulted in the Japanese industry adapting technology to their local factor endowments, in the case of the Indian industry it was more of a mere transplantation of the imported technology. Further, as Branson (68) points out the

68) “Various incentive systems, import licensing regimes, and foreign supplier credits have also had an impact upon technological choice. Investment incentives, in the form of income tax allowances for contd."
kind of import substitution policy resulted in increasing the capital intensity in production. A study of the Japanese subcontracting system reveals that it is not an ad-hoc measure for cost reduction but is an integrated system of management. For such a system to develop not only must there be compelling economic reasons but also the capability to run the system on efficient lines. India's record on the technology front is rather poor especially in the light of the spectacular successes achieved by the Japanese industry. For instance, in the passenger car sector nothing was done towards upgrading the technology. The problem of static technology was compounded by quality related problems and rising price. This was in no small measure due to the absence of competition both

68) contd.

profits reinvested in capital equipment or accelerated amortization allowances, may have resulted in a higher degree of capital intensiveness than would otherwise be the case. In many instances, the regime of import licensing designed to protect domestic manufacturers also forces foreign procurement of larger or more costly equipment than is needed. This is often the case with heavier machine tools that are not on a restricted list as are the lighter domestically manufactured varieties. Similarly, the availability of certain foreign supplier credits is likely to induce excessive expenditure on capital goods."

Branson, J. (1971) ibid. pp.16
external and internal. Externally, imports of cars was banned and internally there were only two manufacturers of any consequence.

The technological status in respect of commercial vehicles was somewhat better. The pace of technological development is also much faster in passenger cars than trucks. Further, probably the fact that the two commercial vehicle producers Telco and Ashok Leyland also had financial participation (it was only minor in case of Telco) with their foreign principals, helped in better assimilation of technology. Telco even assembles CKD parts for trucks in other developing countries such as Indonesia, Guyana, Egypt etc. Telco's performance is attributed to the importance given to the development of its capital goods section. Although in existence for more than 30 years Telco's plant and machinery have an average life which works out to only 5 years and much of it represents the latest in technology.(69)

The technological changes in the automobile industry in the world is taking place at a rapid rate that the Indian firms are highly unlikely to keep pace with the same. Moreover, the introduction of technological changes also need huge financial commitment. (70) A comparison of the R & D expenditure of the automobile industry in India and other countries as shown in Table 3-4 would make this evident.

70) "The imported technology has been assimilated and adapted to suit Indian conditions. But technological dynamism which will enable the country to push forward the technology frontier does not appear to have been achieved. Two factors can be identified as causes for this state of affairs. The pace with which the technology frontiers moves forward in the automobile industry is too fast for the Indian industry to keep up or overtake. The other is that India simply does not have enough resources to do it".
Table 3-§

R & D EXPENDITURE OF SELECTED AUTOMOBILE COMPANIES IN THE U.S., JAPAN AND INDIA

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>R &amp; D expenditure</th>
<th>R&amp;D expenditure on a % of sales</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNITED STATES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) General Motors</td>
<td>1980</td>
<td>2234</td>
<td>3.9</td>
</tr>
<tr>
<td>2) Ford Motors</td>
<td>1980</td>
<td>1675</td>
<td>4.5</td>
</tr>
<tr>
<td>3) Chrysler</td>
<td>1980</td>
<td>278</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>JAPAN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Toyota Motors</td>
<td>1979</td>
<td>433.3</td>
<td>3.7</td>
</tr>
<tr>
<td>5) Nissan Motors</td>
<td>1979</td>
<td>375.0</td>
<td>3.3</td>
</tr>
<tr>
<td>6) Mitsubishi</td>
<td>1979</td>
<td>179.1</td>
<td>4.0</td>
</tr>
<tr>
<td>7) Honda Motors</td>
<td>1979</td>
<td>158.3</td>
<td>3.6</td>
</tr>
<tr>
<td>8) Isuzu</td>
<td>1979</td>
<td>77.5</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>INDIA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9) Telco</td>
<td>1982-83</td>
<td>5.8</td>
<td>2.7</td>
</tr>
<tr>
<td>10) Premier Auto.</td>
<td>1982-83</td>
<td>1.6</td>
<td>1.3</td>
</tr>
<tr>
<td>11) Ashok Leyland</td>
<td>1982-83</td>
<td>1.6</td>
<td>0.4</td>
</tr>
<tr>
<td>12) Bajaj Auto.</td>
<td>1982-83</td>
<td>0.9</td>
<td>0.6</td>
</tr>
</tbody>
</table>


The technological sophistication in the industry is such that the Indian industry can hardly keep pace. There are limitations even in the absorption of the imported technology in production, management and systems. This has resulted in a situation characterised by technological dependence. This
dependence is especially manifested in the spate of foreign collaboration, (Annexure 3-3) mostly with Japanese collaborators, which was the only way for upgrading technology in the industry. Thus after more than three decades of existence, the automobile industry in India has merely shifted its reliance on imported technology from the occident to Japan. The problem of static technology was due to the inability of the Indian automobile industry to get full mileage from their foreign collaborators. Adequate attention was not paid to ensure the fullest backing and collaboration of the foreign firm in carrying out a programme of domestic manufacture. The narrow domestic market and absence of competition, were other factors which dampened the efforts at technological upgradation. The Indian automobile industry was almost a domestic affair and insulated from the winds of change across the globe.

Here again there is a vivid contrast to the Japanese situation. The Japanese firms which had negotiated knocked down assembly of foreign vehicles could achieve near autonomy in the production of parts and passenger
car designs within five years. In each case the design was modified to meet the local needs. Hino, for instance evolved a heavier and more rugged car to suit Japan’s rough roads. The dynamism in the Japanese automobile industry in respect of technology is also due to the linkages with ancillary firms. Odaka, notes that in the 1970s when the public became increasingly intolerant of automobile accidents and environmental pollutions, representatives from the government, primary firms and ancillary firms organised a joint research group to study safety standards and emission control. As the government had set very strict standards on emission level the manufacturers had to evolve new designs to qualify. Later this gave the Japanese industry, a non-price competitive advantage in the international market.

However, in India, with limited cooperation between the primary and ancillary firms no such advantage could be got. The problem of keeping up with the technological pace is certainly therefore aggravated by the absence of linkages between the primary and ancillary firms. Lacking the dynamism of the Japanese automobile
industry, the Indian automobile industry continues to be more dominant in the replacement market. The replacement market in fact can provide the initial stimulus for growth as even the primary producers can take advantage of the same. (71) Although these large ancillary firms supply to the primary producers also, it is not as a subcontractor but as a transaction in the market. These large independent ancillary firms in India belong to important industrial groups and are comparable in size with the primary producers. In fact the relationship between the primary producers and the independent large ancillaries has been marked by tension. The primary producers who were subject to scrutiny for their performance had tried to absolve themselves by raising the issue of the performance of these ancillaries in turn, in terms of price and

71) "The existence (or the potential) of replacement demand is certainly a factor that will invite development of smaller ancillary firms including "backyard operators", although it does not necessarily exclude the possibility of the entry of primary firms into the markets".

Again, "There are a number of critical factors that have contributed to the expansion of the domestic market for motor cars. To begin with, note that the role of the spare parts market was relatively greater in the earlier stages of the growth of the industry until domestic demand for automobile gained momentum".

quality. (72) The ancillaries, on their part had the grievance that continuous orders were not being placed on them which disrupted their production schedule. (73) More recently, in the wake of the spate of technical collaboration in the primary producers, further differences arose in respect of the technological capability of the ancillary sector. (74) The ancillary firms initially resisted the idea of entering into fresh collaboration agreements in order to supply to the primary producers who had gone for technological upgradation. But ultimately, the threat of new firms

72) The Tariff Commission (1968) Automobile Ancillaries, was asked to investigate whether there was any substance in the complaints made by the auto manufacturers that the prices charged by them was excessive for original equipment. The Tariff Commission, however, concluded that the prices were not exhorbitant.

73) Tariff Commission (1968), Automobile Ancillaries, ibid.

74) "From time to time considerable criticism is heard with respect to vehicle quality. Unfortunately, there is a tendency to ascribe the problem in large measure to the quality of the automotive components. A.C.M.A. believes that this is a most unlikely source of complaints, since the components first go through strict quality checks by the component manufacturers and then undergo a further incoming quality inspection by the vehicle manufacturer". Automobile Component Manufacturers Association (ACMA), (1984), "Automotive Component Industry - strategies for growth".
under a liberalised policy of the government, forced the existing ancillaries to change their position. Some details in this regard may be seen in Annexure 3-4.

The scenario in the Indian automobile has not changed substantively despite the influx of fresh technology. The entry of the public sector project, once again demonstrates the technological weakness of the industry as indigenisation programme is slow. More importantly, it has had no impact in terms of subcontracting, although there is a government policy favouring the same. In fact the commencement of a public sector project in collaboration with a Japanese firm, can provide a fresh impetus for subcontracting.

The parallel functioning of primary producers and independent ancillaries in India implied that unlike in Japan subcontracting could not develop into a network of hierarchical structure, where there are first-tier ancillaries of the status of transnational firms. In India, the independent ancillary firms themselves
performed the function of a primary producer in respect of subcontracting. Both the primary producers and the large ancilliaries had developed subcontractors but it could not evolve into a cohesive system. In the absence of the important linkage between the primary producer and the large component producers, the development of subcontracting in India could not go very far.

In the final analysis, it is only when the primary producers develop in the right direction as manufacturers that a meaningful decision in respect of subcontracting can be taken. The high speed growth in Japan implied that the domestic manufacturing programme in the automobile industry had to move at an accelerated pace. This resulted in their making a conscientious choice of subcontracting as an effective supportive system. But in India, the final assemblers were none too anxious to hasten the domestic manufacturing programme. While initially there would have been certain handicaps in terms of technology the Indian automobile industry did not make serious efforts in improving their technological status. Instead it
has taken the soft option of depending on foreign technology and given the protected market and their oligopolistic structure, there is little incentive for improvements in quality or cost reduction. A heavy casualty in the process was subcontracting, which in order to be fostered along the lines obtained in the Japanese industry, requires a dynamic primary producer, technologically progressive and with a keen sense of competition.